

Table 1. Prevalence of primary health condition of participants

	Male		Female	
	Primary health condition chosen		Primary health condition chosen	
	n	%	n	%
Age 18–29 (yr)	(n=340)		(n=749)	
Back or neck disorders	67	19.7	207	27.6
Depression, anxiety, or emotional disorders	57	16.8	84	11.2
Migraine or chronic headaches	25	7.4	76	10.1
Stomach or bowel disorders	31	9.1	70	9.3
Insomnia	20	5.9	32	4.3
Age 30–39 (yr)	(n=763)		(n=737)	
Back or neck disorders	224	29.4	190	25.8
Depression, anxiety, or emotional disorders	102	13.4	114	15.5
Migraine or chronic headaches	44	5.8	56	7.6
Stomach or bowel disorders	51	6.7	46	6.2
Insomnia	39	5.1	29	3.9
Age 40–49 (yr)	(n=867)		(n=513)	
Back or neck disorders	212	24.5	165	32.2
Depression, anxiety, or emotional disorders	115	13.3	60	11.7
Migraine or chronic headaches	44	5.1	30	5.8
Stomach or bowel disorders	74	8.5	24	4.7
Insomnia	45	5.2	22	4.3
Age 50–59 (yr)	(n=565)		(n=466)	
Back or neck disorders	120	21.2	143	30.7
Depression, anxiety, or emotional disorders	43	7.6	23	4.9
Migraine or chronic headaches	17	3	19	4.1
Stomach or bowel disorders	44	7.8	28	6
Insomnia	19	3.4	9	1.9

for women was \$10.8 (20–29 yr old), \$12.7 (30–39 yr), \$13.2 (40–49 yr), and \$12.5 (50–59 yr). All analyses were performed using IBM SPSS Statistics 19.

The data collection was approved by ethical committees: Research A, B, and C by Osaka University, Japan; Research D and E by the International University of Health and Welfare, Japan; and Research F by Kitasato University School of Medicine, Japan.

Results

Table 1 shows the prevalence of conditions. The leading primary health condition was back or neck disorders in all age groups. The prevalence of depression, anxiety, or emotional disorders was 13.3–16.8% (males) and 11.2–15.5% (females) among those aged 18–49, the prevalence of depression, anxiety, or emotional disorders among those in their 50s was 7.6% (males) and 4.9% (females).

Table 2 (males) and Table 3 (females) show the days absent, the wage loss due to absenteeism, the loss of working hours due to presenteeism, and the wage loss due to

presenteeism over the previous 4-wk period. The leading cause of absenteeism and presenteeism due to the primary health condition varied by gender and by age. For men aged 18–39 yr, the leading cause of absenteeism was depression, anxiety, or emotional disorders, and the leading cause of presenteeism was migraines or chronic headaches. For men in their 40s, the leading cause of absenteeism was stomach or bowel disorders, while the leading cause of presenteeism was depression, anxiety, or emotional disorders. For men in their 50s, the leading cause of absenteeism was insomnia, while the leading cause of presenteeism was depression, anxiety, or emotional disorders. In all age groups, the leading cause of wage loss due to absenteeism and presenteeism was depression, anxiety, or emotional disorders. For women, the leading cause of absenteeism was stomach or bowel disorders, while the leading cause of presenteeism was depression, anxiety, or emotional disorders for those aged between 18–39 yr. For women in their 40s, the leading cause of absenteeism and presenteeism was depression, anxiety, or emotional disorders. For women in their 50s, the leading cause of absenteeism was

Table 2. Days of absenteeism and lost hours due to presenteeism, with the estimated wage loss for male workers over the previous 4-wk period (n=1,393)

