

Japanese perspective of future worklife

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The Japanese employment system is characterized by lifetime employment, a seniority wage system, and personnel training. Under the lifetime employment system, workers take jobs with an enterprise upon completion of schooling and continue working for the company until retirement age. This form of employment has been adopted by almost all Japanese enterprises as a custom and is not prescribed by law. Under the seniority wage system, salaries and position rise with the length of service within the company. Many companies promote colleagues simultaneously for the first 10 to 15 years after they enter the company without considering the workers' individual performance. The education system includes on-the-job training where experienced employees teach younger employees while actually working; there is also a job rotation system which calls for employees who are expected to be skilled generalists with work experience in many areas of the company. Under such an employment system, the length of service within a company is very important for the worker, and long-term service within a company is advantageous to

the worker, while switching jobs is very disadvantageous since the worker's previous experience is not sufficiently valued by the new employer. Younger workers accept their relatively low salaries but expect a rise in salary and position with age. Under such work conditions, Japanese workers have a sense of their company being a family and regard the development of the company in the same manner as the development of their lives. Loyalty to the company is also essential. The husband is devoted entirely to his job, while his wife is in charge of the household, child rearing, parent nursing, and local social relationships, and of course husband care. This Japanese employment system was very effective during the post-war economic rehabilitation period and has greatly contributed to the high economic growth in Japan by suppressing lay-offs during recessions.

In this paper, I report the results of a study on the influence of this employment system on the health of workers, on perspectives of the future worklife of Japanese workers, and on possible measures for promoting the health of workers.

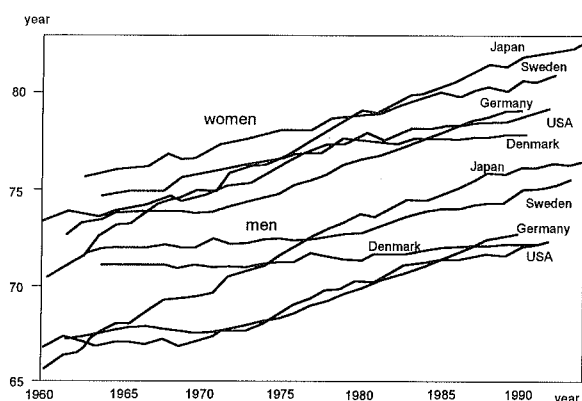


Figure 1. International comparison of life expectancy.

Current health status of Japanese workers

Statistical evidence indicating a high standard of health internationally

A comparison of life expectancy among several countries (figure 1) shows that both Japanese men and women have the longest life expectancy. Regarding mortality from ischemic heart disease, which is one of the most significant causes of death in developed countries, the male age-adjusted death rate in 1990 (1) was 28 per 100 000 of the population, which was very low compared with that in the United States (151/100 000). Infant mortality is also the lowest in the world. Furthermore,

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other behavioral indices closely related to health, including crime rate and drug abuse are fairly low (2). These figures are statistical evidence. However, it has not been clearly defined which factor(s) contribute to such positive health indices in Japan. As shown in developed countries, the rise in the standard of living might influence the disease structure in Japan, early mortality from infectious diseases such as tuberculosis having been greatly decreased. Another important factor might be a well-balanced diet. The traditional Japanese meal had insufficient protein and fat, but had high salt. In the Westernization process, it became richer in protein and fat and less salty, but not too rich in fat. These effects are very clearly reflected in the trends of death rate from cerebrovascular disease, which has dramatically decreased after around 1970 in spite of the aging of the population. In addition, the Japanese education system and even the distribution of wealth (3, 4) may contribute to the positive health outcome. In fact, rising income levels in Japan have made higher education more popular. The proportion of students entering high school has grown dramatically in the postwar era, exceeding 90% in 1974, and reaching 95.7% in 1994 (5). The distribution of wealth has reduced intersocial class or interregional disparities. Disparities in per capita income between prefectures in Japan, for instance, began to decline after 1961. In figure 2, the horizontal axis is average per capita prefectural income in 1955, and the vertical axis is income growth between 1955 and 1992 (5). The poorer the prefecture in 1955, the greater its income growth. After all, high economic growth and the rise in the standard of living provided by the Japanese employment system are very important underlying factors in the high standard of health in Japan.

