Regular Article

Association Between Club Factors and Health Status Among Japanese High School Sports Club Activity Coaches: A Nationwide Cross-Sectional Study

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Running title: Club Factors and Health in High School Sports Club Activity Coaches

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Abstract

Background: Many high school teachers in Japan supervise school sports club activities, which leads to long working hours and elevated stress. However, the relationship between club factors and the health status of coaches remain unclear.

Objective: This study examined associations between club factors and the health status of Japanese high school sports club activity coaches.

Methods: We conducted a nationwide cross-sectional survey of school sports club activity coaches in all Japanese high schools. Two health outcomes were assessed: self-rated health (SRH; good or poor) and psychological distress using the Kessler 6 scale (K6; high distress or not). Data on seven club factors were collected: sport type, weekday and weekend activity duration and frequency, number of student managers, and club aim. Odds ratios for a favorable health outcome of each factor were calculated.

Results: Among 6,045 respondents, weekday activity time ≥ 3 hours was associated with poorer SRH (OR = 0.70; 95% confidence interval: 0.58–0.85) and higher psychological distress (0.67; 0.52–0.86). Coaching ≥ 5 days per week (0.80; 0.68–0.95) and weekend activity ≥ 4 hours (0.83; 0.70–0.98) were also linked to poorer SRH. Aiming for national competitions (1.28; 1.06–1.56) and having ≥ 2 student managers (1.29; 1.07–1.55) were associated with favorable health.

Conclusions: Multiple student managers and an emphasis on national competitions were linked to improved coach health, whereas extended weekday and weekend activities were associated with poorer outcomes.

Keywords:

Physical Education and Training, Health Status, Psychological Distress

日本の高校運動部コーチにおけるクラブ要因と健康状態の関連：全国横断研究

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抄録

背景：

日本では、多くの高校教員が授業に加えて課外の運動部活動のコーチをしている。こうした部活動指導は長時間労働やストレス増加の一因となっている。しかし、クラブ要因とコーチの健康状態との関連は明らかになっていない。

目的：

本研究は、日本の高校運動部コーチにおけるクラブ要因と健康状態の関連を検討した。

方法：

全国の高校運動部コーチを対象に横断的調査を実施した。評価した健康アウトカムは 2 つで、自己評価による健康状態（良好または不良）と、Kessler 6 尺度（K6）を用いた心理的なストレス（高ストレスまたは高ストレスでない）とし

た。収集したクラブ要因は 7 項目で、種目、平日および週末の活動時間・頻度、マネージャーの人数、クラブの目標とした。各要因についてオッズ比（OR）を算出した。

結果：

6,045 名の回答者のうち、平日の活動時間が 3 時間以上のコーチは、健康状態が不良（OR = 0.70; 95% CI: 0.58–0.85）および高ストレス（OR = 0.67; CI: 0.52–0.86）の傾向があった。週 5 日以上の指導（OR = 0.80; CI: 0.68–0.95）や週末 4 時間以上の活動（OR = 0.83; CI: 0.70–0.98）は健康状態の不良と関連があった。一方、全国大会出場を目指すクラブ（OR = 1.28; CI: 1.06–1.56）やマネージャーが 2 人以上いるクラブ（OR = 1.29; CI: 1.07–1.55）は健康状態の良好と関連があった。

結論：

複数のマネージャーを有することや全国大会出場を目指すことは、コーチの健康状態の良好と関連があった。一方、平日・週末の長時間活動は不良な健康アウトカムと関連があった。

Introduction

The Teaching and Learning International Survey 2018 reported that Japanese high school teachers work an average of 56 hours per week—the highest among the 42 Organization for Economic Co-operation and Development (OECD) countries [1]. Long working hours have been shown to negatively affect the mental health of teachers, including leading to increased risks of psychological distress [2], emotional exhaustion, and depersonalization [3]. One study found that teachers working > 50 hours per week were > 2-fold more likely to experience severe psychological distress compared to those with shorter working hours, with the risk increasing further for those working > 60 hours per week [2].

In Japan, school sports club activities (bukatsudō) refer to extracurricular athletic programs that are typically organized within schools and supervised primarily by teachers outside regular teaching hours—after classes, on weekends, and during school vacations. These activities represent a distinctive feature of Japanese educational culture, combining physical training with moral and social education, and are regarded as an important setting for holistic student development [4-5]. In Japan, > 90% of high school teachers serve as a school sports club activity coach in addition to their regular teaching responsibilities [6]. Japanese high school teachers spend an average of 7.7 hours per week supervising these activities (i.e., 2.1 hours longer than the OECD average of 5.6 h [4]), overseeing practices

after school, on weekends, and during long vacations [5]. Supervising school sports club activities thus increases the overall number of working hours of teachers [7]. High school sports club activities play a vital role in student development [8]; however, their supervision is largely undertaken by teachers, contributing further to their workload.

