Occupational Diseases and Environmental Medicine, 2023, 11, 150-156
https://www.scirp.org/journal/odem
ISSN Online: 2333-357X
ISSN Print: 2333-3561

The Effect of Workplace-Based Sports Participation on the Mental Status of Japanese Workers

Yosuke Shibata[1*], Yasunari Kurita[1,2], Toshiyuki Ojima[1]

[1]Department of Community Health and Preventive Medicine, Hamamatsu University School of Medicine, Hamamatsu, Japan
[2]Department of Shizuoka Physical Therapy, Faculty of Health Science, Tokoha University, Shizuoka, Japan
Email: *shibata-yosuke@umin.ac.jp

How to cite this paper: Shibata, Y., Kurita, Y. and Ojima, T. (2023) The Effect of Workplace-Based Sports Participation on the Mental Status of Japanese Workers. *Occupational Diseases and Environmental Medicine*, **11**, 150-156.
https://doi.org/10.4236/odem.2023.113011

Received: July 31, 2023
Accepted: August 26, 2023
Published: August 29, 2023

Abstract

Whether workplace-based sports are part of a company's employee welfare program in terms of mental status is unknown. This study examined the impact of workplace-based sports participation on the mental status of Japanese workers. It involved a single-arm intervention comprising participation in a company's volleyball team. Data on mental status were collected using a simplified version of the Brief Job Stress Questionnaire. Overall, 11 individuals participated, 9 (81.8%) of whom were women; the mean participant age was 38.2 years. Because the intervention was conducted during busy periods, the median (25th and 75th percentiles) score for qualitative job overload significantly increased from 3.0 (2.0, 4.0) to 3.0 (3.0, 4.3) (p = 0.03). Nonetheless, the fatigue score significantly decreased from 3.0 (3.0, 4.3) to 3.0 (2.0, 4.0) (p = 0.03). These results indicate that participation in workplace-based sports can prevent the deterioration of mental status during busy periods.

Keywords

Mental Health, Occupational Stress, Team Sports, Volleyball, Occupation Groups

1. Introduction

Mental disorders are a global problem and affect millions of people worldwide, including Japan [1]. Mental disorders increase the risk of other illnesses [2], and suicide [3]. It additionally becomes an economic burden [4]. The World Mental Health Japan 2002-2005 Survey conducted as part of the World Health Organization's Mental Health Survey showed that 9.1% of Japanese workers had expe-

rienced some form of mental issues over the previous 12 months [5].

It is well known that sports participation has several benefits for mental status [6] [7]. Organizations participate in sports in two major ways. The first is the participation in champion sports as sponsors. The purposes of conducting such sports initiatives include advertising, improving employee morale, increasing employee satisfaction, and creating a sense of pride in the company [8]. However, often the participating players in such sports are professionals and general employees do not have the opportunity to actively participate in these sports. The other type is participation in sports as part of an employee welfare program. The aim of these sports is to promote employee communication and relieve stress [9]. For such sports, typically, the employer or employees recruit members and form a sports team for the company. The company supports the team's activities (e.g., the company provides tools and facilities and handles sports activity-related expenses). Typically, employees can regularly participate in these sports regardless of their skill levels. However, to the best of our knowledge, the effects of participation in workplace-based sports (defined as sports that are part of a company's welfare program) on the mental status of Japanese workers have not yet been investigated. This study was aimed at examining the effect of participation in workplace-based sports on the mental status of Japanese workers.

2. Methods

2.1. Participants

This study was designed as a single-arm intervention study conducted among staff at Hamamatsu University School of Medicine and its affiliated hospitals. The exclusion criterion was a restriction on sports participation. Participants did not need to pay or receive fees for being a part of the study. The participants were recruited via posters at the university in September 2015.

2.2. Intervention

The intervention involved participating in a volleyball team created by Hamamatsu University School of Medicine. Employees with experience in volleyball coached others. The games were mainly played for the purpose of enjoying sports. The participants played volleyball in the university gymnasium for approximately 2 hours from PM 7, once a week, from October to December 2015.

2.3. Measurement

The participants' mental status was assessed using a simplified version of the Brief Job Stress Questionnaire [10], which was a self-administered questionnaire comprising 57 questions covering three categories (18 items): job stressors (nine items), stress reactions (six items), and social support (three items). Each item was scored on a scale of 0 - 5, with a high score indicating a poor status. These scores were used to identify highly stressed individuals [10]. Data were obtained before and after the intervention via the Internet by using Google Forms.