	Days absent due to primary health condition (d)		Wage loss due to absenteeism over 4 wk per person through the primary health condition (US\$)		Loss of working hours due to presenteeism (h)		Wage loss due to presenteeism per person through the primary health condition (US\$)		Wage loss due to absenteeism and presenteeism through the primary health condition (US\$)	
	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)
Age 18–29 (yr)										
Back or neck disorders	1.6	(0.5–2.6)	150	(50–249)	35.6	(29.0–42.2)	426	(347–504)	575	(465–686)
Depression, anxiety, or emotional disorders	2.4	(0.9–3.9)	228	(83–373)	43.5	(35.0–52.0)	520	(419–622)	748	(610–887)
Migraine or chronic headaches	1.2	(0.1–2.3)	115	(8–222)	49.5	(38.2–60.9)	592	(456–728)	707	(582–831)
Stomach or bowel disorders	2.2	(0.3–4.2)	213	(28–397)	39.4	(28.8–50.0)	471	(345–597)	684	(498–869)
Insomnia	0.6	(0.0–1.9)	57	(0–177)	43.8	(32.4–55.2)	524	(388–660)	581	(429–733)
Age 30–39 (yr)										
Back or neck disorders	2.2	(1.5–2.9)	289	(199–380)	35.9	(32.3–39.6)	596	(535–657)	885	(794–976)
Depression, anxiety, or emotional disorders	4.8	(3.4–6.3)	641	(447–835)	50	(42.8–57.1)	828	(710–946)	1469	(1,316–1,621)
Migraine or chronic headaches	2.4	(0.7–4.1)	316	(93–540)	52	(39.9–64.1)	862	(662–1,063)	1179	(947–1,410)
Stomach or bowel disorders	2.1	(0.8–3.3)	273	(107–439)	45.1	(36.9–53.4)	748	(611–885)	1021	(842–1,200)
Insomnia	1.8	(0.4–3.2)	238	(58–418)	44	(37.0–51.0)	729	(613–846)	967	(804–1,130)
Age 40–49 (yr)										
Back or neck disorders	2.3	(1.6–3.0)	392	(268–516)	34.2	(30.6–37.9)	731	(652–809)	1123	(1,001–1,244)
Depression, anxiety, or emotional disorders	3.6	(2.4–4.7)	607	(410–804)	45.2	(39.6–50.7)	965	(846–1,083)	1572	(1,408–1,736)
Migraine or chronic headaches	2.4	(0.6–4.2)	411	(110–713)	40.2	(29.0–51.3)	858	(619–1,096)	1269	(949–1,589)
Stomach or bowel disorders	4.5	(2.9–6.1)	771	(492–1,049)	33.4	(25.8–40.9)	712	(551–873)	1483	(1,239–1,726)
Insomnia	3.3	(1.3–5.3)	565	(224–907)	35.9	(28.4–43.4)	766	(605–927)	1331	(1,047–1,616)
Age 50–59 (yr)										
Back or neck disorders	2.0	(1.2–2.8)	344	(202–487)	30.9	(26.9–34.9)	674	(587–761)	1019	(874–1163)
Depression, anxiety, or emotional disorders	5.2	(2.9–7.5)	912	(510–1,315)	40.1	(30.0–50.2)	874	(654–1,094)	1787	(1,446–2,127)
Migraine or chronic headaches	5.2	(1.3–9.1)	913	(231–1,595)	31.6	(17.8–45.4)	690	(388–991)	1603	(1,046–2,159)
Stomach or bowel disorders	4.4	(2.5–6.3)	769	(433–1,105)	26.4	(21.0–31.9)	577	(457–696)	1346	(1,056–1,635)
Insomnia	5.8	(1.6–9.9)	1010	(286–1,734)	31.5	(19.9–43.0)	687	(435–938)	1697	(1,127–2,266)

CI: confidence Interval, 1 US\$=117 yen.

migraines or chronic headaches, while the leading cause of presenteeism was insomnia. As with males, the leading cause of wage loss due to absenteeism and presenteeism for females in all age groups was depression, anxiety, or emotional disorders.

Table 4 (males) and Table 5 (females) show the wage loss assuming 100 workers per 10-yr age group over the previous 4-wk period. Assuming 100 workers in each age band and considering the prevalence and wage structure differences by age, the total wage loss due to absenteeism and presenteeism through the primary health condition was high for back or neck disorders. The exception to this was males in their 20s, whose highest mean wage loss was for depression, anxiety, or emotional disorders. The mean total wage loss due to absenteeism and presenteeism through depression, anxiety, or emotional disorders was high among men in their 40s and women in their 30s. Assuming 100 workers per 10-yr age band, the proportion of wage loss of the total wage owing to back or neck disorder was 5.9–9.8% for men and 6.5–9.8% for women;

the proportion of wage loss of the total wage as a result of depression, anxiety, or emotional disorders was 3.9–7.4% for men and 2.4–6.1% for women.

Discussion

This study aimed to determine the wage loss in work performance due to absenteeism and presenteeism using five chronic conditions that are potentially comorbid with depressive symptoms among working populations in Japan: back or neck disorders; depression, anxiety, or emotional disorders; migraines or chronic headaches; stomach or bowel disorders; and insomnia. This is the largest study to date determining the economic impact of presenteeism and absenteeism using individual data for workers in Japan. The leading cause of absenteeism and presenteeism varied by gender and by age. For males and females of all ages, the greatest economic impact due to the primary health condition was caused by depression, anxiety, or emotional disorders; among the 100 people in each age

Table 3. Days of absenteeism and lost hours due to presenteeism with the estimated wage loss for female workers over the previous 4-wk period (n=1,427)