Few studies have examined the relationship between school sports club activities and the health status of teacher–coaches [9-10]. Previous observational research has shown that high competitive pressure and intensive coaching schedules are associated with poorer self-rated health (SRH) and increased psychological distress [11]. Systematic reviews have further identified numerous stressors experienced by coaches, such as performance expectations, organizational demands, interpersonal conflicts, and internal psychological pressures [12]. However, these reviews have not examined how specific club factors—such as sport type, weekly practice frequency, daily activity duration, number of team managers, athlete composition, and competitive goals—collectively influence coach health outcomes. Moreover, few studies have addressed the potential influence of school-level variables (e.g., region, school governance, and enrollment size) or individual coach characteristics (e.g., age, sex, coaching experience, marital status, lifestyle habits, and medical history). Understanding these associations is essential not only for identifying the determinants of coach health but also for informing policy and institutional efforts

aimed at fostering healthier and more sustainable club activity environments.

This study aimed to examine the association between sports club factors and the health status among high school sports activity coaches in Japan.

METHODS

Study Design

This was a cross-sectional study conducted in Japan in 2022. Ethical approval was obtained from the Ethical Review Committee of Hamamatsu University School of Medicine (approval number 22-131).

Participants

The target population included all school sports club activity coaches working at the 5,007 full-time high schools across Japan that were listed in the MEXT school code database as of May 1, 2022. In line with the aims of this study, part-time, correspondence, and special-needs high schools were excluded from the survey. In Japan, > 90% of high school teachers serve as school sports club activity coaches [6]. The inclusion criteria were coaches supervising any sports club activity at a Japanese high school. Coaches who were on a leave of absence at the time of the survey were excluded.

Data Collection Procedures

Cooperation letters containing the survey URL and QR code were mailed to all 5,007 high schools in Japan. School addresses were obtained from the most recent list of school codes (as of May 1, 2022) published by the Ministry of Education, Culture, Sports, Science and Technology [13]. Nineteen letters were returned due to unknown addresses, resulting in 4,988 effective deliveries. The survey was conducted between November 28 and December 20, 2022. Data were obtained using Formrun (Basic Inc., Tokyo, Japan), an online questionnaire platform. Although the number of participating schools could not be determined because the survey was conducted anonymously at the individual level, respondent demographics (75.5% male, 50.5% aged 30–39 years, and mean coaching experience of 15.6 years) were comparable to those in the Japan Sports Agency's 2022 national survey (83.9% male, 41.2% aged 30–39 years, and mean 14.7 years of experience) [14]. To avoid identification of individual respondents, school names were not collected. As a result, the number of coaches who responded from each school could not be determined, and there may have been some bias in the respondent distribution across schools. Participants were informed of the purpose, risks, and benefits of the study through both the mailed cooperation letter and the online platform prior to participation, and informed consent was obtained electronically through the survey system. Because school names were not collected, representativeness at the school or prefectural level

could not be directly assessed; however, comparison with the national dataset indicated that respondent characteristics were broadly consistent with the population of high school coaches in Japan.

Outcome Variables

Health status was evaluated using two items: SRH and psychological distress based on the Kessler 6 (K6) scale [15]. SRH was assessed with the question "How would you rate your current health status?" Respondents selected one of five options: "good," "somewhat good," "fair," "somewhat poor," or "poor."

Psychological distress was assessed using the Japanese version of the K6 [15) 16)]. The K6 consists of six items measuring nonspecific psychological distress during the past 30 days, rated on a 5-point Likert scale ranging from 0 ("none of the time") to 4 ("all of the time"). Total scores range from 0–24, with higher scores indicating greater distress. The reliability and validity of the Japanese version of the K6 have been confirmed in a previous study [17].

Explanatory Variables

We collected data on factors of clubs, high schools, and coaches. Club factor included sport type (selected from 58 predefined categories or entered as a free-text response),

number of athletes (numerical response), presence of student managers (numerical response), sex composition of athletes (male, female, or both), activity schedule (frequency and duration of practices on weekdays and weekends), and competitive aim of the club (prefectural tournament participation, top 8 or higher in prefectural tournament, national tournament participation, or top 8 or higher in national tournament - single selection or free response). High school factors included geographic area (one of 47 prefectures), school type (public or private), and student enrollment (numerical response). Coach factors included sex (male or female), age (numerical response), teaching experience (years), marital status (never married, married, widowed/divorced), smoking status (never, current, former), alcohol consumption (never/rarely, occasionally, daily), exercise habits (yes or no), and medical history (presence or absence of hypertension, diabetes, and dyslipidemia, each answered as yes or no). Exercise habits were assessed with the question, “Do you engage in exercise at least once a week for 30 minutes or more?” This item was adopted from the National Health and Nutrition Survey in Japan, which is widely used to capture general lifestyle exercise habits, rather than specifically leisure-time activity; therefore, it is possible that some respondents who were physically active while coaching school sports club activities considered such activity when answering this question,

Statistical Analysis

SRH responses were categorized by grouping “good,” “somewhat good,” and “fair” into a “Good” category, and “somewhat poor” and “poor” into a “Poor” category. K6 scores were categorized using the standard threshold (< 13 vs. ≥ 13) to differentiate lower from higher psychological distress. Multiple cutoff points for the K6 scale have been proposed in prior studies. The cutoff of 4/5 has been shown to effectively screen for mild to moderate mood or anxiety disorders in the Japanese population [17], whereas 9/10 has been empirically applied in occupational and epidemiological studies to identify individuals with moderate psychological distress [18]. In contrast, 12/13 has been used internationally to detect severe psychological distress [15) 16)]. When lower cutoff points (e.g., 4/5 or 9/10) were applied in our preliminary analyses, a large number of participants were classified as having psychological distress, and differences between groups in health-related variables became less pronounced and statistically non-significant. Because lower thresholds made it difficult to distinguish between groups, we adopted the 12/13 cutoff, which yielded clearer and statistically significant associations between self-rated health and club-related factors. This threshold was therefore considered the most appropriate for identifying individuals with marked psychological distress in line with the aim of the study of examining the relationship between poor health status and club activity

conditions.

