

Cost-benefit Analysis of Comprehensive Mental Health Prevention Programs in Japanese Workplaces: A Pilot Study

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Abstract: We examined the implementation of mental health prevention programs in Japanese workplaces and the costs and benefits. A cross-sectional survey targeting mental health program staff at 11 major companies was conducted. Questionnaires explored program implementation based on the guidelines of the Japanese Ministry of Health, Labor and Welfare. Labor, materials, outsourcing costs, overheads, employee mental discomfort, and absentee numbers, and work attendance were examined. Cost-benefit analyses were conducted from company perspectives assessing net benefits per employee and returns on investment. The surveyed companies employ an average of 1,169 workers. The implementation rate of the mental health prevention programs was 66% for primary, 51% for secondary, and 60% for tertiary programs. The program's average cost was 12,608 yen per employee and the total benefit was 19,530 yen per employee. The net benefit per employee was 6,921 yen and the return on investment was in the range of 0.27–16.85. Seven of the 11 companies gained a net benefit from the mental health programs.

Key words: Mental health, Workplaces, Costs, Cost-benefit analysis, Prevention programs

In 2008, Yokoyama *et al.* estimate that the social cost of mental disorders in Japan, in 2008, was about 11 trillion yen. Presenteeism and increasing absenteeism and suicide caused declines in labor productivity accounting for about 60% of mental disorder social costs¹⁾. In 2006 the Japanese Ministry of Health, Labour and Welfare developed Guidelines for the Maintenance and Promotion of Workers' Mental Health (hereafter referred to as Guidelines) for companies nationwide²⁾. The Guidelines promote a

three-tiered comprehensive mental health program. This program includes checkups and workplace improvements at a primary prevention level, mental health checkups and counseling for secondary prevention, and disease management and rehabilitation support at a tertiary prevention level. In 2010, just over half, (50.4%) of 5,250 Japanese companies workplaces tried to develop mental health programs. Primary prevention programs were frequently implemented³⁾.

Seven cost-benefit analysis reports calculated (in monetary terms) increasing productivity and decreasing absenteeism resulting from mental health programs. However, none of these studies are intracorporate. Many

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Japanese companies have introduced Employee Assistance Programs (EAP), targeting primary prevention⁴). Improvements to work environments have also been introduced. Cost-benefit analysis shows that similar programs have different costs and benefits⁵). However, only the partial efforts of employees in a few companies were studied. Tange *et al.* reported no relationship between the number of comprehensive mental health care activities and stress-related diseases or rates of extended leave⁷). Tsuchiya *et al.* indicated that no Japanese program has decreased absenteeism⁸). Kono reported that an increase in part-time psychotherapists and full-time industrial doctors within companies increased mental health patient numbers and treatment costs⁹).

Therefore, no program has effectively decreased employee numbers on administrative leave or the period of absence. It is unclear which Guideline program is most effective. Using previous research, this study sought to clarify which Guideline programs should be emphasized so as to most effectively decrease the number of employees on administrative leave or the period of absence. An assessment of the programs was conducted analyzing their costs and benefits.

A cross-sectional survey targeting staff in charge of mental health services within 11 companies was conducted from December 2011 to December 2012. The survey questionnaire included a range of discussions and items. Subjects were asked about their business categories and employee numbers. Using the Guidelines, we established 36 items concerning the implementation status of mental health prevention programs. Five items examined primary prevention: health committee discussions, new employee and manager health education, leaflet distribution, and workplace reviews. Seven items concerned secondary prevention, including mental health checkups, interviewing overworked employees, and introducing hospital services to employees. Tertiary prevention questions to assess the worsening of symptoms of employees at work contained six items, including periodic interviews with industrial doctors and health nurses, information exchanges with industrial and family doctors, and job transfer assistance by personnel management officers. On-leave employee programs had six items, including periodic interviews with industrial doctors and health nurses, evaluations on the employees' fitness to return to work, management interviews, and rehabilitation preparation. Return to work programs included industrial doctors checking patient conditions, assessments on the person's ability to continue working, and restrictions on their work. The implemen-

tation of 15 outsourcing activities were surveyed. To investigate the labor costs of persons in charge of mental health checks, we asked about their job categories, staff numbers and the hours required for mental health checks, and annual salaries. Absentee numbers and total days' absence were used as indicators of effective mental health programs.