	Days absent due to primary health condition (days)		Wage loss due to absenteeism over 4 wk per person through the primary health condition (US\$)		Loss of working hours due to presenteeism (h)		Wage loss due to presenteeism per person through the primary health condition (US\$)		Wage loss due to absenteeism and presenteeism through the primary health condition (US\$)	
	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)	Mean	(95% CI)
Age 18–29 (yr)										
Back or neck disorders	1.8	(1.2–2.5)	159	(104–215)	35	(31.6–38.3)	379	(343–415)	538	(483–594)
Depression, anxiety, or emotional disorders	2.4	(1.3–3.6)	211	(112–309)	52.5	(45.9–59.1)	569	(498–640)	780	(695–864)
Migraine or chronic headaches	2	(0.9–3.0)	172	(80–264)	40.4	(35.1–45.7)	438	(380–496)	610	(528–693)
Stomach or bowel disorders	3.4	(1.7–5.0)	292	(149–434)	32.2	(26.7–37.6)	349	(290–408)	641	(518–763)
Insomnia	0.8	(0.0–2.0)	73	(0–178)	43.6	(36.1–51.0)	472	(391–553)	545	(433–657)
Age 30–39 (yr)										
Back or neck disorders	1	(0.6–1.4)	101	(57–145)	32.2	(29.7–34.8)	409	(376–441)	510	(459–560)
Depression, anxiety, or emotional disorders	2.2	(1.1–3.2)	221	(116–325)	45.4	(21.2–59.5)	576	(514–638)	797	(706–888)
Migraine or chronic headaches	1.2	(0.3–2.2)	123	(27–219)	37.3	(40.6–50.3)	473	(392–554)	596	(491–701)
Stomach or bowel disorders	3.3	(1.3–5.2)	331	(131–531)	29.9	(30.9–43.6)	379	(312–446)	710	(547–873)
Insomnia	2.5	(0.3–4.7)	255	(33–478)	36.3	(24.6–35.1)	461	(345–576)	716	(514–919)
Age 40–49 (yr)										
Back or neck disorders	2	(1.2–2.8)	210	(125–295)	33.1	(29.3–36.9)	438	(388–488)	648	(569–726)
Depression, anxiety, or emotional disorders	2.6	(1.3–4.0)	279	(139–418)	51.3	(42.2–60.5)	679	(559–800)	958	(824–1,092)
Migraine or chronic headaches	0.9	(0.0–1.8)	95	(0–193)	43.7	(32.4–55.0)	578	(428–728)	674	(494–853)
Stomach or bowel disorders	1.2	(0.0–3.0)	123	(0–317)	42.5	(29.1–56.0)	563	(385–741)	686	(457–915)
Insomnia	0.9	(0.0–2.0)	96	(0–208)	49.1	(40.3–58.0)	650	(533–767)	746	(589–903)
Age 50–59 (yr)										
Back or neck disorders	3.1	(2.1–4.1)	308	(207–408)	23.6	(20.4–26.7)	296	(256–335)	603	(509–697)
Depression, anxiety, or emotional disorders	3.7	(0.9–6.4)	366	(95–638)	47.5	(34.7–60.4)	596	(435–757)	962	(738–1,186)
Migraine or chronic headaches	6.2	(2.6–9.8)	623	(258–988)	25.6	(16.8–34.5)	322	(210–433)	944	(659–1,230)
Stomach or bowel disorders	2.7	(0.4–5.0)	269	(38–499)	29.8	(16.8–42.8)	374	(211–537)	643	(393–892)
Insomnia	0.9	(0.0–2.9)	89	(0–295)	49.8	(21.5–78.1)	624	(269–979)	713	(353–1,074)

CI, confidence interval; 1 US\$=117 yen.

band, the highest loss of wage through presenteeism and absenteeism was caused by back or neck disorders—with the exception of males aged 18–29.

Depression, anxiety, or emotional disorders are the major cause of absenteeism and presenteeism^{5, 13, 14}. In the present study, the total economic loss due to depression, anxiety, or emotional disorders was lower than for back or neck disorders; however, we were unable to include workers with long-term absence due to depression. Based on a survey by the Japan Productivity Center in 2008, 0.4% of workers took more than one month working absence in Japan¹⁵. Hence, our assessment of absenteeism and its wage loss due to depression, anxiety, or emotional disorders could be an underestimation. Symptoms of depression, anxiety, or emotional disorders include feelings of sadness, a lack of interest, difficulty in making decisions, and—at worst—thoughts of death and suicide¹⁶. Those symptoms could severely affect an individual's core work performance as well as making them unable to respond to our questionnaire.

The most chosen primary health condition was back or neck disorder, which resulted in the greatest wage loss through presenteeism and absenteeism among 100 workers in the 10-yr age bands. The prevalence of back or neck disorders in this study was similar to a survey finding on the state of employees' health by the Ministry of Health, Labour and Welfare, Japan¹⁷. According to that survey (carried out in 2007 and used multiple-choice questions), the proportion of people with back pain was 25.6% for males and 21.4% for females. In our study, the prevalence of back or neck disorders was 19.7–29.4% for men and 25.8–32.2% for women. However, the prevalence could vary depending on the type of work: some types of occupation are more likely to cause work-related back or neck disorders^{18, 19}.

Migraines or chronic headaches (primarily tension-type headaches), cause intensive work loss by presenteeism among men aged 18–39 yr and by absenteeism among men in their 50s. Globally, tension-type headaches have a four times greater prevalence than migraine²⁰. In the

Table 4. Wage loss due to presenteeism and absenteeism and its proportion of the total wage assuming 100 workers per 10-yr age group for male workers over the previous 4-wk period