Prefecture data were consolidated into seven regional categories. Sport types were ranked based on the number of respondents, with the top 10 categories listed individually and all others (11th rank and below) grouped as "Others." Regarding coach characteristics, marital status was dichotomized as "Married" (currently married) and "Not currently married" (including never married, widowed, or divorced), following previous epidemiological studies that contrasted currently married individuals with those not currently married [19) 20)]. The number of widowed or divorced coaches was small, which would have made separate categories statistically unstable. Smoking status was categorized as "Non-smoker" (including never smoker and former smoker) and "Current smoker."

First, we performed cross-tabulation analyses to examine the associations between SRH and other factors, followed by similar analyses of the associations between K6 scores and these factors. Secondly, binary logistic regression analysis was used to calculate odds ratios (ORs) for good SRH of club factors. Three models were applied: Model 1 provided unadjusted (crude) ORs; Model 2 presented ORs adjusted for high school factors (region, school type, and enrollment); and Model 3 expanded on Model 2 by additionally adjusting for coach factors (sex, age, teaching experience, marital status, smoking status, alcohol

consumption, regular physical activity, and medical history).

We used the same three models to estimate ORs for low psychological distress (K6 score < 13). A p-value of < 0.05 was considered statistically significant. All statistical analyses were performed using IBM SPSS Statistics 29 (IBM Corp., Armonk, NY).

RESULTS

Participant Information

A total of 6,045 school sports club activity coaches responded to the survey. Table 1 summarizes the characteristics of the respondents. The mean age of participants was 39.6 years (± 11.2). The average number of weekday activity days was 4.1 (± 0.9), with a mean practice duration of 2.2 hours per day (± 0.7). On weekends, coaches held practice an average of 1.3 days (± 0.7), with a mean duration of 3.3 hours per day (± 1.9). The average length of teaching experience was 15.6 years (± 10.9).

Among the 6,045 respondents, 742 (12.3%) rated their health as "poor," while 5,303 (87.7%) rated it as "good." For K6 scores, 5,647 respondents (93.4%) had low psychological distress (K6 score < 13) and 398 (6.6%) were classified as having high psychological distress (K6 score ≥ 13).

Insert Table 1

Associations Between School, Club, and Coach Factors and Health Outcomes (SRH and K6 Scores)

Table 2 shows the cross-tabulation of SRH and K6 scores with other variables.

High school factors showed that working at public schools was significantly associated with good SRH. Among club factors, shorter weekday activity durations (< 3 hours per day), fewer weekday activity days (< 4 days per week), shorter weekend activity durations (< 3 hours per day), and clubs with higher competitive aims were significantly associated with good SRH. Among coach factors, being male, being married, not consuming alcohol, engaging in regular exercise habits, and having no history of hypertension, dyslipidemia, or diabetes were significantly associated with good SRH.

Regarding K6 scores, high school factors showed that working at public schools was significantly associated with lower psychological distress. In terms of club factors, shorter weekday activity durations (< 3 hours per day) were significantly associated with lower stress; whereas for coach factors, lower psychological distress was significantly associated with being male, aged ≥ 39 years, having ≥ 14 years of coaching experience, being married, not consuming alcohol, and engaging in regular exercise habits.

Insert Table 2

Health Outcomes

(1) Subjective Health Status (Good SRH)

As shown in Table 3,coaches with longer weekday coaching hours (≥ 3 hours) were significantly more likely to report poorer SRH (OR = 0.70, 95% CI: 0.58–0.85). Coaching for ≥ 5 days per week (OR = 0.80, 95% CI: 0.68–0.95) and weekend activity duration ≥ 4 hours (OR = 0.83, 95% CI: 0.70–0.98) were also associated with poorer SRH. Baseball coaches reported the highest proportion of good SRH among all sports. Coaches whose teams aimed for national-level competitions (OR = 1.28, 95% CI: 1.06–1.56) and those with two or more student managers (OR = 1.29, 95% CI: 1.07–1.55) showed improved health outcomes.

(2) Psychological Distress (Low Psychological Distress)

In the fully adjusted model, baseball coaches showed significantly higher odds of having low psychological distress than coaches of other sports, consistent with the pattern observed for SRH. Supervising teams with one or more student managers, especially two or more managers, showed similar results. Conversely, coaching mixed-sex teams and engaging in weekend coaching of ≥ 3 hours per day (especially ≥ 4 hours) were associated with significantly lower odds of low psychological distress.

