

Original article

Investigation for Quality of Life (QOL) and self-esteem for health in masters' athletes

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Abstract

Objective: Masters' athletes have been recognized as the model of anti-aging or "exceptionally successful ageing". To explore the reasons for such recognition, we have investigated masters' athletes from the viewpoints of lifestyle and sport psychology, and clarified several new findings.

Methods: Subjects were 142 masters' athletes (100 males, 40 females, and 2 unknowns, average age 64.3 years old), in which approximately 90% have no history of metabolic syndrome or arteriosclerotic diseases. Anti-aging common questionnaire for QOL (AAQOL) was conducted and activity of daily living (ADL) was evaluated.

Results: Significant correlations were observed between AAQOL categories and 4 factors, which are self-esteem for health, daily satisfaction, worthwhile daily life, sleep quality.

The factors influencing health self-esteem were constipation, abdominal fullness, insomnia, age, hypnagogic disorder, fatigue-related symptom, and forgetfulness. The factors influencing the satisfaction of daily life were persistent neurological symptoms, age and difficulty in making judgment.

Conclusion: The present study would contribute to the development of theoretical anti-aging medicine and increasing masters' athletes with low glycative stress, leading to a new era for the practice of anti-aging QOL/ADL in combination with anti-aging medicine and masters' athletes.

KEY WORDS: Masters' athletes, Anti-Aging Medicine, glycative stress, quality of life (QOL), activities of daily living (ADL)

Introduction

Anti-aging medicine has been recently received attention and has become more popular in research and clinical medicine¹⁾. In the light of protective and satisfactory care, the philosophy of anti-aging medicine has been included in the fundamental concept in primary care (PC) medicine, integrative medicine (IM) and alternative and complementary medicine (CAM).

The objective and/or goal of anti-aging medicine have been to live as long as possible in good health. Moreover, it is important that medical treatment that not only prolongs our lives, but also enables us to live a healthy and happy life, maintains quality of life (QOL), and reduces the physical and mental deterioration of aging²⁾.

In anti-aging medicine, checkups and screenings for

assessing physiological, psychological and habitual aspects have been indispensable for evaluating the patients and/or clients. Consequently, anti-aging common questionnaire for QOL (AAQOL) have been developed and used in numerous medical reports³⁻⁶⁾.

The AAQOL has been recognized to be a convenient and useful measure in anti-aging medicine and prophylactic medicine, but its application and method of evaluation have not been established. As to the clinical application of AAQOL, we have reported new evaluating methods of AAQOL using 6 or 8 categories from similar symptom/problems⁶⁻⁹⁾.

In this study, we have chosen the Masters' Athletes for subjects, and investigated the following: 1) AAQOL, 2) correlation among the data from AAQOL, 3) psychological

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and psychiatric aspects including self-esteem for health and daily satisfaction degree. We obtained the characteristic points for masters' athletes, and will discuss these in this report.

Subjects and Methods

Subjects

The subjects of this study consisted of 142 masters' athletes in athletics who attended the International Masters Athletics at Kyoto, Japan in October 2013. The subjects were 100 males, 40 females, and 2 unknowns, the mean age is 64.3 years old. Two unknowns were included for the total analysis.

Survey methods and parameters

A questionnaire form was given to the subjects, and collected at the athletics game. Each subject was asked to list their height, body weight, and to reply the AAQOL questionnaire including physiological, psychological and lifestyle habit inquiries (*Fig. 1*), as well as several inquiries concerning masters' athlete sports.

The analysis of the AAQOL included 6 categories, *i.e.*, visual display terminal (VDT)-related symptom, fatigue-

related symptom, persistent neurological symptom, lost confidence-related symptom and anxiety-related symptom.

The factors from lifestyle included daily diet habit, self-esteem for health, feeling of daily satisfaction, feeling worthwhile in daily life, smoking habit, alcohol intake habit, exercise habit, sleep quality, and so on.