	Total wage loss due to absenteeism and presenteeism per 100 workers (US\$)		Proportion of total wage loss due to absenteeism and presenteeism in the total wage of 100 workers (%)	
	Mean	(95% CI)	Mean	(95% CI)
Age 18–29 (yr)				
Back or neck disorders	11,340	(9,170–13,510)	5.9	(4.8–7.1)
Depression, anxiety, or emotional disorders	12,543	(10,220–14,866)	6.6	(5.3–7.8)
Migraine or chronic headaches	5,196	(4,282–6,109)	2.7	(2.2–3.2)
Stomach or bowel disorders	6,234	(4,542–7,927)	3.3	(2.4–4.1)
Insomnia	3,419	(2,524–4,313)	1.8	(1.3–2.3)
Age 30–39 (yr)				
Back or neck disorders	25,986	(23,312–28,660)	9.8	(8.8–10.8)
Depression, anxiety, or emotional disorders	19,634	(17,592–21,676)	7.4	(6.6–8.2)
Migraine or chronic headaches	6,797	(5,463–8,131)	2.6	(2.1–3.1)
Stomach or bowel disorders	6,823	(5,628–8,018)	2.6	(2.1–3.0)
Insomnia	4,944	(4,109–5,778)	1.9	(1.5–2.2)
Age 40–49 (yr)				
Back or neck disorders	27,456	(24,486–30,427)	8.0	(7.2–8.9)
Depression, anxiety, or emotional disorders	20,849	(18,676–23,022)	6.1	(5.5–6.7)
Migraine or chronic headaches	6,439	(4,817–8,062)	1.9	(1.4–2.4)
Stomach or bowel disorders	12,654	(10,578–14,731)	3.7	(3.1–4.3)
Insomnia	6,910	(5,434–8,387)	2.0	(1.6–2.5)
Age 50–59 (yr)				
Back or neck disorders	21,637	(18,564–24,709)	6.2	(5.3–7.1)
Depression, anxiety, or emotional disorders	13,599	(11,007–16,191)	3.9	(3.2–4.6)
Migraine or chronic headaches	4,822	(3,148–6,497)	1.4	(0.9–1.9)
Stomach or bowel disorders	10,480	(8,226–12,733)	3.0	(2.4–3.7)
Insomnia	5,705	(3,789–7,621)	1.6	(1.1–2.2)

CI, confidence interval; 1 US\$=117 yen.

United States, the prevalence of migraine was highest for both men and women aged between 35–45 yr²¹). Our study found the prevalence of migraine has been found to be higher in women than in men^{21, 22}). In the present study, we were unable to determine the proportion of wage loss due to migraines and tension-type headaches; however, based on the epidemiological characteristics of headaches, occupational health practitioners should intervene and provide better access to treatment for those suffering from these conditions²³).

Stomach or bowel disorders, which include a variety of conditions, such as gastritis, gastroesophageal reflux, and irritable bowel syndrome, can also lead to work impairment. Dean *et al.*²⁴) reported that the symptom severity of gastroesophageal reflux and nocturnal heartburn disturbed work performance. In addition, such working conditions as shift and night work can promote the development of stomach disorders, e.g., chronic gastritis, gastroduodenitis, and peptic ulcers^{25, 26}). With regard to bowel disorders,

impairment due to irritable bowel syndrome, whose prevalence is high in Japan as a result of perceived stress, was estimated to amount to 9.7–14 h of lost productivity per week among sufferers^{27, 28}). Stomach or bowel disorders are the leading cause of absenteeism among men in their 40s and women aged 18–39, and those populations need to receive information about controlling their symptoms and treatment.

Insomnia is often caused by depressive symptoms, visual display terminal workload, over-involvement in work, and frequent alcohol consumption^{29, 30}). In Japan, the prevalence of insomnia, including mid-sleep awakenings and early morning awakening insomnia, is high among people aged 50–64 yr³⁰). As the present study shows, for men in their 50s insomnia can lead to absenteeism among those severely affected.

This study has its limitations. First, workers tend to develop multiple chronic health conditions; however, we only examined the primary health condition. Thus could

Table 5. Wage loss due to presenteeism and absenteeism and its proportion of the total wage assuming 100 workers per 10-yr age group over the previous 4-wk period for female workers

	Total wage loss due to absenteeism and presenteeism per 100 workers (US\$)		Proportion of total wage loss due to absenteeism and presenteeism in the total wage of 100 workers (%)	
	Mean	(95% CI)	Mean	(95% CI)
Age 18–29 (yr)				
Back or neck disorders	14,880	(13,342–16,419)	8.6	(7.7–9.5)
Depression, anxiety, or emotional disorders	8,744	(7,796–9,691)	5.0	(4.5–5.6)
Migraine or chronic headaches	6,192	(5,356–7,029)	3.6	(3.1–4.1)
Stomach or bowel disorders	5,987	(4,844–7,130)	3.5	(2.8–4.1)
Insomnia	2,329	(1,850–2,808)	1.3	(1.1–1.6)
Age 30–39 (yr)				
Back or neck disorders	13,137	(11,842–14,433)	6.5	(5.8–7.1)
Depression, anxiety, or emotional disorders	12,331	(10,925–13,736)	6.1	(5.4–6.8)
Migraine or chronic headaches	4,530	(3,731–5,329)	2.2	(1.8–2.6)
Stomach or bowel disorders	4,430	(3,413–5,446)	2.2	(1.7–2.7)
Insomnia	2,818	(2,021–3,615)	1.4	(1.0–1.8)
Age 40–49 (yr)				
Back or neck disorders	20,841	(18,317–23,365)	9.8	(8.7–11.0)
Depression, anxiety, or emotional disorders	11,206	(9,643–12,769)	5.3	(4.6–6.0)
Migraine or chronic headaches	3,939	(2,887–4,991)	1.9	(1.4–2.4)
Stomach or bowel disorders	3,210	(2,139–4,281)	1.5	(1.0–2.0)
Insomnia	3,200	(2,526–3,874)	1.5	(1.2–1.8)
Age 50–59 (yr)				
Back or neck disorders	18,512	(15,630–21,394)	9.2	(7.8–10.7)
Depression, anxiety, or emotional disorders	4,748	(3,643–5,854)	2.4	(1.8–2.9)
Migraine or chronic headaches	3,851	(2,686–5,016)	1.9	(1.3–2.5)
Stomach or bowel disorders	3,862	(2,363–5,361)	1.9	(1.2–2.7)
Insomnia	1,378	(681–2,074)	0.7	(0.3–1.0)

CI, confidence interval; 1 US\$=117 yen.

lead to an underestimation of the burden of each chronic health condition. In addition, the health conditions identified by individual workers are not necessarily based on clinical diagnosis. Second, the prevalence of health conditions could vary according to occupation and other work-related factors. Finally, although the response rate was relatively high, the generalizability of our study is limited. Further studies should address the effect of working conditions on absenteeism and presenteeism.