Insert Table 3

Discussion

This study found that coaching baseball, aiming for national-level competition, and having two or more student managers were positively associated with good SRH, whereas longer weekday and weekend activity durations were negatively associated with SRH. Similar patterns were observed for psychological distress: longer weekday coaching hours and coaching mixed-sex teams were associated with high psychological distress, whereas baseball coaching and greater managerial support were linked to lower psychological distress.

Our findings indicated that coaches with longer weekday activity durations and higher weekly frequencies tended to report poorer SRH, suggesting that longer weekday coaching hours, rather than frequency, have a greater adverse impact on SRH—possibly because coaching after regular teaching hours extends total working time and contributes to overwork. Weekend sessions exceeding half a day may also reduce recovery time and lead to chronic fatigue, indicating that limiting weekend activities could help maintain better health among teacher–coaches. In contrast, weekend activity frequency was not significantly associated with SRH, likely because only 543 coaches (9.0%) reported zero weekend sessions, limiting statistical power. These extended schedules leave minimal time for rest and recovery, potentially leading to chronic fatigue. Previous research has

documented a strong association between long working hours—including after-school and weekend club responsibilities—and increased psychological stress among elementary and junior high school teachers in Japan [21]. However, this previous study did not examine high school sports coaches or consider sport-specific or school-level factors. The present study not only corroborates those findings in a high school setting but also extends them by identifying weekday coaching hours as a key factor associated with poorer SRH, even after adjusting for school and coach characteristics. In line with these findings, the Ministry of Education, Culture, Sports, Science and Technology in Japan has promoted the community-based transfer of weekend school club activities, aiming to reduce the burden on teacher–coaches [22]. Our results suggest that reducing weekday coaching hours may offer additional benefits for improving the health of coaches.

Our findings also indicated that the presence and number of student managers were positively associated with good SRH and low psychological distress among coaches. Although having one student manager showed a positive trend, having two or more managers was significantly associated with improved health outcomes. In the context of Japanese high school sports, student managers commonly assist with practical tasks such as preparing drinks, managing equipment, and cleaning, thereby reducing the workload of coaches. These results align with previous studies showing that coaches who receive

231 support from athletic trainers [23], external instructors, or certified club advisors [24] report
232 a higher health status. Furthermore, a nationwide survey found that the use of sports
233 trainer services was associated with improved mental health among coaches [25]. The
234 absence of professional support systems—such as sports trainers and external coaches—
235 likely contributes to both physical and mental exhaustion among coaches. These findings
236 suggest that access to adequate support, whether through student managers or
237 professional staff, plays a crucial role in promoting coach health and well-being.

238 Our study also found that baseball coaches reported the highest level of good SRH and
239 the lowest level of psychological distress. Baseball is among the most historically and
240 culturally embedded sports in Japanese high schools, with its first national tournament
241 held in 1915. This long-standing tradition has helped cultivate a culture of discipline,
242 standardized routines, and well-established club norms. As a result, student athletes in
243 baseball clubs may require less behavioral management, allowing coaches to focus on
244 instruction rather than administrative or disciplinary responsibilities. These factors may
245 help explain the lower psychological distress observed among baseball coaches. In
246 addition, differences in coaching motivation may also have contributed to these findings.
247 Baseball coaches are often voluntary and experienced individuals who choose to engage
248 actively, whereas in minor sports, teachers without prior experience may be assigned

coaching duties passively. Such differences in autonomy and intrinsic motivation could influence psychological stress and overall health status.

In addition to these motivational differences, the background of the coaches themselves may also have contributed to the observed disparities. In our dataset, 98.4% of baseball coaches had participated in athletic clubs during their student years, whereas this proportion was 93.9% among all respondents. Given that most baseball coaches have prior athletic experience—often in baseball itself—they may have greater familiarity with coaching practices, game strategies, and communication styles within the sport. Because approximately 27% of respondents were categorized as coaching “Other” sports, some sport-specific variations in workload or coaching style might have been obscured. These sports were grouped into a single category in the present analyses because each sport had a small sample size, resulting in large standard errors for sport-specific estimates. Future research should analyze these smaller sports separately or incorporate qualitative approaches to capture the diversity within this group. This familiarity likely reduces psychological strain compared with coaches who instruct sports that they did not personally play. Therefore, the lower psychological distress observed among baseball coaches may have partially reflected not only the established organizational culture and motivational structure of the sport but also their higher proportion of coaches with

personal athletic backgrounds, which could enhance confidence and reduce the perceived workload.

This study found that the club factor "clubs' aim" at the national competition level was positively associated with improved SRH. Previous studies have shown that goal-directed engagement and intrinsic motivation can reduce stress and promote psychological well-being among coaches [26], and that satisfaction of autonomy needs predicts better mental health [27]. Our findings suggest that setting ambitious goals—such as aiming for national-level competition—may have beneficial psychological effects on coaches by strengthening intrinsic motivation and fostering a stronger sense of purpose. Although the association between national-level competitive goals and psychological distress was not significant after full adjustment, this may have been partly due to the influence of covariates such as individual characteristics (e.g., sex, age, and lifestyle factors) included in Model 2. The nonsignificant result in Model 2 may have reflected the strong influence of these covariates on psychological distress.