The labor cost of the person in charge of mental health was calculated by multiplying their annual salary by the hours spent providing mental health evaluations. Mental health absence rates were calculated by multiplying absentees by the number of mental health evaluations. Cost-benefit analyses were conducted from the company's viewpoint. According to the labor market theory of Pauly *et al.*, a loss of working days means a daily loss of wages, including welfare expenses¹⁰). Therefore, a loss caused by an absence is counted as lost work time and days. The benefit of absenteeism is that companies are not required to compensate employees on the day of their absence. Using Leon's example, we divided the average monthly salary by monthly work days, and multiplied it by the ratio of compensation for workplace absence, working days, and number of absences¹¹). We established the monthly average salary of a male office worker in a major company as 386.1 thousand yen¹²). In accordance with Health Insurance Law, compensation rates for absence were set at two-thirds the average salary. The number of working days was calculated using the working condition survey from the Ministry of Health, Labour and Welfare. Working days were set at 243.0 days. This was established by taking 365 days and subtracting 113.0 (annual holiday days), and 8.6 (annual leave days in Japan during 2011)¹³). The working day absences were calculated by subtracting administrative leave days per absentee in each company from 243.4 days. The absentee rate was calculated for each company. The benefit of work attendance for mental discomfort was calculated by multiplying the number of employees participating in secondary and tertiary prevention programs, by income per day and by 243.0 days less medical examination days, and then multiplied by the production capacity factor. The friction cost method was used to calculate income per day by dividing 386.1 thousand yen, (the average monthly salary for a major company employee), by 20.6 (the average monthly working days)¹⁴). There were 26.8 medical examination days. This was established by dividing 365 by 13.6, which according to a 2008 patient survey is the average number of medical examination days of asylum patients suffering psychiatric conditions, including depression. Basing our work on the studies of

Table 1. Implementation status of mental health prevention programs at surveyed companies

| | Mean | SD | Mini.value | Max.value |
|--|-------------|-------------|------------|--------------|
| Total number of employees | 5,543.1 | 10,481.6 | 380.0 | 36,000.0 |
| Total number of targeted employees | 1,169.5 | 1,364.7 | 130.0 | 4,500.0 |
| Implementation rate of primary prevention programs (%) | 65.5 | 15.7 | 40.0 | 80.0 |
| Implementation rate of secondary prevention programs (%) | 48.1 | 26.6 | 14.0 | 100.0 |
| Implementation rate of tertiary prevention programs (%) | 58.3 | 22.4 | 13.0 | 83.0 |
| Implementation rate of prevention programs before absenteeism (%) | 63.7 | 27.7 | 17.0 | 100.0 |
| Implementation rate of prevention programs during absenteeism (%) | 61.4 | 28.2 | 0.0 | 100.0 |
| Implementation rate of prevention programs before return to work (%) | 48.9 | 26.5 | 0.0 | 75.0 |
| Implementation rate of prevention programs after return to work (%) | 63.6 | 23.4 | 33.0 | 100.0 |
| Annual duty hours of industrial doctors | 238.9 | 304.0 | 0.0 | 945.0 |
| Annual duty hours of occupational health nurses and nurses | 571.8 | 903.8 | 0.0 | 2,880.0 |
| Annual duty hours of other occupation staff members | 200.7 | 344.8 | 0.0 | 950.0 |
| Annual activity hours of health committee × number of members | 33.0 | 44.2 | 0.0 | 130.0 |
| Annual activity hours of council × number of members | 46.2 | 109.9 | 0.0 | 360.0 |
| Annual interview hours of managers | 5.7 | 12.0 | 0.0 | 36.0 |
| Annual interview hours of laborers and personnel management officers | 3.6 | 5.4 | 0.0 | 13.5 |
| Total duty hours of persons in charge | 1,046.2 | 1,322.8 | 51.6 | 4,706.4 |
| Labor cost (yen) | 7,418,765.5 | 6,998,949.0 | 25,270.0 | 18,958,167.0 |
| Outsourcing cost (yen) | 967,854.5 | 1,553,063.3 | 0.0 | 4,000,000.0 |
| Material cost and overhead (yen) | 1,258,365.5 | 2,611,948.0 | 0.0 | 7,500,000.0 |
| Total cost (yen) | 9,644,985.5 | 6,751,744.9 | 193,000.0 | 20,279,566.0 |
| Cost per targeted employee (yen) | 12,608.2 | 9,101.4 | 508.0 | 28,611.0 |
| Number of absentees | 7.4 | 7.8 | 1.0 | 25.0 |
| Total days of absence | 880.6 | 743.7 | 60.0 | 2,454.0 |
| Average days of absence per employee | 135.9 | 56.0 | 60.0 | 247.0 |
| Number of attendees with mental discomfort | 13.2 | 11.3 | 1.0 | 42.0 |
| Rate of employees with mental discomfort (%) | 0.020 | 0.019 | 0.003 | 0.069 |
| Rate of absenteeism (%) | 0.007 | 0.003 | 0.003 | 0.012 |

N=11.