In conclusion, the wage loss due to presenteeism and absenteeism per 100 workers in the 10-yr age bands was high for back or neck disorders, as these were identified by a large number of participants. However, the wage loss per person was relatively high among those choosing depression, anxiety, or emotional disorders. We delineated the burden of presenteeism and absenteeism of depressive symptoms. These values offer insight into forming strategies for workplace interventions toward increasing work performance.

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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			

ROM>=1 N=7, ROM<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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職場主導で行われる介入が労働者のメンタルヘルス および生産性を含むコストに与える影響：系統的文献レビュー

The effect of workplace-led interventions on employees' mental health
and cost: a systematic review and discussion on current situation in Japan

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<要約>

目的:本研究の目的は、職場主導の介入が労働者のメンタルヘルスおよび労働生産性を含むコストに与える効果を検討することである。

方法:電子データベース (MEDLINE, Web of Science, Willey Online Library (journals), PsycINFO) を用いて系統的な文献検索を実施した。1992年から2012年に出版された論文で、ランダム化比較試験 (RCT) であり、18歳以上の労働者を対象とし、メンタルヘルスおよびコストに関するアウトカムの両方を評価した文献が選定された。研究デザインの質の評価にはコクランのバイアスリスク評価ツール (Cochrane Collaboration's tool for assessing the risk of bias) が用いられた。選択された研究結果は順序行列によって統合され、介入場所、介入戦略の種類 (全体的、選択的、個別的)、介入の手法ごとの解析が行われた。

結果:合計で17の研究が系統的レビューに含められた。順序行列分析の結果、14の研究がメンタルヘルス関連またはコスト関連アウトカムにおける改善を示し、経費効率がよい可能性を示した。15の研究において、労働生産性がコストのアウトカムとして用いられており、介入のコストを測定した研究はほとんどなかった。介入の場所は費用対効果と関係がなかった。介入戦略として、個別的介入は経費効率がよい可能性が高かった。介入手法としては、特に個別的なマネジメントを組み合わせた認知行動療法 (CBT) は、経費効率がよい可能性が高いことが示された。

結論: 介入が行われる場所は、費用対効果と関係がみられなかった。手法としては個別的なマネジメントを組み合わせた CBT が、介入戦略としては個別的介入が、経費効率がよい可能性が高かった。今後は、介入のコストも測定した研究が望まれる。

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1. はじめに

労働人口におけるメンタルヘルスの問題は深刻な公衆衛生上の問題である。例えば、うつ病は2020年までに労働障害を引き起こす主要な疾患の一つになると推定されており¹⁾、米国の報告では労働人口の6.4%がうつ病の診断を受けているとされている²⁾。精神疾患を抱える人の受療率の低さを考慮すると³⁾、うつ病の有病率は更に高い可能性がある。さらに、労働人口におけるメンタルヘルスの問題は自殺を含む悲惨な結果を引き起こすこともありうる⁴⁾。

また、メンタルヘルスの問題は労働生産性を低下させる原因ともなり、これは経済的損失を引き起こす重要な問題である。約半数の労働者が職場におけるストレスによる労働生産性の低下を経験したことがあり⁵⁾、また、うつにより引き起こされる経済的損失の60%近くが労働生産性の低下によるものと推定されている⁶⁾。さらに、英国の統計では、メンタルヘルスの問題による経済的損失は国家のヘルスケア費用を上回ると報告された⁷⁾。メンタルヘルスの問題により起こる生活への深刻な影響や経済的損失を考慮すると、労働人口のメンタルヘルスへの効果的な介入が求められる。

今日までに、労働者のメンタルヘルス改善を目的とした様々な介入が行われてきたが⁸⁻¹¹⁾、職場主導で行われる介入は乏しかった。職場に近接した場所における介入の提供や、職場スタッフとの相互作用が介入をより効果的にする可能性が指摘されていることから、雇用している企業のコミットメントは重要であると考えられる¹²⁾。従って、労働者のメンタルヘルスと生産性をマネジメントする観点から、職場主導の介入の費用対効果に関する情報が求められる。

これまでも労働者を対象とした介入の費用対効果について検討したレビューが存在するが¹³⁾、職場主導でない介入も含まれており、その多くは外来クリニック主導で行われるリワークプログラムであった。我々の知る限り、職場主導で行われる介入が労働者のメンタルヘルスおよび生産性を含むコストに与える影響について検討した系統的レビューは存在しない。また、予防戦略の導入方法は複数あるため、どの戦略が最も効果的かを検討するための研究が求められる。