Statistical analyses

The result from AAQOL was analyzed by the 6-category method that is reported in our previous report ⁶⁾. The score in each category was calculated and a correlative analysis was performed using them. Data are shown as the mean \pm standard deviation.

Ethical Considerations

The present study was conducted in compliance with the ethical principles of the Declaration of Helsinki and Japan's Act on the Protection of Personal Information, and with reference to the Ministerial Ordinance on Good Clinical Practice (GCP) for Drug (Ordinance of Ministry of Health and Welfare No. 28 of March 27, 1997). No ethics committee meeting was held. Informed consent was obtained from the subjects concerning this questionnaire.

Anti-Aging Quality of Life Questionnaire (AAQOL)

Athlete from abroad Age () (male / female) country ()

How is your health condition in recent 10-14 days? Please check the degree of your symptoms.

1: Not at all, 2: Almost not, 3: Slightly, 4: Moderately, 5: Severe

	1	2	3	4	5		1	2	3	4	5
Physical						Mental					
tired eyes	<input type="checkbox"/>	irritability	<input type="checkbox"/>								
blurry eyes	<input type="checkbox"/>	short temper	<input type="checkbox"/>								
eye pain	<input type="checkbox"/>	loss of motivation	<input type="checkbox"/>								
stiff shoulders	<input type="checkbox"/>	no feeling of happiness	<input type="checkbox"/>								
muscle pain/strain	<input type="checkbox"/>	nothing to expect	<input type="checkbox"/>								
palpitation	<input type="checkbox"/>	daily life is not enjoyable	<input type="checkbox"/>								
shortness of breath	<input type="checkbox"/>	loss of confidence	<input type="checkbox"/>								
overweight	<input type="checkbox"/>	reluctance to talk	<input type="checkbox"/>								
weight loss	<input type="checkbox"/>	depression	<input type="checkbox"/>								
feeling heavy body	<input type="checkbox"/>	feeling of uselessness	<input type="checkbox"/>								
no feeling of good health	<input type="checkbox"/>	shallow sleep	<input type="checkbox"/>								
thirst	<input type="checkbox"/>	difficulty falling asleep	<input type="checkbox"/>								
skin problems	<input type="checkbox"/>	pessimism	<input type="checkbox"/>								
appetite loss	<input type="checkbox"/>	lapse of memory	<input type="checkbox"/>								
abdominal fullness	<input type="checkbox"/>	inability to concentrate	<input type="checkbox"/>								
abdominal pain	<input type="checkbox"/>	inability to solve problems	<input type="checkbox"/>								

Fig 1. AAQOL questionnaire.

AAQOL, Consequently, anti-aging common questionnaire for QOL.

Results

Subjects:

Included subjects were 100 males and 40 females, 2 cases were excluded with no description of gender. The average age was 64.3 ± 12.1 years old, and ranging from 34 to 103 years old. Average experience of masters' athlete was 16.3 ± 10.6 years.

Past and present medical history of the subjects is shown in [Table 1](#). A high ratio of the subjects (71.1% - 98.6%) did not have metabolic and/or vascular diseases, including obesity, hypertension, diabetes mellitus, hyperlipidemia, cerebral vascular accident (CVA), coronary artery disease (CAD) and peripheral artery disease (PAD).

Table 1. Medical history of the subjects

	Past Hx Present Hx (%)	None (%)
Obesity*	11.3	88.7
Diabetes*	12.7	87.3
Hypertension	28.9	71.1
Hyperlipidemia*	20.4	79.6
Fatty liver*	9.9	90.1
Gout	7.0	93.0
Angina pectoris	2.8	97.2
AMI	2.8	97.2
CVA (bleeding)	1.4	98.6
CVA (infarct)	1.4	98.6
PAD	2.1	97.9

*Diseases with high glycativ stress. n = 140. Hx, history; AMI, acute myocardial infarction; CVA, cerebral vascular accident; PAD, peripheral artery disease.

AAQOL analyses:

The relationships between AAQOL categories and lifestyle factors are shown in [Table 2](#). Significant correlation was seen in the area with colored background. Four factors, self-esteem for health, daily satisfaction, worthwhile daily life, and sleep quality, showed correlations with AAQOL categories.