Uegaki¹⁵⁾ and others, we counted productivity of healthy employees as one. The productivity of employees with mental illness was 0.8, and their associated productivity was 0.2. We calculated net benefit, subtracting the benefit of one person from the cost of the mental health program. Also, we calculated the ratio of benefit to investment (the return on investment: ROI). Return on investment = (gain from investment – cost of investment)/ cost of investment. Companies were divided into two groups: companies with an ROI of more than one and those with an ROI of less than one. We then examined the difference between the mental health programs in the two groups. IBM SPSS STATISTICS Ver. 20 was used for analysis.

The average total number of employees in each company was 5,543. The average total number of workers in each company targeted by mental health prevention programs was 1,169. There were 11 target companies including six wholesale dealers, three transportation companies,

and two production companies.

The average implementation rate of primary prevention programs were 65.5% (3.3 item of the 5 primary prevention measures), secondary programs undertaken for 48.1% (3.4 item of the 7 measures), and tertiary programs undertaken for 58.3% (14.1 item of the 24 measures) (Table 1). The average annual hours for mental health programs were: 238.9 h for part-time industrial doctors; 571.8 h for occupational health and general nurses; and 200.7 h for psychotherapists and associated professionals.

The annual average number of employees on administrative leave with mental discomfort was 7.4 for the 11 companies. The annual average leave period of an employee with mental discomfort was 135.9 days. The average number of employees with mental illness but still attending work was 13.2. The average ratio of attendance for employees with mental discomfort was 0.020. The average ratio of employees on administrative leave was 0.007.

Table 2. Company-classified costs and cost-benefits

| Company | Number of targeted employees | Productivity of attendees with mental discomfort (yen) | Saved leave compensation (yen) | Total benefit (yen) | Benefit per employee (yen) | Cost per employee (yen) | Net benefit (yen) | ROI |
|---------|------------------------------|--|--------------------------------|---------------------|----------------------------|-------------------------|-------------------|-------|
| A | 1,269 | 4,886,331 | 3,851 | 5,535,537 | 4,362 | 15,981 | -11,619 | 0.27 |
| B | 398 | 814,388 | 2,046 | 3,139,864 | 7,889 | 28,611 | -20,722 | 0.28 |
| C | 400 | 8,143,885 | 20,360 | 8,143,885 | 20,360 | 23,563 | -3,203 | 0.86 |
| D | 4,500 | 15,473,381 | 3,439 | 17,608,660 | 3,913 | 4,115 | -202 | 0.95 |
| E | 450 | 8,958,273 | 19,907 | 9,994,636 | 22,210 | 18,849 | 3,361 | 1.18 |
| F | 2,918 | 17,102,158 | 5,861 | 18,942,179 | 6,491 | 5,163 | 1,329 | 1.26 |
| G | 500 | 10,587,050 | 21,174 | 12,090,875 | 24,182 | 13,243 | 10,939 | 1.83 |
| H | 1,469 | 34,204,316 | 23,284 | 35,460,214 | 24,139 | 8,528 | 15,611 | 2.83 |
| I | 130 | 7,329,496 | 56,381 | 9,249,219 | 71,148 | 17,063 | 54,084 | 4.17 |
| J | 450 | 8,143,885 | 18,098 | 9,708,573 | 21,575 | 3,066 | 18,508 | 7.04 |
| K | 380 | 2,443,165 | 6,429 | 3,251,292 | 8,556 | 508 | 8,048 | 16.85 |
| Mean | 1,169 | 10,735,121 | 16,439 | 12,102,267 | 19,530 | 12,608 | 6,921 | 1.55 |

The average cost savings of the mental health programs for the 11 companies was 19,530 yen per worker targeted by mental health prevention programs. As Table 2 shows, while the cost per worker targeted by mental health prevention programs was 12,608 yen, the average net benefit was 6,921 yen. ROI ranged from a minimum 0.27 to a maximum of 16.85. Seven of the 11 companies experienced a net benefit from the mental health programs. Similarly, seven of the 11 companies gained a ROI greater than one. Tertiary prevention programs were more commonly implemented (31% higher use rate) by companies with a ROI over one compared with companies with a ROI under one (Table 3). Prevention programs were used more frequently before employees took leave and before returning to work. Implementation rates were high for combined primary, secondary, and tertiary prevention programs. The total annual cost of prevention programs was significantly smaller for companies with a ROI over one. The rate of absenteeism was also 0.004% higher than for companies with a ROI less than one. As Table 3 shows, the net benefit of companies with a ROI over one was significantly higher (24,919 yen) compared with companies with a ROI under one.