本研究の目的は、職場主導で行われる介入が労働者のメンタルヘルスおよび生産性を含むコストに与える影響を検討した研究について、系統的なレビューを行うことである。

2. 方法

2.1 文献検索

2.1.1 包含基準および除外基準

包含基準

- 1) 1992年1月～2012年1月に出版された

- 2) ランダム化比較試験 (RCT) である
- 3) 介入の対象が18歳以上の被雇用者である
- 4) メンタルヘルス関連のアウトカムを測定している
- 5) コスト関連のアウトカムを測定している (直接コストまたは間接コスト)

除外基準*

- 1) 介入の対象が自営業の労働者である
- 2) 介入が薬物療法のみで他の要素を含まない
- 3) 介入の導入に職場が関与していない

*言語による除外基準は設けず、すべての言語による文献が含まれた。

2.1.2 データベースによる検索

4つの電子データベース (Pubmed、PsycINFO、Web of Science、Wiley Online Library) により、2012年2月1日に検索を行った。検索語は以下に示す4つの領域から決定され、Medical Subject Headings (MeSH) term およびテキストワードの双方が用いられた。(付録参照) (* = truncation、[] = MeSH terms)

- 1) メンタルヘルス関連アウトカム : Depress*、Anxi*、Mental health、Mental disorders*、Mental illness*、Psychiatric illness*、Well-being*、Emotion*、Distress*、Stress*、OR [Depression]、[Mental health]、[Emotions]、[Stress、Psychological] .
- 2) 職場 : Workplace、Corporat*、Occupation*、Job*、Employee、Labor/Labour、Organization、Business*、OR [Employment] .
- 3) 研究デザイン : Experimental、Quasi、Randomized controlled trial (RCT)、Controlled clinical trial、Random* trial: [Clinical Trials] .
- 4) コスト関連アウトカム : Cost-effect*、Cost-utility、Cost-benefit、Economic Evaluation*、Absenteeism、Productivity、OR [Cost and Cost Analysis]、[Efficiency、Organizational] .

2.1.3 手作業による関連雑誌、引用文献、選定された文献を引用した文献からの検索

電子データベースの検索に加え、Journal of Occupational & Environmental Medicine誌およびOccupational Medicine誌の手作業による検索も実施した。選定された文献および関連するレビューの引用文献も調べた。また、選定された文献を引用している文献も調べた。

2.1.4 文献選定の手続き

データベースから検索された文献は、1名の研究者 (RT) によってタイトル、抄録でスクリーニングされた。もう1名の研究者 (NI) が全文献タイトルと抄録の10%のランダムサンプルをスクリーニングし、選定の合致率は93.5% (145文献/155文献中) であった。