Long workhours and death from overwork

Since 1970, more than a few *karoshi* cases have been reported. *Karoshi* is defined as "a permanent disability or death brought on by worsening high blood pressure or arteriosclerosis resulting in disease of the blood vessels in the brain such as cerebral hemorrhage, subarachnoid hemorrhage and cerebral infarction and acute heart failure and myocardial infarction induced by conditions such as overwork" (6). The results of a study (7) that analyzed 203 *karoshi* cases demonstrated that the key issue in these cases was long workhours. In about two-thirds of these cases (131 cases), long workhours (> 60 h/week) or excessive overtime (> 50 h/month) or holiday work more frequent than half of the scheduled holidays per month were reported.

Figure 3 shows the number of male employees whose mean weekly workhours exceeded 60 hours (more than 3120 workhours per year) (8). As shown in the figure, approximately 2 450 000 employees worked more than 60 hours a week in 1950. The number increased suddenly after 1975, and reached 6 850 000 in 1988 and 1989. The proportion of workers with long workhours was one-fourth in 1988 (24%) and one-sixth in 1993 (17%).

Figure 4 shows the results of two surveys on total annual workhours (8–10). One survey was the Labor Survey compiled by the Management and Coordination Agency (8), and the other was the Monthly Labor Survey of the Ministry of Labor (9). There is a consistent difference between the two figures. It was mainly due to underestimation by the enterprises in the latter survey. The difference might contain so-called service overtime (overtime work without pay), *furoshiki zangyo* (overtime work at home), and overtime work of the intermediate

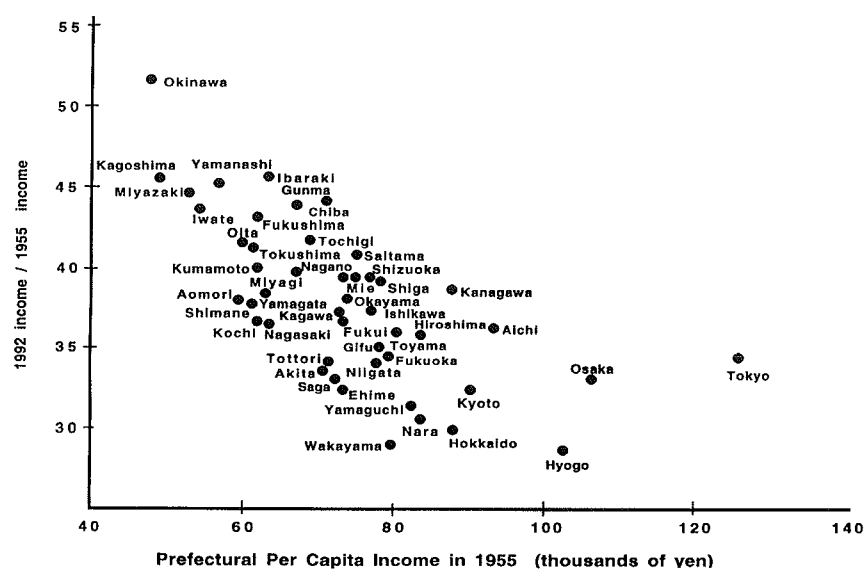


Figure 2. Changes in prefectural per capita income.

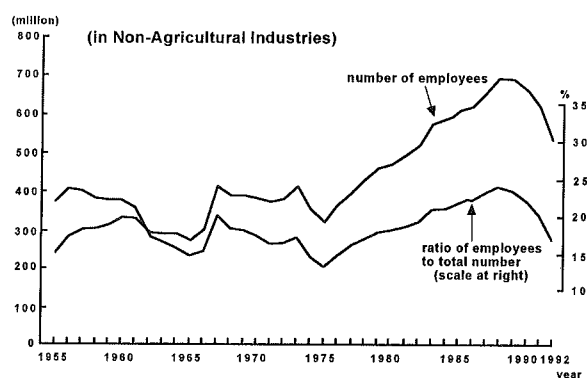


Figure 3. Changes in the number of employees working over 60 hours per week.