In addition, clubs aiming for national tournaments often have multiple teachers or external coaches involved in instruction. Such multi-coach or support systems may distribute responsibilities and alleviate individual workloads, and consequently reduce psychological strain. Because these organizational supports likely mediate the

285 relationship between club goals and coach health, they were not adjusted as covariates in
286 the multivariate model to avoid overcontrolling for mediating pathways. Taken together,
287 these results suggested that while individual attributes were major determinants of
288 psychological distress, structural and social supports embedded in highly organized clubs
289 may have contributed to better mental health and overall well-being among coaches.

290 While most factors showed similar associations with both SRH and psychological distress,
291 athlete sex composition was uniquely associated with psychological distress. Coaches of
292 mixed-sex teams reported significantly higher psychological distress, suggesting that
293 managing both male and female athletes may introduce additional psychological burdens.
294 Previous research indicates that coaching mixed-sex teams requires adjustments and
295 adaptations in communication and instructional strategies depending on athlete sex, and
296 that although shared leadership and inclusive communication can be effective, they are
297 often more difficult to implement in such settings [27) 28)]. These increased demands may
298 increase the workload and stress levels of coaches, even if their overall subjective health
299 assessments remain unchanged. Our findings are consistent with these studies and further
300 support the notion that coaching mixed-sex teams present distinct psychological
301 challenges.

302 A major strength of this study is its nationwide scope and the comprehensive nature of

the collected data. To the best of our knowledge, this is the first survey to target all high school sports club coaches across Japan. By adjusting for a wide range of potential confounding factors—including geographic region, school governance type, school size, and sport-specific variables such as competitive level and practice schedules—this study provides a robust and valid assessment of the health status of coaches.

However, several limitations should be acknowledged. One limitation is that some respondents may have included physical activity performed while coaching sports club activities as part of their exercise habits. This potential overlap between occupational and leisure-time physical activity may have led to minor misclassification when assessing exercise habits, although this issue is common in population-based surveys that rely on self-reported data. The use of subjective indicators presents another limitation. However, both SRH and the K6 scale are widely used in epidemiological research, including national surveys such as the Comprehensive Survey of Living Conditions in Japan, and are considered valid tools for assessing general health and psychological distress, respectively.

Conclusion

This study investigated the association between club factors and health status among Japanese high school sports club activity coaches. Longer weekday practice durations and

frequency, as well as longer weekend practice durations, were negatively associated with the health status of coaches. In contrast, national-level competitive goals and the presence of multiple student managers were positively associated with improved SRH and lower psychological distress.

These findings suggest that future club management should take these factors into account to improve the working conditions of high school coaches.

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Contributions

YS and TO conceived and designed the study. YS performed the experimental work. SH analyzed the data, and SH and YS interpreted the results. SH wrote the manuscript. All authors reviewed and approved the final version of the manuscript.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

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Table 1. Participant Characteristics (n = 6,045).

		Variables		Number	Proportion(%)
Club	Sport Type	Basketball		690	11.4
		Volleyball		572	9.5
		Baseball		500	8.3
		Badminton		458	7.6
		Athletics		448	7.4
		Football		414	6.8
		Table tennis		404	6.7
		Tennis		400	6.6
		Soft tennis		294	4.9
		Kendo		254	4.2
		Others		1,611	26.7
	Athlete No.	< 13		2,847	47.1
		>= 13		3,198	52.9
	Student manager	Absent		3,500	57.9
		Present		2,545	42.1
			1	613	10.1
			>= 2	1,932	32.0
	Athlete Sex	Male		2,184	36.1
		Female		1,330	22.0
		Both		2,531	41.9
	Activity:Weekday	Time	< 3 h/ time	4,986	82.5
			>= 3 h/ time	1,059	17.5
		Frequency	< 4 times / week	4,289	71.0
			5 times / week	1,755	29.0
	Activity:Weekend	Time	< 4 h/ week	4,276	70.7
			>= 4 h/ week	1,769	29.3
		Frequency	0 days	543	9.0
			>= 1 times / week	5,499	91.0
	Aim	Sub-national level		4,489	74.3
		National competition level or higher		1,556	25.7
High School	Area	Hokkaido		335	5.5
		Tohoku		877	14.5
		Kanto		1,397	23.1
		Chubu		1,410	23.3
		Kinki		609	10.1
		Chugoku/Shikoku		619	10.2
		Kyushu		798	13.2
	Establishment	Public		4,936	81.7
		Private		1,109	18.3
	Enrolment	≦ 600		3,183	52.7
		> 600		2,862	47.3
Coach	Sex	Male		5,022	82.8
		Female		1,043	17.2
	Age	< 39		3,125	51.7
		>= 39		2,920	48.3
	Teaching career	< 14 years		3,121	51.6
		>= 14 years		2,924	48.4
	Marital status	Never married		2,026	33.5
		Married		3,884	64.2
		Widowed/Divorced		136	2.2
	Smoking status	Never		4,342	71.8
		Current		915	15.1
		Ever		788	13.0
	Alcohol consumption	Never/Rarely		2,289	37.9
		Occasionally		2,350	38.9
		Daily		1,406	23.3
	Exercise habits	No		2,568	42.5
		Yes		3,477	57.5
	Medical history	Hypertension	No	5,540	91.6
			Yes	505	8.4
		Dyslipidema	No	5,643	93.3
			Yes	402	6.7
		Diabetes mellitus	No	5,847	96.7
			Yes	198	3.3
	Self-rated health	Poor		111	1.8
		Somewhat poor		631	10.4
		Fair		1,627	26.9
		Somewhat good		1,433	23.7
		Good		2,243	37.1
	Kessler 6-item	< 13 points		5,647	93.4
		>= 13 points		398	6.6