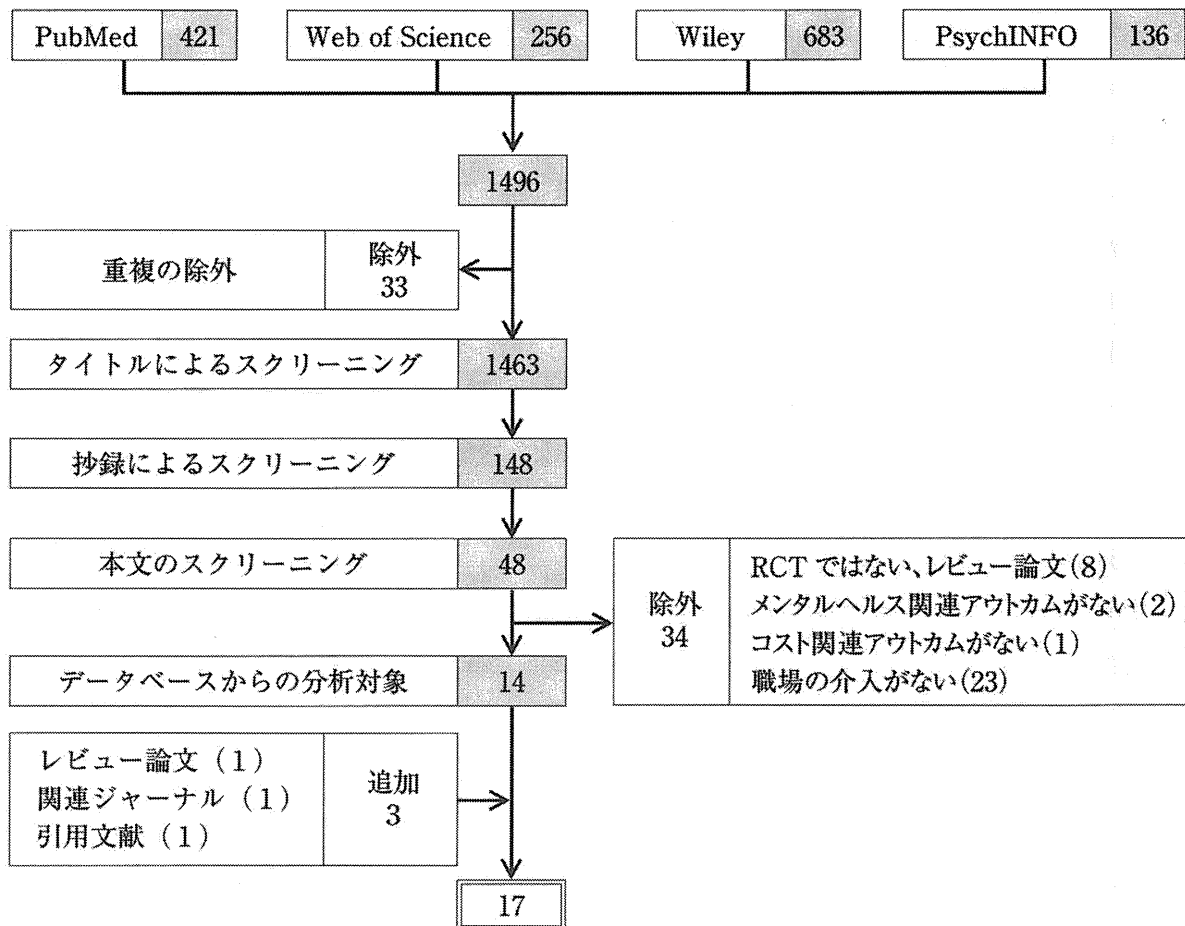


図1 文献選定のフローチャート

2.2 データの抽出

選定された文献より、メンタルヘルスおよびコストに関するアウトカムを抽出した。労働者を雇用している企業においては、介入が生産性を改善し病気休業を予防することが重要であるため、金銭的な価値に加え、労働生産性の指標をコストの指標に含めた。労働生産性の測定は一般に、absenteeism（病気休業および疾患による短期の休業）および presenteeism（職場において、疾患または障害のために生産性が失われること）によって測定される¹³⁾。Absenteeismおよび presenteeism の測定には、the WHO Health and Work Performance Questionnaire (HPQ) および Work Limitation Questionnaire (WLQ) といった自己報告式質問紙が用いられる。

2.3 研究の質の評価

独立した2名の研究者(RT, NI)が、コクランのバイアスリスク評価ツールthe Cochrane Collaboration's tool to assess the risk of biasを用いて、研究デザイン(RCT)の質の評価を行った¹⁴⁾。評価の不一致については、第3の研究者(SA)を含めたディスカッションにより解決した。

2.4 結果の統合

選定された文献から抽出された結果は、費用対効果の研究に用いられる順序行列 (permutation matrix) によって統合した¹⁵⁾。アウトカムが複数の時点で測定されている場合は、介入後直近のアウトカムを用いた。評価は2名の研究者 (RT, NI) によって独立して実施され、評価の不一致については、第3の研究者 (SA) を含めたディスカッションにより解決した。

3. 結果

3.1 文献の選定

電子データベースの検索により、1,496文献が選定された。タイトルと抄録によるスクリーニングの結果、48件が残った。さらに本文を検討した結果、14件が包含基準に適合していた。除外理由は、職場の介入がない (23件)、RCTでない (5件)、レビュー論文 (3件)、コスト関連のアウトカムが含まれていない (1件)、メンタルヘルス関連のアウトカムが含まれていない (2件) というものであった。加えて、選定された文献を引用した文献から1件、除外したレビュー論文の引用文献から1件が追加された。さらに、関連雑誌の検索からも文献を1件追加し、最終的に17件が本レビューの分析に用いられた (表1、P10)。

3.2 研究の質の評価

RCTの質に関しては、選定された文献のすべてが the Cochrane Collaboration's tool for assessing risk of bias¹⁴⁾ の6項目のうち、最低4項目を満たしていた。1件の研究を除いては、研究参加者に対する盲検性の項目は満たさなかった¹⁶⁾ (表2、P12)。

3.3 選定された文献の概要

表1 (P10) に、選定された研究の概要を示す。17件の研究に、合計4,795名の労働者が対象として含まれた。ほとんどの研究が労働生産性をコスト関連アウトカムとして測定していた。2件の研究はヘルスケアおよび医療コストを用いており、1件はヘルスセンターの利用率を¹⁷⁾、もう1件は医療費の請求を用いていた¹⁸⁾。介入のコストを考慮していたのは2件のみであった^{17, 19)}。

3.3.1 介入の行われる場所

9件の研究^{16, 20-21, 23-24, 26-29)} は職場外で介入が実施され、8件^{17-19, 22, 25, 30-32)} は職場で介入が行われていた。8件の研究は電話を用いた介入か、マルチメディアを用いた介入が提供されていた^{20-21, 23-24, 26, 28-30)}。

3.3.2 介入戦略の類型

用いられた予防戦略に関しては³³⁾、5件は全体的予防介入^{17-18, 23, 28, 31)} であり、4件^{16, 19, 22,}

²⁹⁾ は選択的予防介入、8件^{20-21, 24-27, 30, 32)} は個別的予防介入であった。

全体的介入は、労働者の全般的な身体的および精神的健康を促進し、職場におけるストレスの減少を目的としていた。このタイプの介入を用いた研究の多くでは、対象者はニュースレターや職場の招待状によって募集されていた。企業によって開催された健康関連イベントにおいて募集をしたものが1件²⁸⁾、労働者だけでなくその配偶者もリクルートしたものが1件あった¹⁸⁾。

選択的介入は、既にメンタルヘルスの問題により休職している従業員の一部を対象に実施されたものや²⁹⁾、適応障害の者に実施されたものがあつた²²⁾。また、ハイリスク群として妊娠中の労働者や中高年の看護師を対象に実施された研究もあつた^{16, 19, 20)}。