2.4. Statistical Analyses

Scores for each 18 items were analyzed using Wilcoxon's rank sum test, and the proportion of highly stressed individuals was analyzed using Fisher's direct probability test. The level of significance was set at $p < 0.05$.

2.5. Ethical

The study was approved by the Ethical Review Committee of Hamamatsu University School of Medicine (approval number 17-059). All participants were invited to a group briefing session and were informed of study aim, protocol and their right to refuse participation or withdraw their consent at any time. Then, informed consent was obtained from all participants before the study. This study was conducted in compliance with Ethical Guidelines for Medical and Health Research Involving Human Subjects in Japan.

3. Results

Eleven individuals participated in the study. Although two participants dropped out, we conducted a modified intention-to-treat analysis, imputing the baseline values to the post-values. Nine participants (81.8%) were female, and the mean age of the participants was 38.2 years (Table 1). During the intervention period, the median (25th and 75th percentiles) score for qualitative job overload significantly increased from 3.0 (2.0, 4.0) to 3.0 (3.0, 4.3) ($p = 0.03$) (Table 2). The

Table 1. Characteristics of the participants.

	Number (percent) or mean (standard deviation)	
Sex (female)	9	(81.8)
Age, years	38.2	11.5
Height, cm	164.6	10.2
Weight, kg	55.4	10.3
Occupation		
Medical worker	3	(27.3)
Office worker	7	(63.6)
Researcher	1	(9.1)
Education		
High school	2	(18.2)
University	5	(45.5)
Graduate school	4	(36.4)
Marital status (married)	8	(72.7)
Smoking status (current smoker)	2	(18.2)
Drinking status (current alcohol drinker)	5	(45.5)

Table 2. Changes in employees' mental status.

		Pre-intervention findings		Post-intervention findings		
		Median (25th and 75th percentiles) or Number (percent)		Median (25th and 75th percentiles) or Number (percent)		p-value
Job stressors	Quantitative job overload	3.0	(2.0, 4.3)	3.5	(3.0, 5.0)	0.10
	Qualitative job overload	3.0	(2.0, 4.0)	3.0	(3.0, 4.3)	0.03
	Physical demands	2.0	(1.0, 2.0)	2.0	(1.0, 2.3)	0.65
	Interpersonal conflict	2.0	(2.0, 3.0)	2.0	(2.0, 3.0)	0.74
	Poor physical environment	2.0	(1.8, 2.3)	2.0	(2.0, 2.3)	0.56
	Job control	3.0	(1.0, 4.0)	3.0	(1.8, 3.3)	1.00
	Unsuitable job	4.0	(3.0, 4.3)	3.0	(3.0, 4.0)	0.10
	Skill utilization	3.0	(3.0, 4.0)	3.0	(2.5, 4.0)	0.32
	Meaningfulness of work	3.0	(1.0, 3.3)	3.0	(1.0, 3.0)	0.65
Stress reaction	Vigor	2.0	(1.0, 3.0)	2.0	(1.0, 3.0)	0.32
	Anger and irritability	3.0	(3.0, 4.3)	3.0	(3.0, 4.0)	1.00
	Fatigue	3.0	(3.0, 4.3)	3.0	(2.0, 4.0)	0.03
	Anxiety	4.0	(3.0, 5.0)	3.5	(2.0, 5.0)	0.06
	Depression	3.0	(3.0, 4.0)	3.0	(1.8, 4.3)	0.33
	Physical stress reaction	3.0	(3.0, 3.3)	3.0	(1.8, 4.0)	0.13
Social support	Supervisor support	4.0	(2.8, 4.0)	4.0	(2.0, 4.0)	0.32
	Coworker support	3.5	(2.8, 4.0)	4.0	(2.8, 4.0)	0.56
	Support from family and friends	3.0	(1.8, 4.0)	3.0	(1.8, 3.3)	1.00
Highly stressed participants		0	(0)	4	(36.4)	0.09

Median values and proportions were compared using the Wilcoxson test and Fisher's exact test, respectively.

proportion of highly stressed participants tended to increase from 0 (0%) to 4 (36.4%) ($p = 0.09$). In contrast, the fatigue scores decreased from 3.0 (3.0, 4.3) to 3.0 (2.0, 4.0) ($p = 0.03$). The anxiety score tended to decrease from 4.0 (3.0, 5.0) to 3.5 (2.0, 5.0) ($p = 0.06$). Regarding the sensitivity analysis, the two participants who dropped out of the study were excluded from the per-protocol set. Results remained statistically significant.

