

9-1

Facts About the Onset of Brain and Heart Diseases Due to Overwork and Investigative Research on the Background Factors

— Preventing Onset of Brain and Heart Diseases Caused by Overwork (Karoshi) —

Field name "Brain and heart disease caused by overwork (karoshi: death from overwork)"

We investigated what kind of influence the quantitative and qualitative burden of work on workers has on the onset of brain and heart diseases using 3,200 employees of the Japan Labour Health and Welfare Organization as the subjects of this investigation^{1, 2}. Over a 5 year average observation period, we observed the onset of brain and heart diseases in 35 people (23 males and 12 females), and the annual incidence rate per 1000 people was 3.5 males and 1.2 females.

When we investigated the relationship between the quantitative and qualitative workloads and the onset of

Table 10. Relationship Between Quantity of Workload and Brain and Heart Disorders

| | Acquired vacation | Length of business trip (days) |
|---|-------------------|--------------------------------|
| Patient without complications (n=2,130-2,293) | 9.0 | 3.0 |
| Patient with complications (n=34-35) | 6.7 | 5.2 |
| p value | 0.0442 | 0.0802 |

brain and heart diseases, we found a relationship among the conditions regarding the acquired vacation time (Table 10), low practical use of technical skill, and the level of control of work (Table 11).

We also investigated the relationship between the quantitative and qualitative workloads and carotid hardening lesions and that between the reoccurrence of coronary lesions in patients with acute myocardial infarction and the character traits that indicate onset^{1, 2}.

Table 11. Relationship Between Quality of Workload and Brain and Heart Disorders(Partial NIOSH Occupational Stress Questionnaire)

| | Low practical use of technical skill | Control of work (Level of discretionary authority) |
|---|--------------------------------------|--|
| Patient without complications (n=2,294) | 8.1 | 47.6 |
| Patient with complications (n=33) | 9.5 | 42.9 |
| p value | 0.0074 | 0.0331 |

Least square average based on by sex and age

References:

- 1) Nanto S., et al.: Research, development, and dissemination of facts and background factors concerning the onset of brain and heart disease from overwork, Research report. The Japan Labour Health and Welfare Organization, Clinical Research Center for Brain and Heart Diseases in Workers, 2008.
- 2) Nanto S., et al.: Preventing onset of brain and heart disease caused by overwork (karoshi) – the significance of occupational stress. The Japan Labour Health and Welfare Organization, Clinical Research Center for Brain and Heart Diseases in Workers, 2008.

9-2

Relationship Between Worker Overtime and the Conditions That Sustain Metabolic Syndrome

— Long Work Hours the Cause of Metabolic Syndrome —

Field name "Brain and heart disease caused by overwork (karoshi: death from overwork)"

In order to investigate the relationship between an excessively heavy work load and the onset of metabolic syndrome, we conducted a study using the employees of The Japan Labour Health and Welfare Organization for whom the BMI and blood data were clear. We targeted 2,108 employees that had overtime in the previous year. We investigated the influence of the onset risk of metabolic syndrome and premetabolic syndrome on the group that had

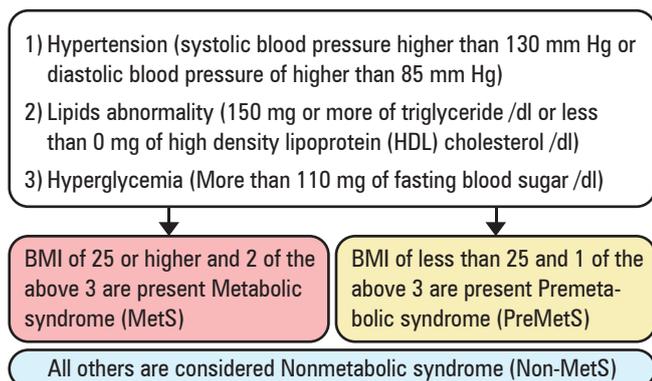
worked overtime (Table 12)^{1, 3}.

Figure 29 shows frequency distributions for metabolic syndrome, premetabolic syndrome and non-metabolic syndrome based on overtime classification. The figure shows that if overtime exceeds 500 hours there is an increasing trend in the frequency distribution of the metabolic syndrome and premetabolic syndrome groups.