個別的介入の3件の研究は、中等度から重度のうつ（未診断の者）を呈している者をスクリーニングして対象としていた^{21, 25, 30)}。他の3件は、閾値下のうつを呈している者^{24, 26, 27)}、1件は職場におけるストレスをターゲットとしていた²⁰⁾。他の1件の研究では、ハイリスクな健康行動を多く伴うブルーカラーの労働者を対象としていた³²⁾。

3.3.3 介入の手法

選定された研究では様々な手法による介入が実施されていた。認知行動療法（CBT）およびその変形技法は、最も多く用いられていた^{20-22, 25-26, 28-30, 32)}。うち5件の研究では、電話およびオンラインによるCBTが用いられていた^{20-21, 26, 28-29)}。次に多く用いられていたのは教育的アプローチ/セッションで、7件の研究で用いられていた^{17-18, 23, 28, 30-32)}。ヨガや太極拳といった運動を用いた研究は5件であつた^{18-20, 27, 31)}。これらの研究のうち2件は、主に身体的健康および全般的な健康増進に焦点をあてていたが、介入によるメンタルヘルスおよび生活の質の改善も評価していた^{18, 31)}。3件の研究はケアマネジメント/コーディネートを用いており^{16, 21, 30)}、他の2件の研究では専門家によるコーチングやコンサルテーションが用いられ²³⁻²⁴⁾、このいずれも電話によって実施されていた。さらに、8件の研究は2種類以上の介入を組み合わせれていた^{20-21, 23, 28, 30-31)}。5件の研究はCBTに加え、運動²⁰⁾、ストレスマネジメントプログラム^{20-21, 28, 30, 32)}、ケアマネジメント^{21, 30)}を組み合わせていた。2件の研究は運動、教育的セッション、ストレスマネジメントプログラムを組み合わせていた^{18, 31)}。残る1件は、一般的な健康増進プログラム（栄養管理等含む）に専門的コーチングを組み合わせていた²³⁾。

3.4 コストおよびメンタルヘルスにおける介入効果

6件の研究においてメンタルヘルス関連およびコスト関連の両方のアウトカムが改善していた。従って、これらの介入は経費効率がよい可能性が高いことが示された^{17-18, 21, 25, 28, 30)}。4件の研究ではメンタルヘルス関連アウトカムのみ改善しており^{20, 26-27, 32)}、他の4件ではコスト関連アウトカムのみ改善がみられ^{19, 22, 24, 29)}、これら8件の研究においても経費効率がよい可能性が示された。3件の研究はどちらのアウトカムにおいても統計学的に有意な改善は示さなかつた^{16, 23, 31)}（表3、P13）。

3.4.1 介入の場所

介入が行われた場所ごとにみると、職場外で実施された9件の介入のうち7件(77.8%)^{20-21, 24, 26-28)}、職場内で実施された8件の介入のうち7件(87.5%)^{17-19, 22, 25, 30, 37)}が経費効率が良い可能性を示した。それぞれの場所で行われた介入について、介入の手法および予防戦略の違いは認められなかった。加えて、経費効率が良い可能性を示した14件の研究のうち6件は電話およびオンラインによる介入を実施していた^{21, 24, 26, 28-30)}。

3.4.2 介入戦略の種類

全体的介入を用いた研究5件のうち3件(60.0%)が経費効率が良い可能性を示した。選択的介入を行った4件の研究のうち3件(75.0%)では労働生産性が改善し、経費効率が良い可能性を有していた^{19, 22, 29)}。個別的介入では、8件すべて(100%)の研究において経費効率が良い可能性を示していた^{20-21, 24-27, 30, 32)}。

3.4.3 介入の手法

介入の手法別にみると、CBTを用いた9件の研究全て(100%)において経費効率が良い可能性が示された。教育的セッションまたはストレスマネジメントプログラムを用いた7件の研究のうち5件(71.4%)で^{17-18, 28, 30, 32)}、運動を用いた5件の研究のうち4件(80.0%)で^{18-20, 27)}、ケアマネジメントを実施した3件の研究のうち2件(66.7%)で^{21, 30)}経費効率が良い可能性が示された。

3.4.4 介入戦略と介入の手法との関連

全体的介入では、5件全てが教育的セッションを用いていた。そのうち2件(40.0%)の経費効率がよい可能性を示した研究では、ストレスマネジメントプログラムを採用していた^{18, 28)}。

個別的介入タイプの研究8件のうち6件(75.0%)では、CBTを用いていた^{20-21, 25-26, 30, 32)}。6件すべての研究においてメンタルヘルス関連アウトカムの改善を示し、3件の研究では経費効率がよい可能性が高かった^{21, 25, 30)}。これら3件の研究は、ケアマネジメントまたはCBTを用いた個別的問題解決療法を採用していた。一方、選択的介入タイプの戦略においてCBTを採用した2件の研究においては、メンタルヘルス関連アウトカムの改善は見られなかったが、コスト改善アウトカムの改善は認められた²¹⁻²²⁾。

4. 考察

本研究では、職場主導の介入が労働者のメンタルヘルスやコスト関連のアウトカムに与える影響を検討したRCTの系統的レビューを実施した。レビューに包含された研究の質は十分に高