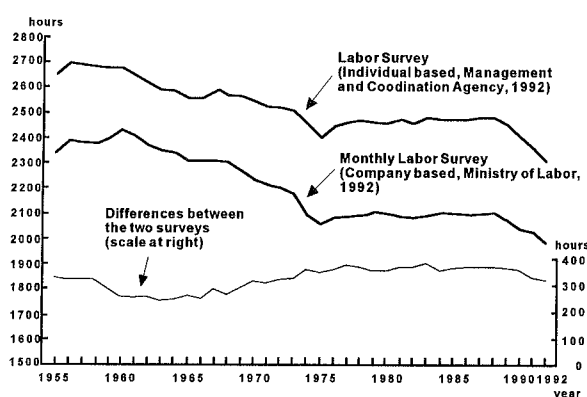


Figure 4. Total annual workhours in two surveys.

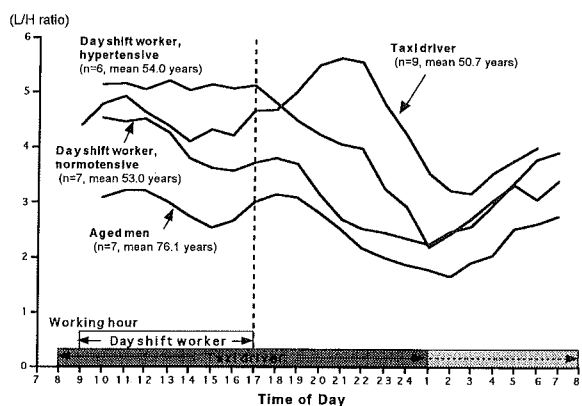


Figure 5. Changes in sympathetic nervous activity (3-point moving average). (L/H ratio = the ratio of low-frequency components to high-frequency component)

management class, which was not included in the latter figure. This form of overtime work accounted for 360 hours per year (30 h/month, 1.5 h/day) on the average. Thus, during the recessions due to two oil-shocks and the strong yen, Japanese companies confronted the recessions by demanding long workhours while restructuring the company. Thereafter, during the business upturn, em-

ployees were forced to work considerable overtime. As a concomitant factor, we can point out the long commuting time that precedes and follows a long workday. The work conditions with long workhours are undoubtedly the background of *karoshi*. However, the pathological mechanisms underlying death from overwork are not clear.

We investigated the influence of long workhours on the autonomic nervous system. We took Holter electrocardiographic records, and changes in the R-R interval and the time course were analyzed by a complex demodulation method (11–13). The amplitudes of the high-frequency components (central frequency 0.3 Hz) were used as the parameter of the parasympathetic activity, and the ratio of low-frequency components (central frequency 0.09 Hz) to a high-frequency component (L/H) as the parameter of sympathetic activity. Normotensive male taxi drivers ($N = 9$, mean age 50.7 years, workhours from 0800 to 0800, including naps after 0100) representative of workers with long workhours (14) were compared with normotensive ($N = 7$, mean age 53.0 years), and borderline hypertensive ($N = 6$, mean age 54.0 years) dayshift workers (workhours from 0900 to 1700) and normotensive retired men ($N = 7$, mean age 76.1 years). Figure 5, shows that the sympathetic nervous activities of the workers with long workhours (taxi driver) persisted until night. This pattern differed from that of the dayshift workers, who showed a decline starting around the time work ended. Parasympathetic activity was suppressed in taxi drivers until late at night (data is not shown). Although we did not evaluate hypertensive taxi drivers, more significant increases in sympathetic nervous activities and suppressed parasympathetic nervous activities would be anticipated in such a population.

Thus long workhours may cause the development or worsening of serious diseases (and their worsening) such as cardiovascular disease through multiple routes involving the autonomic nervous system and endocrine system.

From these results, it has been pointed out that the traditional Japanese employment system has brought a very satisfactory health condition to Japanese workers on the one hand, but it has caused several health problems related to long workhours on the other.

Changes in the Japanese work environment

The Japanese work environment will unavoidably be changed in the future. In this section, I present the main factors causing such changes and the anticipated effects.