This study's respondents were employees of major companies. Major companies are defined as those employing more than 300 people. They account for 0.2% of all Japanese companies. All 11 respondent companies conducted their own mental health programs. The 2010 Japan Institute for Labour Policy and Training Survey found that 52.7% of companies with more than 300 employees³⁾. The survey conducted by Tange *et al.* also showed that primary prevention programs (including training and development,

company policy implementation, and counseling referrals) were more common than other programs. However, no reports detail the entire implementation status for each stage, from primary to tertiary prevention. Respondent companies to our survey implemented 65.5% of primary prevention programs, 48.1% of secondary programs, and 58.1% of tertiary programs. This confirms that comprehensive prevention programs were implemented based on the Guidelines previously described.

A survey of five companies by Nagata *et al.* found that program costs ranged from 64 to 13,903 yen per employee, with the average cost being 2,963 yen per employee⁶⁾.

This study shows that both costs and benefits differ significantly across companies. Four companies out of 11 had a ROI less than one. This suggests that ROIs tend to be influenced by the mental health prevention program costs of a company and by the differences among various programs. This is because specific implementation methods are not detailed in Japan. The Guidelines only provide mental health program outlines from primary to tertiary prevention. Therefore, these programs do not have specific effects because companies use various approaches. Previous studies assessed the introduction of particular programs into several companies. Using Mental Health Improvement and Reinforcement Research Recognition (MIRROR), the cost-benefit was positive in just two of the five companies surveyed⁶⁾. Therefore, the EAP's net benefit was 6,440,000 yen and its ROI was 1.4⁴⁾. As shown above, the same intervention tools do not always offer benefits to companies. In the West, some external workplace interventions reduce absenteeism, thus offering significant benefits. We believe that Japanese companies

Table 3. ROI comparison of the mental health prevention programs implementation status

| | | Mean | SD | T | p-value | 95% CI |
|--|--------|------------|------------|-------|---------|--------------------------|
| Implementation rate of primary prevention programs (%) | ROI>=1 | 71.4 | 15.7 | 1.86 | 0.096 | -3.5 – 36.4 |
| | ROI<1 | 55.0 | 10.0 | | | |
| Implementation rate of secondary prevention programs (%) | ROI>=1 | 55.1 | 29.2 | 1.19 | 0.266 | -17.6 – 56.4 |
| | ROI<1 | 35.8 | 18.5 | | | |
| Implementation rate of tertiary prevention programs (%) | ROI>=1 | 69.6 | 15.0 | 2.95 | 0.016 | 7.2 – 54.9 |
| | ROI<1 | 38.5 | 19.9 | | | |
| Implementation rate of prevention programs before absenteeism (%) | ROI>=1 | 76.3 | 23.2 | 2.43 | 0.038 | 2.4 – 66.7 |
| | ROI<1 | 41.8 | 21.6 | | | |
| Implementation rate of prevention programs during absenteeism (%) | ROI>=1 | 71.4 | 22.5 | 1.71 | 0.121 | -8.9 – 64.3 |
| | ROI<1 | 43.8 | 31.5 | | | |
| Implementation rate of prevention programs before return to work (%) | ROI>=1 | 62.6 | 19.1 | 3.07 | 0.013 | 9.9 – 65.3 |
| | ROI<1 | 25.0 | 20.4 | | | |
| Implementation rate of prevention programs after return to work (%) | ROI>=1 | 71.4 | 23.0 | 1.56 | 0.153 | -9.6 – 52.5 |
| | ROI<1 | 50.0 | 19.6 | | | |
| Average implementation rate of prevention programs (%) | ROI>=1 | 67.6 | 9.6 | 3.27 | 0.010 | 7.6 – 41.6 |
| | ROI<1 | 43.0 | 15.6 | | | |
| Total cost of prevention program (yen) | ROI>=1 | 6,640,926 | 5,741,853 | -2.35 | 0.043 | -16,199,916 – 322,410 |
| | ROI<1 | 14,902,089 | 5,301,830 | | | |
| Rate of employees with mental discomfort (%) | ROI>=1 | 0.026 | 0.021 | 1.49 | 0.171 | -0.009 – 0.042 |
| | ROI<1 | 0.010 | 0.010 | | | |
| Rate of absenteeism (%) | ROI>=1 | 0.008 | 0.002 | 2.64 | 0.027 | 0.001 – 0.007 |
| | ROI<1 | 0.005 | 0.002 | | | |
| Productivity of attendees with mental discomfort (yen) | ROI>=1 | 12,681,192 | 10,448,926 | 0.92 | 0.380 | -7,767,286 – 18,470,678 |
| | ROI<1 | 7,329,496 | 6,202,198 | | | |
| Saved leave compensation (yen) | ROI>=1 | 21,591 | 16,861 | 1.54 | 0.157 | -6,600 – 34,933 |
| | ROI<1 | 7,424 | 8,659 | | | |
| Total benefit | ROI>=1 | 14,099,570 | 10,496,866 | 0.94 | 0.372 | -7,721,329 – 218,706,495 |
| | ROI<1 | 8,606,987 | 6,339,501 | | | |
| Benefit per employee | ROI>=1 | 25,472 | 21,455 | 1.44 | 0.183 | -9,284 – 41,966 |
| | ROI<1 | 9,131 | 7,694 | | | |
| Cost per employee (yen) | ROI>=1 | 9,489 | 7,078 | -1.62 | 0.139 | -20,545 – 3,387 |
| | ROI<1 | 18,068 | 10,652 | | | |
| Net benefit | ROI>=1 | 15,983 | 17,892 | 2.56 | 0.031 | 2,873 – 46,966 |
| | ROI<1 | -8,937 | 9,224 | | | |