Correlation among AAQOL categories:

Correlations among 6 AAQOL categories are shown in [Table 3](#). Significant correlation was observed in each category among them.

Correlation among 8 lifestyle factors:

Correlations among 8 lifestyle-related factors are shown in [Table 4](#). AAQOL categories are shown in [Table 4](#). Significant correlation was observed in diet habit vs alcohol intake, self-esteem for health vs daily satisfaction, self-esteem for health vs sleep quality.

Factors influencing health self-esteem:

According to the analysis, the factors influencing health self-esteem were constipation, abdominal fullness, insomnia, age, hypnagogic disorder, fatigue-related symptom and forgetfulness ([Fig. 2](#)).

Factors influencing daily satisfaction:

The factors influencing satisfaction for daily life were, persistent neurological symptoms, age and difficulty in making judgment ([Fig. 3](#)).

Discussion

Features masters' athletes

Anti-aging medicine has recently developed internationally, and masters' athletes have been recognized as the living model of anti-aging. In this study, we have investigated their physical, psychological and habitual aspects, and clarified the characteristic new findings psychosomatically, such as self-esteem for health and daily life satisfaction.

Masters' athletes remain a fascinating model of 'exceptionally successful ageing' and therefore are highly deserving of our continued scientific attention as physiologists¹⁰. As a whole, masters' athletes seem to be a unique population which should be evaluated and cared for utilizing a multidisciplinary approach¹¹.

Formerly, the expert performance of masters' athletes was thought to be largely automatic in nature, but recent empirical evidence suggests the importance of conscious cognitive activity, which can facilitate further improvement amongst expert sports performers and musicians¹². Thus, the key to continuous improvement in masters' athletes would be the result of excellent conscious awareness and psychosomatic controlling mechanisms.

While there are many reports of masters' athletes from the physiological point of view, few focus on older athletes' experiences in the context of broader sociocultural discourses and the strength of sociological qualitative research in this area¹³.

The present study revealed that 140 such athletes rarely have metabolic syndrome and/or diseases of arteriosclerosis ([Table 1](#)). Based on the current Japanese medical situation, these data have been highly evaluated, and the continuing applicable diet and exercise lifestyle would serve to protect from obesity which can be the fundamental cause of metabolic syndrome and arteriosclerosis.

Other studies for masters' athletes

There is a similar report with masters' athletes by Shephard et al¹⁴. In older age-classed competitors over a 7-year period, 750 questionnaires examined the long-term health value of exercise training. The weekly time for training, competition and exercise-related travel was 10 to 30 hours. Despite their age (mean 58 ± 10 years old, range 40-81 years), only 1.4% reported sustaining a non-fatal heart attack (10 cases in 7 years) and 0.6% had required bypass surgery over the 7-year interval.

Hypertension was seen in 30 subjects (4%) in 7 years, and the overall incidence of diagnosed hypertension was 5.5 cases per 1000 per year. Diabetes was observed in 10 cases, with an average incidence of 0.4 cases per 1000 per year.

The majority (90%) were very interested in good health; 76% considered themselves as less vulnerable to viral illnesses than their peers, and 68% regarded their quality of life as much better than that of their sedentary friends. In keeping with their health-conscious attitude, 59% had regular medical check-ups.

In contrast with many older people, 88% slept well or very well. 57% had sustained some injury which limited