Rapid growth of the aged population

The Japanese population is rapidly aging. The problem is that the rate of aging of its population is rising very

rapidly. For example, in Japan, the proportion of the population over 65 years of age doubled from 7% to 14% during the past 24 years; this period is short when compared with that of 85 years in Sweden and that of 115 years in France (15). Changes and the future estimation of the ratio of the dependent population to the productive population in Japan (16) are shown in figure 6. Mainly due to the rapid growth of the aged population, the ratio of the dependent population will increase, and Japan will be the country with the highest percentage of the dependent population index by 2010. Under these circumstances, maintaining the seniority wage system will be somewhat difficult, and changes in the employment system in favor of evaluating each employee's ability and credentials will be unavoidable. Development of a suitable work environment for aged workers who show significant differences in abilities and physical strength is urgent.

Working women

The second factor is working women. Figure 7 shows changes in the labor force participation rate for women in Japan (17). The curve shows a characteristic "M" shape, with a decrease between 25 to 35 years of age and thereafter an increase. This tendency reflects the tendency for women 25 to 35 years of age to leave their jobs for marriage, children, and child rearing. In 1990, the labor force participation rate for women aged 40 to 54 years increased, showing a tendency toward female participation in the labor market. The female work environment has gradually been improved by the Equal Employment Opportunity Law between men and women in 1986, and the Child-Care Leave Law in 1992. There still remains many problems for women to take full-time jobs.

Figure 8 shows the results of a time study on the dual-income family (18). The figure shows a clear difference between husband and wife in housekeeping, child rearing, nursing, and leisure time, demonstrating the heavy burden on wives. In addition, improving the work environment to be fit for women, social back-ups for child rearing and the home care of elderly parents would be necessary, since these tasks have been carried out mainly by housewives.

Other factors

The Japanese employment system will be forced to change not only by the described biological factors, but also by other social factors, including the internationalization of companies, changes in work-style due to the introduction of high technology into the workplace, such as computers, and especially the restructuring of the organization. The "project system" has been suggested as a model, where workers are employed for a certain period of time to accomplish a limited project and the project team is dissolved as soon as the predefined results are

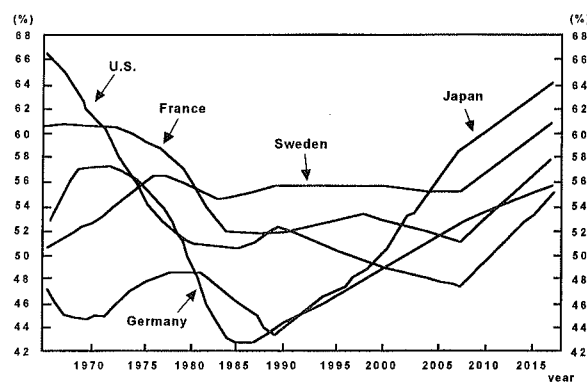


Figure 6. Dependent population ratio (1965–2020).

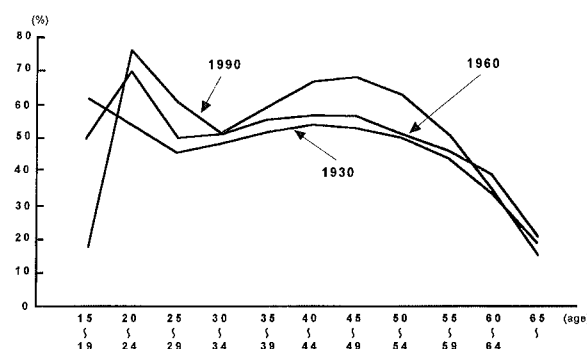


Figure 7. "M" shaped labor force participation rate of women (1930–1990).

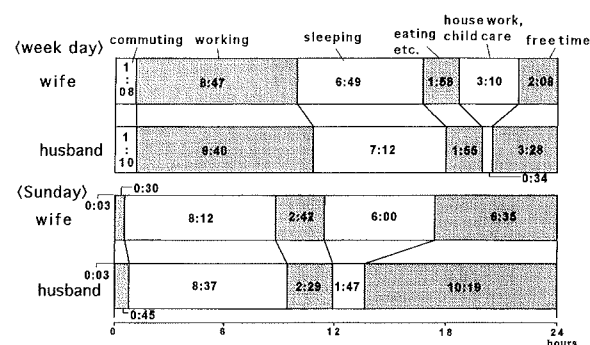


Figure 8. Daily schedule of full-time working women.

obtained. Along with these changes in the work environment, workers are expected to change their life-style as "company people" to a style that pays greater attention to personal life.