ROI>=1 N=7, ROI<1 N=4.

need to collect evidence of effective primary, secondary, and tertiary mental health programs. Furthermore, they need to promote training to acquire skills to help other companies succeed in addressing workplace mental health issues.

In a cross-sectional study, Tsuchiya et al. conducted logistic regression analysis examining the comprehensive mental health services in 171 companies. Findings indicated that nurses, management training, a gradual return to work, and knowledge of the availability of an EAP significantly and positively reduced sick leave. Alternatively, no programs negatively impacted a return to work or increased sick leave or retirement. Tange *et al.* did not

find a negative relationship between the number of mental health activities, the number of patients with stress-related conditions, and extended sick leave. Our study compared the implementation rates of tertiary prevention programs (before sick leave and on return to work) with the average implementation rates of companies with a ROI over one and of those with a ROI less than one. Companies with a ROI over one showed higher implementation rates than those with a ROI below one. Among the surveyed companies, companies with a ROI over one had 12 less absentee days per employee compared with companies with a ROI below one. This result suggests that if employees with mental discomfort continue to work and do not take

temporary leave, are aggressively encouraged to return to work, and are in an environment that has been prepared for an easy transition back to work, then their absenteeism can be decreased and benefits to the company can be increased. Although most of the cost relates to employment expenses, companies with a ROI over one use full-time occupational health nurses who enhance their tertiary prevention programs and lower costs. The lower costs result in significantly higher net benefits (24,919 yen) for companies with a ROI over one compared with those with a ROI under one. Further assessment of the particularly effective mental health methods used by companies in Japan is required. Training on a consistent level should also be developed for industrial doctors, occupational health nurses, and personnel management officers.

This study excludes medical costs including office visits, hospitalizations and commuting costs to hospitals. Furthermore, tax reductions resulting from decreased salaries are not included in the cost-benefit evaluation. However, these costs should be included to assess cost-benefits from a social perspective. Moreover, this study's respondents were only drawn from major companies that were implementing a significant number of mental health programs during the study period. Therefore, our data cannot be generalized to all Japanese companies because the data were taken from convenience samples. Further examination of more Japanese companies is required. A specific cause-and-effect relationship between ongoing programs and employees on leave cannot be established because this study is a 2010 cohort study.

This study explores the implementation status of mental health programs across 11 major Japanese companies examining the relationship between cost and absenteeism. The implementation rate of primary prevention programs was 65.5%, of secondary programs was 48.1%, and of tertiary programs was 58.3%. The average benefit of the mental health program per employee was 19,530 yen and the average cost per employee was 12,608 yen. The average net benefit was 6,921 yen and the average ROI was 1.55. Seven companies had a ROI higher than one. These companies, when compared with companies with a ROI less than one, had significantly higher tertiary prevention program implementation rates, substantially lower total costs. This study suggests that the engagement of occupational health nurses lowers employment costs while enhancing the implementation of tertiary prevention programs, and that this may lead to reduced absenteeism and increased benefits.

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