Table 2. Relation between AAQOL categories and lifestyle factors

		daily diet habit	health self-esteem	daily satisfaction	worthwhile daily life	smoking habit	alcohol intake	exercise habit	sleep quality
VDT-related symptom	α	-0.016	0.349	0.219	-0.231	-0.079	0.026	0.02	0.255
	p	0.854	0	0.009	0.006	0.351	0.764	0.816	0.007
	N	142	142	141	138	140	139	138	111
fatigue-related symptom	α	0.036	0.544	0.309	-0.249	-0.115	0.048	0.021	0.217
	p	0.673	0	0	0.003	0.178	0.579	0.808	0.022
	N	142	142	141	138	140	139	138	111
persistent neurological symptom	α	0.098	0.449	0.298	-0.058	-0.134	0.039	0.15	0.292
	p	0.246	0	0	0.497	0.114	0.647	0.079	0.002
	N	142	142	141	138	140	139	138	111
depressive-related symptom	α	-0.04	0.328	0.375	-0.154	-0.127	0.136	0.066	0.26
	p	0.64	0	0	0.072	0.136	0.11	0.439	0.006
	N	142	142	141	138	140	139	138	111
lost confidence-related symptom	α	-0.013	0.345	0.444	-0.171	-0.124	0.081	0.055	0.121
	p	0.88	0	0	0.045	0.144	0.343	0.524	0.207
	N	142	142	141	138	140	139	138	111
anxiety-related symptom	α	-0.024	0.391	0.391	-0.094	-0.054	0.066	0.055	0.256
	p	0.779	0	0	0.274	0.53	0.443	0.521	0.007
	N	142	142	141	138	140	139	138	111

AAQOL, Consequently, anti-aging common questionnaire for QOL; VDT, visual display terminal.

Table 3. Correlation among 6 AAQOL categories

		VDT-related	Fatigue	Neurological	Depressive	Lost-confidence	Anxiety
VDT-related symptom	α	1	0.561	0.582	0.332	0.2	0.406
	p		0	0	0	0.017	0
	N	142	142	142	142	142	142
Fatigue-related symptom	α	0.561	1	0.63	0.503	0.536	0.566
	p	0		0	0	0	0
	N	142	142	142	142	142	142
Persistent neurological symptom	α	0.582	0.63	1	0.455	0.424	0.505
	p	0	0		0	0	0
	N	142	142	142	142	142	142
Depressive-related symptom	α	0.332	0.503	0.455	1	0.832	0.828
	p	0	0	0		0	0
	N	142	142	142	142	142	142
Lost confidence-related symptom	α	0.2	0.536	0.424	0.832	1	0.786
	p	0.017	0	0	0		0
	N	142	142	142	142	142	142
Anxiety-related symptom	α	0.406	0.566	0.505	0.828	0.786	1
	p	0	0	0	0	0	
	N	142	142	142	142	142	142

AAQOL, Consequently, anti-aging common questionnaire for QOL; VDT, visual display terminal.

Table 4. Correlation among 8 lifestyle factors

		Daily diet habit	Health self-esteem	Daily satisfaction	Worthwhile daily life	Smoking habit	Alcohol intake	Exercise habit	Sleep quality
Daily diet habit	α	1	0.06	0.107	0.062	-0.113	-0.241	-0.006	-0.064
	p		0.476	0.208	0.471	0.185	0.004	0.947	0.505
	N	142	142	141	138	140	139	138	111
Health self-esteem	α	0.06	1	0.467	-0.115	0.013	0.068	0.089	-0.209
	p	0.476		0	0.179	0.88	0.429	0.301	0.028
	N	142	142	141	138	140	139	138	111
Daily satisfaction	α	0.107	0.467	1	-0.152	-0.05	0.03	0.044	-0.105
	p	0.208	0		0.076	0.559	0.727	0.608	0.272
	N	141	141	141	138	139	138	137	111
Worthwhile daily life	α	0.062	-0.115	-0.152	1	-0.011	-0.001	0.004	-0.107
	p	0.471	0.179	0.076		0.901	0.993	0.964	0.27
	N	138	138	138	138	136	135	134	108
Smoking habit	α	-0.113	0.013	-0.05	-0.011	1	0.03	0.005	0.05
	p	0.185	0.88	0.559	0.901		0.727	0.949	0.602
	N	140	140	139	136	140	138	136	109
Alcohol intake	α	-0.241	0.068	0.03	-0.001	0.03	1	0.033	-0.023
	p	0.004	0.429	0.727	0.993	0.727		0.703	0.817
	N	139	139	138	135	138	139	135	108
Exercise habit	α	-0.006	0.089	0.044	0.004	0.005	0.033	1	0.12
	p	0.947	0.301	0.608	0.964	0.949	0.703		0.211
	N	138	138	137	134	136	135	138	110
Sleep quality	α	-0.064	-0.209	-0.105	-0.107	0.05	-0.023	0.12	1
	p	0.505	0.028	0.272	0.27	0.602	0.817	0.211	
	N	111	111	111	108	109	108	110	111