Health promotion in the workplace

Figure 9 shows a scheme for changes in the roles of wives and husbands. Traditionally, men work outside and women stay home caring for children or parents.

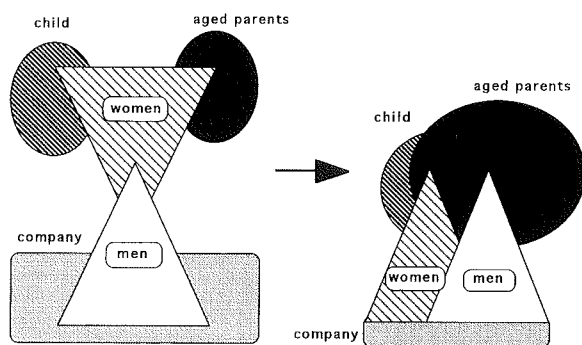


Figure 9. Changes in the roles of wife and husband.

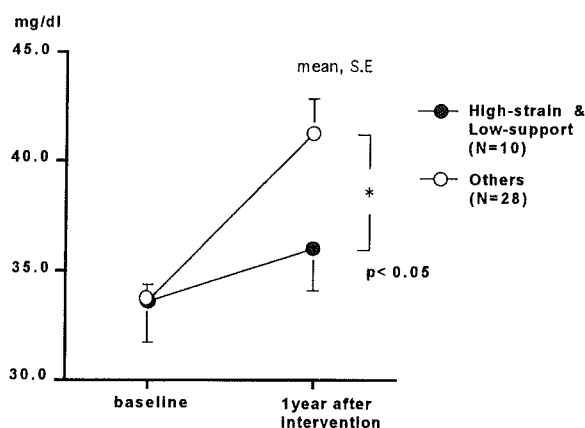


Figure 10. Changes in the level of high-density lipoprotein cholesterol.

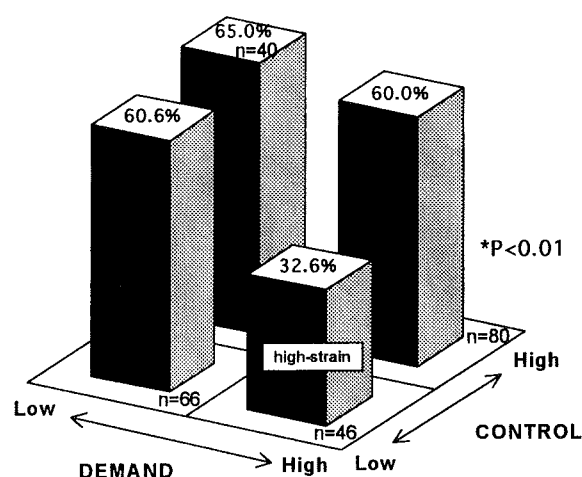


Figure 11. Job strain and exercise habit.

Men could devote themselves to their work because they were almost completely free from the duties at home. In the future, however, they should equally share in household work. The support function among family members will decline because of the wife's participation in the work force. In addition, the introduction of a flexible employment system will gradually weaken the ties be-

tween companies and individual workers. Companies will not be able to offer comprehensive support as they used to. These changes might be disadvantageous for workers' health. In order to prevent undesirable worsening of health conditions as a consequence of these changes, an integrated health policy should be applied. Increasing social capitals related to public life-style is one of the most urgent tasks. For instance, sufficient welfare facilities or health services need to be arranged.