Table 2. Self-rated Health, K6 Scores, and characteristics of sports club coaches

Variables				Self-rated health [*1]				p-value	K6 Score				p-value
				Poor		Good			>=13 points		< 13 points		
				Number	Proportion(%)	Number	Proportion(%)		Number	Proportion(%)	Number	Proportion(%)	
Club	Sport Type	Basketball		68	9.2	622	11.7	<0.01	53	7.1	637	12.0	0.03
		Volleyball		77	10.4	495	9.3		37	5.0	535	10.1	
		Baseball		25	3.4	475	9.0		18	2.4	482	9.1	
		Badminton		67	9.0	391	7.4		40	5.4	418	7.9	
		Athletics		54	7.3	394	7.4		25	3.4	423	8.0	
		Football		37	5.0	377	7.1		23	3.1	391	7.4	
		Table tennis		65	8.8	339	6.4		34	4.6	370	7.0	
		Tennis		56	7.5	344	6.5		22	3.0	378	7.1	
		Soft tennis		51	6.9	243	4.6		24	3.2	270	5.1	
		Kendo		37	5.0	217	4.1		22	3.0	232	4.4	
		Others		205	27.6	1406	26.5		100	13.5	1511	28.5	
	Athlete No.	< 13		353	47.6	2494	47.0	0.78	178	44.7	2669	47.3	0.33
		>= 13		389	52.4	2809	53.0		220	55.3	2978	52.7	
	Student manager	Absent		470	63.3	3030	57.1	<0.01	258	64.8	3242	57.4	<0.01
		Present		272	36.7	2273	42.9		140	35.2	2405	42.6	
			1	82	11.1	531	10.0		39	9.8	574	10.2	
			>= 2	190	25.6	1742	32.8		101	25.4	1831	32.4	
	Athlete Sex	Male		242	32.6	1942	36.6	0.10	114	28.6	2070	36.7	<0.01
		Female		171	23.0	1159	21.9		94	23.6	1236	21.9	
		Both		329	44.3	2202	41.5		190	47.7	2341	41.5	
	Activity:Weekday	Time	< 3 h/ time	575	77.5	4411	83.2	<0.01	301	75.6	4685	83.0	<0.01
			>= 3 h/ time	167	22.5	892	16.8		97	24.4	962	17.0	
		Frequency	< 4 times / week	494	66.6	3795	71.6	<0.01	273	68.6	4016	71.1	0.28
			5 times / week	248	33.4	1507	28.4		125	31.4	1630	28.9	
	Activity:Weekend	Time	< 4 h/ time	501	67.5	3775	71.2	0.04	273	68.6	4003	70.9	0.33
			>= 4 h/ time	241	32.5	1528	28.8		125	31.4	1644	29.1	
		Frequency	0 days	73	9.8	470	8.9	0.39	41	10.3	502	8.9	0.34
			>= 1 times / week	669	90.2	4830	91.1		357	89.7	5142	91.1	
	Aim	Sub-national level		579	78.0	3910	73.7	0.01	311	78.1	4178	74.0	0.07
		National level or higher		163	22.0	1393	26.3		87	21.9	1469	26.0	
High School	Area	Hokkaido		44	5.9	291	5.5	0.35	26	6.5	309	5.5	0.30
		Tohoku		121	16.3	756	14.3		52	13.1	825	14.6	
		Kanto		166	22.4	1231	23.2		106	26.6	1291	22.9	
		Chubu		170	22.9	1240	23.4		90	22.6	1320	23.4	
		Kinki		86	11.6	523	9.9		40	10.1	569	10.1	
		Chugoku/Shikoku		68	9.2	551	10.4		44	11.1	575	10.2	
		Kyushu		87	11.7	711	13.4		40	10.1	758	13.2	
	Establishment	Public		578	77.9	4358	82.2	<0.01	305	76.6	4631	82.0	<0.01
		Private		164	22.1	945	17.8		93	23.4	1016	18.0	
	Enrolment	<= 600		396	53.4	2787	52.6	0.68	213	53.5	2970	52.6	0.72
		> 600		346	46.6	2516	47.4		185	46.5	2677	47.4	
Coach	Sex	Male		575	77.5	4427	83.5	<0.01	311	78.1	4691	83.1	0.01
		Female		167	22.5	876	16.5		87	21.9	956	16.9	
	Age	< 39		379	51.1	2746	51.8	0.72	271	68.1	2854	50.5	<0.01
		>= 39		363	48.9	2557	48.2		127	31.9	2793	49.5	
	Teaching career	< 14 years		378	50.9	2743	51.7	0.69	269	67.6	2852	50.5	<0.01
		>= 14 years		364	49.1	2560	48.3		129	32.4	2795	49.5	
	Marital status [*2]	Never married		306	41.2	1856	35.0	0.01	196	49.2	1966	34.8	<0.01
		Married		436	58.8	3447	65.0		202	50.8	3681	65.2	
	Smoking status [*3]	Non-smoker		635	85.6	4495	84.8	0.56	345	86.7	4785	84.7	0.30
		Current smoker		107	14.4	808	15.2		53	13.3	862	15.3	
	Alcohol consumption [*4]	Non-drinker		324	43.7	1965	37.1	<0.01	170	42.7	2119	37.5	0.04
		Current drinker		418	56.3	3338	62.9		228	57.3	3528	62.5	
	Exercise habits	No		441	59.4	2127	40.1	<0.01	213	53.5	2355	41.7	<0.01
		Yes		301	40.6	3176	59.9		185	46.5	3292	58.3	
	Medical history	Hypertension	No	625	84.2	4915	92.7	<0.01	359	90.2	5181	91.7	0.28
			Yes	117	15.8	388	7.3		39	9.8	466	8.3	
		Dyslipidema	No	657	88.5	4986	94.0	<0.01	372	93.5	5271	93.3	0.92
			Yes	85	11.5	317	6.0		26	6.5	376	6.7	
		Diabetes mellitus	No	693	93.4	5154	97.2	<0.01	384	96.5	5463	96.7	0.78
			Yes	49	6.6	149	2.8		14	3.5	184	3.3	