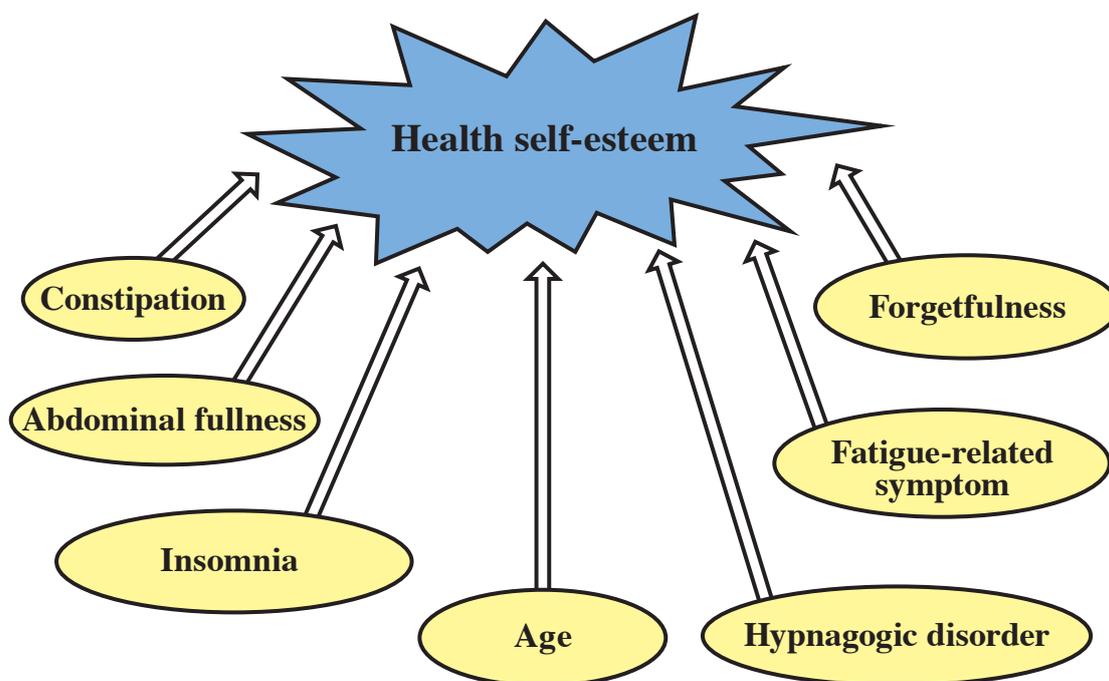


Fig 2. Factors influencing health self-esteem.

A multiple regression analysis using the stepwise method, with the 7th step in the last analysis