Within the workplaces, to date, Japanese companies have conducted various health promotion programs in accordance with the Labor Security and Health Law, such as an annual health check and early detection and treatment of diseases. In addition, the Ministry of Labor advocated the "total health promotion plan" as defined in the 1988 amendment of the Labor Security and Health Law, which requires employers to endeavor continuously to promote employees' health. In programs of the total health promotion plan, after the measurement and analysis of the health conditions of each employee, health education, exercise guidance, diet education, and psychological counseling are carried out by health care staff. Since most chronic diseases, for example, cardiovascular diseases, are highly correlated with one's life-style, such as eating habits and exercise, the total health promotion plan promotes health by improving employees' life-style in these areas. In such activities, however, job stress has emerged as a key issue. Figure 10 shows an example of applying the total health promotion plan to workers with obesity or mild hyperlipidemia and low levels of high-density lipoprotein cholesterol (<35 mg/dl) mainly through diet education and exercise guidance (19). Job stress was evaluated by the job content questionnaire developed by Karasek (20), and the subjects were classified according to the demand-control-support model proposed by Johnson (21) before intervention with the total health promotion plan. The results were compared with those obtained one year after the intervention. The improvement in the level of high-density lipoprotein cholesterol in the group with high scores for job strain and isolation was significantly lower than that of the other group. Figure 11 shows the relation of job strain and the prevalence of exercise habit (22). The proportion of those with positive exercise habits in the high-strain group was significantly lower than that in the other groups. Furthermore, job stress was significantly correlated with depressive symptoms. Thus it was clear that health status was greatly influenced by job stress. A schematic diagram of these relationships is shown in figure 12. If there is stress in the workplace, the health status of workers decreases and becomes less responsive to improvements initiated through individual-based intervention. Furthermore, decreases in health status caused by aging would be more significant in such an environment. Although traditional job stress measures in the workplace have been mainly

individual-based, such as training in coping, relaxation, counseling, or mental health care, a more environmental and health promotion-oriented approach should be used. And when the health-related activities in progress in the workplace (ie, health care, total health promotion plan, job stress measures, and promotion of a comfortable work environment) are closely integrated, the results will be promising (figure 13). In Japan, about 65% of the total labor population works for small-scale enterprises which employ fewer than 50 workers (23). The occupational health services for workers in such small-scale enterprises tend to be inadequate when compared with that in large enterprises. For example, the implementation percentage of regular medical examinations drops as the size of the enterprise becomes smaller or the percentage of enterprises with an occupational physician increases in accordance with the size of the enterprise (24). Therefore, the suggested integrated health promotion activities should be expanded to small- and medium-size enterprises.

Concluding remarks

Although the Japanese employment system is characterized by lifetime employment, a seniority wage system and educational opportunities have greatly contributed to the improvement of health status by increasing the standard of living through rapid economic growth. *Karoshi* also became a problem because of the long workhours and disturbance in the autonomic system. The employment system will unavoidably be changed by the rapid growth of the aging population, participation of women, globalization, and structural changes due to the development of the information system. In the future, integrated health promotion programs in the workplace will need to be conducted both individually and comprehensively, and the activities should be expanded to even smaller scale enterprises.

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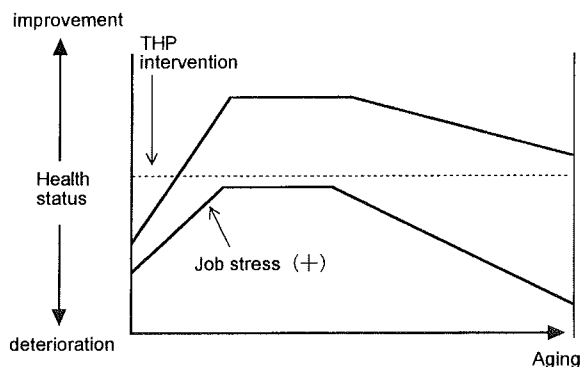


Figure 12. Effects of job stress on the course of the total health promotion (THP) plan.

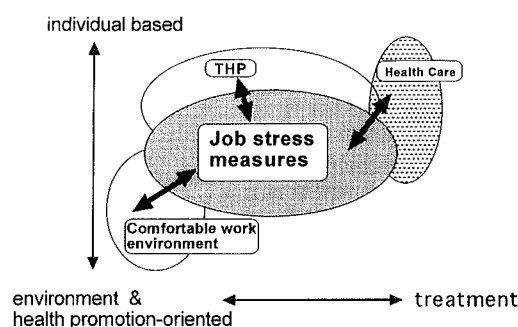


Figure 13. Integration of health policies in the workplace. (THP = total health promotion)

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