Column percentages were calculated for all categorical variables.

＊1 Self-rated health responses were classified by grouping “Good” and “Fair” as “Good,” and “Poor” as “Poor.”

＊2 Marital status responses were classified by grouping “Never married” as “Never married” and combining “Married” and “Widowed/Divorced” into “Married.”

＊3 Smoking status responses were classified by grouping “Never” and “Ever” as “Non-smoker,” and “Current” as “Current smoker.”

＊4 Alcohol consumption responses were classified by grouping “Never/Rarely” as “Non-drinker” and “Occasionally” and “Daily” as “Current drinker.”

Table 3. Odds ratios of Good self-rated health and low psychological distress (K6 Score < 13) among sports club coaches according to club characteristics

				Crude				Model 1				Model 2			
				OR		95%CI	p-value	OR		95%CI	p-value	OR		95%CI	p-value
Good self-rated health	Sport Type	Basketball		1.00	(Reference)			1.00	(Reference)			1.00	(Reference)		
		Volleyball		0.70		0.50-0.99	0.05	0.70		0.43-0.99	0.04	0.69		0.49-0.99	0.04
		Baseball		2.08		1.29-3.34	<0.01	2.08		1.29-3.33	<0.01	1.73		1.07-2.80	0.025
		Badminton		0.64		0.45-0.92	0.01	0.64		0.45-0.92	0.02	0.67		0.45-0.95	0.02
		Athletics		0.80		0.55-1.17	0.24	0.80		0.55-1.17	0.25	0.77		0.53-1.14	0.19
		Football		1.11		0.73-1.70	0.62	1.12		0.73-1.70	0.61	0.95		0.62-1.46	0.81
		Table tennis		0.57		0.40-0.82	<0.01	0.57		0.40-0.82	<0.01	0.60		0.41-0.86	<0.01
		Tennis		0.67		0.46-0.98	0.04	0.67		0.46-0.97	0.04	0.73		0.50-1.07	0.11
		Soft tennis		0.52		0.35-0.77	<0.01	0.52		0.35-0.77	<0.01	0.50		0.50-1.08	<0.01
		Kendo		0.64		0.42-0.99	0.04	0.63		0.41-0.98	0.04	0.55		0.50-1.09	<0.01
		Others		0.75		0.56-1.00	0.05	0.75		0.56-1.01	0.06	0.78		0.50-1.10	0.11
	Athlete No.	< 13		1.00	(Reference)			1.00	(Reference)			1.00	(Reference)		
		>= 13		1.02		0.88-1.19	0.78	1.03		0.87-1.21	0.75	1.03		0.87-1.22	0.75
	Student manager	Absent		1.00	(Reference)			1.00	(Reference)			1.00	(Reference)		
		Present		1.30		1.11-1.52	<0.01	1.28		1.09-1.50	<0.01	1.17		1.00-1.38	0.06
			1	1.00		0.78-1.29	0.97	1.00		0.78-1.29	0.98	0.92		0.71-1.19	0.52
			>= 2			1.19-1.70	<0.01	1.40		1.17-1.68	<0.01	1.29		1.07-1.55	<0.01
	Athlete Sex	Male		1.00	(Reference)			1.00	(Reference)			1.00	(Reference)		
		Female		0.85		0.69-1.04	0.11	0.87		0.71-1.08	0.20	1.17		0.81-1.27	0.88
		Both		0.83		0.70-1.00	0.044	0.84		0.70-1.00	0.051	0.92		0.76-1.10	0.36
	Activity:Weekday	Time	< 3 h/ time	1.00	(Reference)			1.00	(Reference)			1.00	(Reference)		
			>= 3 h/time			0.58-0.84	<0.01	0.72		0.55-0.87	<0.01	0.70		0.58-0.85	<0.01
		Frequency	< 4 times / week	1.00	(Reference)			1.00	(Reference)			1.00	(Reference)		
			5 times / week	0.79		0.67-0.93	<0.01	0.80		0.68-0.94	<0.01	0.80		0.68-0.95	0.01
	Activity:Weekend	Time	< 4 h/ time	1.00	(Reference)			1.00	(Reference)			1.00	(Reference)		
			>= 4 h/time			0.71-0.99	0.04	0.85		0.72-1.00	0.05	0.83		0.70-0.98	0.03
		Frequency	0 days	1.00	(Reference)			1.00	(Reference)			1.00	(Reference)		