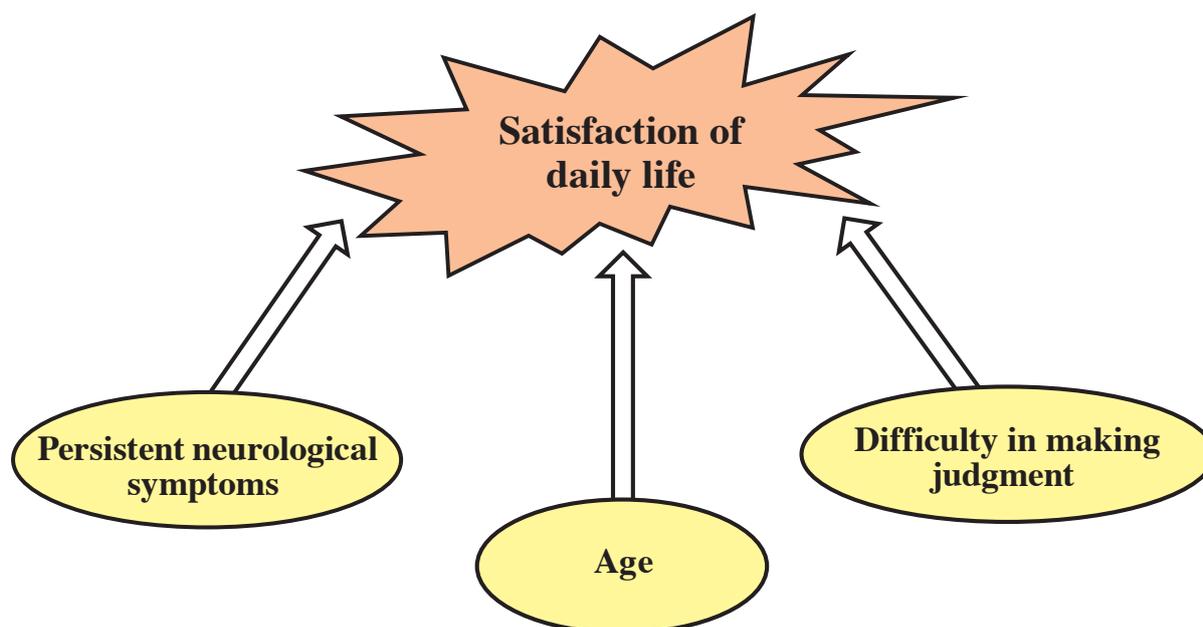


Fig 3. Factors influencing satisfaction of daily life.

A multiple regression analysis using stepwise method, with the 3rd step in the last analysis.

their training for one or more weeks over the 7-year study. Although participation in Masters' competition appears to carry considerable health benefits, the gains may in part reflect an overall healthy lifestyle.

Although the report of Shephard et al ¹⁴ was 20 years ago and it cannot be compared to our current results, it is no doubt that masters' athletes have less metabolic disease or arteriosclerosis than the general public.

Masters' athletes are a group of middle-aged and older adults who engage in regular vigorous physical training and competitive sport ¹⁵. Compared with their sedentary/less active (untrained) peers, Masters' athletes who perform endurance training-based activities demonstrate a more favorable arterial function-structure phenotype, including lower large elastic artery stiffness, enhanced vascular endothelial function and less arterial wall hypertrophy.

The training effect for the vascular age was investigated in 10 sedentary seniors (pre-training and post-training) and 11 masters' athletes using several precise cardiovascular examinations ¹⁶. Three parameters [model flow aortic age, peripheral vascular resistance, effective arterial elastance (Ea)] in sedentary seniors showed a decrease after training. The decreased data of post-training were close to those of masters' athletes. Consequently, these parameters would be, at least in part, involved in the preserved vascular age in masters' athletes.

Psychological analysis

In sports psychiatry research, the Attitudes to Moral Decisions in Youth Sport Questionnaire (AMDYSQ) have been evaluated and applied ¹⁷⁻²⁰. In these series, Schwartz ¹⁹

proposed the values of self direction (independence), stimulation, hedonism, achievement, power, security, conformity, tradition (respect for customs), benevolence (preserving and enhancing in-group welfare), and universalism (preserving and enhancing the welfare of all people). These values reflect the satisfaction of biological needs, demands of coordinated social interaction, and survival and welfare needs of groups.

Schwartz ¹⁹ mapped these 10 values in a circular structure that has two dimensions. The first ranges on a continuum from self-enhancement (power, achievement) to self-transcendence (universalism, benevolence). The second dimension ranges on a continuum from openness to change (stimulation, self-direction) to conservation (security, conformity, and tradition).