We also clarified that if overtime exceeds 500 hours



Table 12. Definition of Metabolic Syndrome and Pre-metabolic Syndrome Groups



per year, the risk to the under 40 and 40 to 44 age group increases (Table 13).

These results show that the number of working hours has a significant influence on the onset of metabolic syndrome and that in addition to overeating, lack of exercise, and stress, working hours is a contributing factor to the cause of metabolic syndrome. In the future, we need to investigate the influence that long working hours has on overeating, lack of exercise, and stress (Figs. 30 and 31).

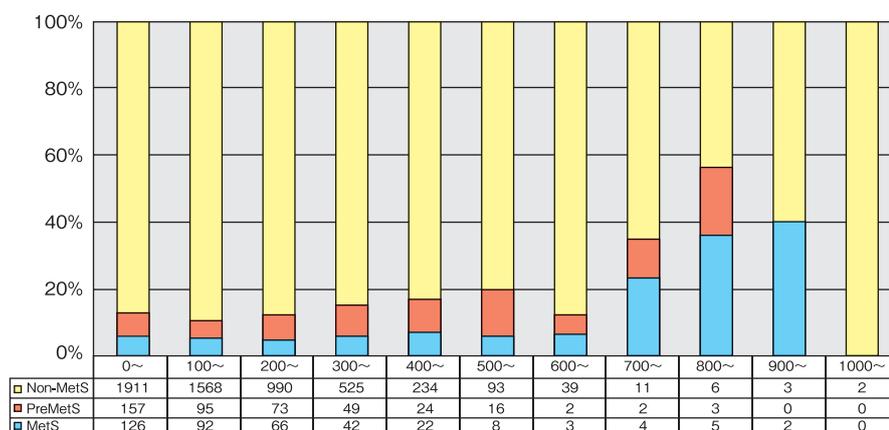


Fig. 29. Relationship among yearly overtime and the group that became afflicted with metabolic syndrome (MetS) the following year, the Premetabolic syndrome group (PreMetS), and the Non-metabolic syndrome (Non-MetS) group.

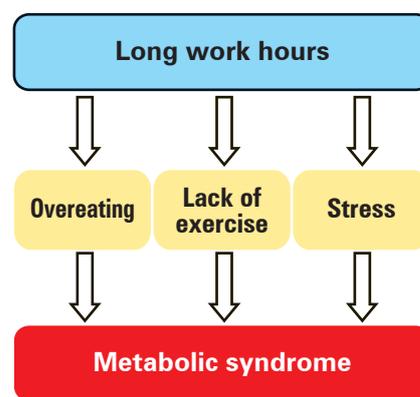


Fig. 30. Onset mechanism for metabolic syndrome in the workplace

Table 13. Onset Odds Ratio for Metabolic Syndrome and Pre-metabolic Syndrome Group Based on More Than or Less Than 500 hours of Overtime

| Age | Metabolic syndrome classification | Less than 500 hours overtime | More than 500 hours overtime | Chi-square Distribution p value | Odds ratio (95% Confidence interval) |
|----------|-----------------------------------|------------------------------|------------------------------|---------------------------------|--------------------------------------|
| Under 40 | Mets or PreMets | 141 (8.8%) | 18 (25.0%) | $p < 0.001$ | 3.442 (1.965, 6.030) |
| | Non-Mets | 1,456 (91.2%) | 54 (75.0%) | | |
| 40 ~ 44 | Mets or PreMets | 240 (13.1%) | 17 (28.8%) | $p < 0.001$ | 2.682 (1.502, 4.787) |
| | Non-Mets | 1,590 (86.9%) | 42 (71.2%) | | |



Fig. 31. Image depicting the cause of the onset mechanism for metabolic syndrome in the workplace

References:

3) Munakata M.: Investigative research on the relationship between worker overtime and the onset of metabolic syndrome – long work hours the cause of metabolic syndrome. The Japan Labour Health and Welfare Organization, Clinical Research Center for Brain and Heart Diseases in Workers, 2008.

* Reference 1 can be viewed at <http://www.research12.jp/h13/index2.html>, a site dedicated to the research and development, and dissemination projects related to the 13 fields of occupational injuries and illnesses.

* References 2 and 3 can be viewed at <http://www.research12.jp/h13/index.html>, a site dedicated to the research and development, and dissemination projects related to the 13 fields of occupational injuries and illnesses.