4. Discussion

The study was conducted from September to December, which was a busy period. This led to an increase in the qualitative job overload score and the proportion of participants with high stress levels. However, fatigue scores decreased. We considered three mechanisms to explain this phenomenon: the effects of sports, sport type, and workplace-based programs.

Sports participation has been reported to have a positive effect on mental sta-

tus [11] [12] [13]. It is associated with higher perceived health and happiness [11], and higher psychological health, as assessed by the World Health Organization Quality of Life Questionnaire [12] and the General Health Questionnaire (GHQ) [13]. Team sports have a beneficial effect on mental status compared to individual sports [13] [14] [15]. Psychological distress status assessed using the GHQ [13] and Hopkins Symptom Checklist [14] was lower in team sports than in individual sports. One review article mentioned that team sports have the advantage of improving mental health because they encourage social networking and a sense of belonging, leading to social and psychological support [15]. Workplace-based exercise has a more positive impact on work than home-based exercise. A randomized controlled trial showed that workplace-based exercise improved working ability more than home-based exercise [16]. Improved working ability during busy periods may contribute to decreased fatigue. These findings are consistent with those of previous studies [11] [12] [13] [14] [15].

This study focused on workplace-based sports participation, which has a positive impact on both employees and employers. Previous studies have mostly focused on workplace-based exercises such as stretching, yoga, pilates, and resistance training, which are individual exercises that require a specialist instructor, involve fees, and might be on offer for a short period such as 3-4 months. On the other hand, workplace-based sports are frequently team sports such as baseball, football, basketball, and volleyball. These could contribute to enhancing communication among employees and team building in the company. No specialist instructors are required for these sports because some employees with experience in sports teach others as volunteers. Activity adherence was often high because most participants liked sports. In fact, the volleyball team continues to date, although approximately 8 years have passed since the intervention period.

The present study had several limitations. First, a selection bias may have occurred. The participants were from only one university and its affiliated hospitals and were highly educated; the proportion of participants with a university degree and a higher level of education was higher than 81.8%. Therefore, further studies involving different facilities and occupations are required. Second, the study did not include a control group. Due to the small number of participants, it was not possible to establish a control group. Third, the intervention involved volleyball. We chose volleyball because most nurses are female [17] and it is a popular sport among women [18]. Finally, our results demonstrate the prevention of deterioration of mental status. However, it is unknown whether workplace-based sports participation has a positive effect during non-busy periods.

In conclusion, the present study showed that workplace-based sports participation positively impacts the fatigue status of Japanese workers during busy periods. This would contribute to an improved mental status.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Demyttenaere, K., Bruffaerts, R., Posada-Villa, J., Gasquet, I., Kovess, V., Lepine, J.P., *et al.* (2004) Prevalence, Severity, and Unmet Need for Treatment of Mental Disorders in the World Health Organization World Mental Health Surveys. *Journal of the American Medical Association*, **291**, 2581-2590. https://doi.org/10.1001/jama.291.21.2581

[2] Correll, C.U., Solmi, M., Veronese, N., Bortolato, B., Rosson, S., Santonastaso, P., *et al.* (2017) Prevalence, Incidence and Mortality from Cardiovascular Disease in Patients with Pooled and Specific Severe Mental Illness: A Large-Scale Meta-Analysis of 3,211,768 Patients and 113,383,368 Controls. *World Psychiatry*, **16**, 163-180. https://doi.org/10.1002/wps.20420

[3] Nordentoft, M., Mortensen, P.B. and Pedersen, C.B. (2011) Absolute Risk of Suicide after First Hospital Contact in Mental Disorder. *Archives of General Psychiatry*, **68**, 1058-1064. https://doi.org/10.1001/archgenpsychiatry.2011.113

[4] Christensen, M.K., Lim, C.C.W., Saha, S., Plana-Ripoll, O., Cannon, D., Presley, F., *et al.* (2020) The Cost of Mental Disorders: A Systematic Review. *Epidemiology and Psychiatric Sciences*, **29**, e161. https://doi.org/10.1017/S204579602000075X

[5] Tsuchiya, M., Kawakami, N., Ono, Y., Nakane, Y., Nakamura, Y., Fukao, A., *et al.* (2012) Impact of Mental Disorders on Work Performance in a Community Sample of Workers in Japan: The World Mental Health Japan Survey 2002-2005. *Psychiatry Research*, **198**, 140-145. https://doi.org/10.1016/j.psychres.2011.10.014