Regarding sport psychology, assessment is an important element for the present and future, both in science and in practice ²¹. Trait anxiety inventory for sports (TAIS) was reported in 1993, including mental agitation, cognitive worry concerning victory or defeat, somatic anxiety, flight from situation, loss of confidence in young and older adolescents ²².

In the younger generation, Youth Sport consulting Model (YCSM) ¹⁷, followed by theoretical framework of YCSM ²³ and by measurement practice in sport and exercise psychology ²⁴ were developed in this field. In the case of masters' athletes, however, it is necessary to consider a strong emphasis on self-awareness of thoughts, actions, and decisions, and on ability, self-efficacy, self-control and social understanding ²⁵.

Gau and James ²⁶ investigated the values associated with sports, and compared the sports attitude with 4 historically famous researchers, Maslow, Schwarz, Kahle, Trail and James. It is a valuable trial in which a 10-value-type framework was analyzed, including enjoyment, sociability, identity, status, spirituality, epistemic, aesthetic, moral, ritual, none or

negative.

Athletes' values and moral disengagement in sport was investigated using YSVQ-2 and Moral disengagement in sport scale-short (MDSS-S)²⁷⁾ for 318 university athletes²⁸⁾. The results showed that: 1) a negative correlation between moral values and moral disengagement, 2) female athletes' scores on moral values were higher compared to those of male athletes, 3) there were no differences comparing moral disengagement in sport, 4) athletes of higher levels of competition (international level athletes) scored higher on competence values, and 5) athletes' moral disengagement in sport did not differ across sport experience.

Consequently, further evaluation using several adequate questionnaires in the theoretical and practical aspects would be expected for middle- high aged masters' athletes, suggesting the new era of maintaining healthy life with an anti-aging perspective.

Lifestyles in masters' athletes

From the results of correlation among AAQOL and lifestyle factors (**Table 2**), significant correlations were observed in self-esteem, life satisfaction, worthwhile daily life and sleep quality. In other words, no correlations were seen between AAQOL and diet, exercise and smoking habits, suggesting subjective judgment rather than practical lifestyle would lead to anti-aging life in masters' athletes. Moreover, athletes who have attended masters games for years, may not be aware of these habits, because they have already controlled fundamental lifestyle habits.

Significant correlations among mutual AAQOL 6 categories were seen, indicating the same results as in our previous report using 6-8 categories (**Table 3**). From these results, we can emphasize that the same correlations would be observed in the subjects of masters' athletes.

Significant correlations were seen in 1) diet vs alcohol habits, 2) health self-esteem vs life satisfaction and 3) health self-esteem vs sleep quality (**Table 4**). High health self-esteem would influence the correlation in health self-esteem vs life satisfaction and in health self-esteem vs sleep quality, but no correlation was seen between life satisfaction and sleep quality, indicating that the consciousness in good health may be the valuable factor for anti-aging perspective. Moreover, the coefficient between life satisfaction and sleep quality was low, suggesting that other factors would be mediated to these correlations.

Eight factors influencing self-esteem for health were clarified (**Fig. 2**). These factors can be classified into 2 groups, which are physical pain and quality of sleep. These results would suggest that consciousness of feeling health in masters' athletes may be derived from the lack of daily physical pain or from no sleep problem.

Three factors influencing daily life satisfaction were clarified (**Fig. 3**). The factors regulating daily life satisfaction would have relation of ability for activities of daily living (ADL) of the subjects. In this study, we did not include the inquiry for ADL within our questionnaire. We can speculate from our results, however, that people would feel anti-aging health daily life when they do not recognize any neurological pain or any problem of ADL.

Conclusions

The results showed that approximately 90% of 142 masters' athletes have no history of metabolic syndrome or arteriosclerotic diseases, accompanied by daily satisfaction and high sleep quality, indicating low glycativ stress condition. The present study would contribute to the development of theoretical anti-aging medicine and increasing masters' athletes, leading to a new era for the practice of anti-aging QOL/ADL in combination with anti-aging medicine and masters' athletes.

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Statement of conflict of interest

Non contributory.

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