			>= 1 times / week	1.12		0.87-1.45	0.39	1.06		0.81-1.38	0.67	0.95		0.76-1.25	0.71
	Aim	Sub-national level		1.00	(Reference)			1.00	(Reference)			1.00	(Reference)		
		National level or higher		1.27		1.05-1.52	0.01	1.34		1.11-1.63	<0.01	1.28		1.06-1.56	<0.01
low psychological distress (K6 Score < 13)	Sport Type	Basketball		1.00	(Reference)			1.00	(Reference)			1.00	(Reference)		
		Volleyball		1.20		0.78-1.86	0.41	1.21		0.78-1.87	0.39	1.15		0.734-1.79	0.54
		Baseball		2.23		1.29-3.85	<0.01	2.22		1.29-3.85	<0.01	1.87		1.08-3.27	0.03
		Badminton		0.87		0.57-1.34	0.52	0.89		0.58-1.37	0.59	0.86		0.56-1.33	0.49
		Athletics		1.41		0.86-2.30	0.17	1.44		0.88-2.35	0.15	1.28		0.78-2.11	0.33
		Football		1.41		0.85-2.34	0.18	1.45		0.87-2.40	0.15	1.27		0.76-2.13	0.36
		Table tennis		0.91		0.58-1.42	0.67	0.91		0.58-1.42	0.67	0.90		0.57-1.41	0.64
		Tennis		1.43		0.86-2.39	0.17	1.42		0.85-2.38	0.18	1.47		0.88-2.47	0.15
		Soft tennis		0.94		0.57-1.55	0.80	0.94		0.57-1.56	0.82	0.91		0.88-2.47	0.73
		Kendo		0.88		0.522-1.48	0.62	0.87		0.52-1.46	0.59	0.71		0.55-1.52	0.20
		Others		1.26		0.89-1.78	0.19	1.27		0.90-1.80	0.18	1.20		0.84-1.20	0.31
	Athlete No.	< 13		1.00	(Reference)			1.00	(Reference)			1.00	(Reference)		
		>= 13		0.90		0.74-1.11	0.33	0.89		0.72-1.11	0.29	0.87		0.70-1.09	0.22
	Student manager	Absent		1.00	(Reference)			1.00	(Reference)			1.00	(Reference)		
		Present		1.37		1.11-1.69	<0.01	1.32		1.07-1.64	0.01	1.28		1.03-1.58	0.03
			1	1.17		0.83-1.66	0.37	1.15		0.81-1.63	0.44	1.13		0.80-1.62	0.49
			>= 2			1.14-1.83	<0.01	1.39		1.09-1.77	<0.01	1.33		1.05-1.70	0.02
	Athlete Sex	Male		1.00	(Reference)			1.00	(Reference)			1.00	(Reference)		
		Female		0.72		0.55-0.96	0.03	0.75		0.57-1.00	0.05	0.82		0.61-1.11	0.20
		Both		0.68		0.53-0.86	<0.01	0.68		0.53-0.86	<0.01	0.70		0.55-0.90	<0.01
	Activity:Weekday	Time	< 3 h/ time	1.00	(Reference)			1.00	(Reference)			1.00	(Reference)		
			>= 3 h/time			0.50-0.81	<0.01	0.66		0.52-0.85	<0.01	0.67		0.52-0.86	<0.01
		Frequency	< 4 times / week	1.00	(Reference)			1.00	(Reference)			1.00	(Reference)		
			5 times / week	0.89		0.71-1.10	0.28	0.90		0.72-1.13	0.36	0.83		0.66-1.04	0.10
	Activity:Weekend	Time	< 4 h/ time	1.00	(Reference)			1.00	(Reference)			1.00	(Reference)		
			>= 4 h/time			0.72-1.12	0.33	0.44		0.73-1.15	0.44	0.90		0.72-1.12	0.35
		Frequency	0 days	1.00	(Reference)			1.00	(Reference)			1.00	(Reference)		
			>= 1 times / week	1.18		0.87-1.45	0.34	1.06		0.75-1.50	0.73	1.06		0.75-1.50	0.74
	Aim	Sub-national level		1.00	(Reference)			1.00	(Reference)			1.00	(Reference)		
		National level or higher		1.26		0.98-1.61	0.07	1.31		1.02-1.35	0.04	1.19		0.92-1.54	0.19

OR:odds ratio, CI:confidence interval

Model 1:adjusted for High School factor (Area, Establishment, Enrolment)

Model 2: Model 1+ adjusted for club coach factor (Sex, Age, Teaching Career, Marital Status, Smoking status, Alcohol Consumption, Regular physical activity, Medical History)