[6] Sivaramakrishnan, H., Gucciardi, D.F., McDonald, M.D., Quested, E., Thogersen-Ntoumani, C., Cheval, B., *et al.* (2021) Psychosocial Outcomes of Sport Participation for Middle-Aged and Older Adults: A Systematic Review and Meta-Analysis. *International Review of Sport and Exercise Psychology*. https://doi.org/10.1080/1750984X.2021.2004611

[7] Blake, H.T., Buckley, J.D., Stenner, B.J., O'Connor, E.J., Burgess, S.A. and Crozier, A.J. (2022) Sport Participation and Subjective Outcomes of Health in Middle-Aged Men: A Scoping Review. *American Journal of Men's Health*, **16**. https://doi.org/10.1177/15579883221084493

[8] Smith, A.C. and Stewart, B. (2008) Introduction to Sport Marketing. Routledge, London. https://doi.org/10.1016/B978-0-7506-8685-3.50004-2

[9] The Japan Institute for Labour Policy and Training (2019) Survey on the Actual Status of Corporate Welfare Policies. (In Japanese) https://www.jil.go.jp/institute/siryo/2019/documents/210.pdf

[10] Shimomitu, T. (2005) Research on Mental Health Measures through Improvement of Workplace Environment, etc., Comprehensive Research Projects for Occupational Safety and Health, Health and Labour Sciences Research Grants from the Ministry of Health, Labour and Welfare of Japan. (In Japanese) http://www.tmu-ph.ac/pdf/090716_03.pdf

[11] Kao, C.H., Hsu, P.Y. and Kuo, Y.T.T. (2010) Are You Healthy and Happy? Does Sport Participation Matter? A Study of the Inter-Relationships between Sport Participation, Perceived Health and Perceived Happiness at Six Life Stages. *World Leisure Journal*, **52**, 61-67. https://doi.org/10.1080/04419057.2010.9674623

[12] Omorou, Y.A., Erpelding, M.L., Escalon, H. and Vuillemin, A. (2013) Contribution of Taking Part in Sport to the Association between Physical Activity and Quality of Life. *Quality of Life Research*, **22**, 2021-2029. https://doi.org/10.1007/s11136-013-0355-3

[13] Hamer, M., Stamatakis, E. and Steptoe, A. (2009) Dose-Response Relationship be-

tween Physical Activity and Mental Health: The Scottish Health Survey. *British Journal of Sports Medicine*, **43**, 1111-1114.
https://doi.org/10.1136/bjsm.2008.046243

[14] Guddal, M.H., Stensland, S.Ø., Småstuen, M.C., Johnsen, M.B., Zwart, J.A. and Storheim, K. (2019) Physical Activity and Sport Participation among Adolescents: Associations with Mental Health in Different Age Groups. Results from the Young-HUNT Study: A Cross-Sectional Survey. *BMJ Open*, **9**, e028555.
https://doi.org/10.1136/bmjopen-2018-028555

[15] Tahira, S. (2022) The Association between Sports Participation and Mental Health across the Lifespan. *International Journal of Sport Studies for Health*, **5**, e134601.
https://doi.org/10.5812/intjssh-134601

[16] Jakobsen, M.D., Sundstrup, E., Brandt, M., Jay, K., Aagaard, P. and Andersen, L.L. (2015) Physical Exercise at the Workplace Prevents Deterioration of Work Ability among Healthcare Workers: Cluster Randomized Controlled Trial. *BMC Public Health*, **15**, Article No. 1174. https://doi.org/10.1186/s12889-015-2448-0

[17] Ministry of Health, Labour and Welfare (2022) Report on Public Health Administration and Services (Practincing Health Professionals) 2020. (In Japanese)
https://www.mhlw.go.jp/english/database/db-hss/dl/rophas_2020_biennialyear.pdf

[18] Shibata, Y., Hayasaka, S., Noda, T., Murata, C. and Ojima, T. (2011) Cross-Sectional and Longitudinal Analysis of Sports Participation with Focus on Age, Frequency, and Type of Sport during Adolescence and Middle Age: Descriptive Study Using the Data from the Survey on Time Use and Leisure Activities over a 15-Year Period. *Research in Exercise Epidemiology*, **13**, 51-60. (In Japanese)
https://doi.org/10.24804/ree.13.51