

## *Original*

### **Investigation of quality of life in athletes from an anti-aging perspective**

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#### **Abstract**

A common questionnaire on aging and quality of life (Anti-Aging Quality of Life Questionnaire, AAQOL) has been used for screening for health check-ups and preventive management in anti-aging and primary care medicine. In this report, we attempted to categorize the 51 items of the AAQOL, which includes 8 groups of 7 items each, and some items for lifestyle. The symptoms were a) visual display terminal (VDT)-related symptoms, b) fatigue-related symptoms, c) persistent neurological symptoms, d) depression-related symptoms, e) loss of self-confidence, f) anxiety-related symptoms, g) autonomic nerve-related symptoms, h) fragile constitution. We applied this method to the investigation of 88 athletes (age 56.83±10.78 years) and 88 normal aged-matched men (age 54.51±14.69 years). The results were as follows; 1) The average number of days of exercise per week were 4.20±1.85 in the athletes and 2.11±2.60 in the control group, 2) There were no significant differences in the 51 items between the athletes and control groups, but significant differences were observed in the 8 categories between the 2 groups, 3) the P value was 0.012 in category c, and nearly 0.000 in categories b and e. From these results, the athletes had less physical and mental symptoms than control subjects, probably due to a lifestyle of exercise continued for many years. These methods and results will provide fundamental data for the application and evaluation of the AAQOL in the future.

#### **Introduction**

In Japan, primary care (PC) physicians commonly take care of many aged patients<sup>1,2)</sup>. On the other hand, anti-aging medicine has recently been the focus of medical attention. In these specialties, emphasis has been placed on evaluation of the quality of life (QOL) status.

Middle-aged and aged persons tend to develop various problems, and regular health checkups and early evaluation are important in the light of preventive medicine. In this sense, the Anti-Aging Quality of Life Questionnaire (AAQOL) has been applied in anti-aging and primary care medicine<sup>3,4)</sup>.

The AAQOL has been recognized to be a convenient and useful measure in primary care medicine and anti-aging medicine, but its application and method of evaluation have not been established. We categorized the 51 items of the AAQOL and applied this to investigation of the QOL status in athletes and age-matched

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subjects<sup>5</sup>). We calculated the differences between the two groups to clarify the importance of exercise in anti-aging medicine.

### Subjects and Methods

The subjects of our study were 88 male athletes (56.83±10.78 years). As comparative controls, we used 88 normal healthy men whose ages had been adjusted (54.51±14.69 years), and no deviation was seen in light of attribute aspects.

We used a generic questionnaire on aging and QOL (the AAQOL, supervised by the Japanese Society of Anti-Aging Medicine). The questionnaire was administered and returned, and questionnaires with incomplete answers were excluded from analysis. The AAQOL includes 30 physical and 21 mental items<sup>3,4</sup>, and the responses are made on a scale of 1 to 5 (1: Not at all, 2: Almost not, 3: Slightly, 4: Moderately, and 5: Severely).

We categorized the 51 items into 8 groups. Each category had 7 items, and 5 items were used twice in 2 categories. The 8 categories were 1) visual display terminal (VDT)-related symptoms, 2) fatigue-related symptoms, 3) persistent neurological symptoms, 4) depression-related symptoms, 5) loss of self-confidence, 6) anxiety-related symptoms, 7) autonomic nerve-related symptoms, 8) fragile constitution (Table 1). The data were calculated by the sum total of the points of 7 items (Table 1). We investigated the differences in the 51 items and 8 categories between the athletes and the control group (t-test).

### Results

- 1) The average number of days of exercise per week were 4.20±1.85 in the athletes and 2.11±2.60 in the controls with a significant difference ( $P=0.001$ ).
- 2) There were no significant differences in the 51 items between the athletes and the control group.
- 3) Significant differences were observed in the 8 categories between the 2 groups. In the 8 categories, the p value was highest (0.012) in category c (persistent neurological symptoms), and was lowest (nearly 0.000) in category b (fatigue-related symptoms) and e (loss of self-confidence) (Table 2).

### Discussion

Internationally, the 36-Item Short Form Health Survey (SF-36) is one of the best known questionnaires for evaluating QOL including physical and mental states<sup>6</sup>. For example, physical function, mental health and vitality scores are investigated in collegiate athletes<sup>7</sup>.

On the other hand, a compact and useful questionnaire in Japan is the AAQOL<sup>3,4</sup>. It has been used in primary care medicine and anti-aging medicine, but its rating or method of evaluation has not been established yet. Therefore, we attempted in this report to categorize the items of the AAQOL and applied this to investigation of the QOL of athletes. We made 8 categories with 7 items each, covering all 51 items. This is an experimental method, and its statistical significance, validity or reliability cannot be discussed in detail because of the limitations of the protocol. Moreover, the categorization also has limitations concerning significance and evaluation. As many reports concerning the AAQOL will be published, a better evaluation method will be established in primary care and anti-aging medicine.

As to the differences between the athletes and the control group, there were no significant differences in the 51 items, but there were significant differences in the 8 categories. Among them, we discuss category c (small significance value) and categories b and e (large significance value).

Category c (persistent neurological symptoms) showed a significant difference but weaker value ( $p=0.012$ )

than other categories. This is probably due to the various causes of neural pain. Some are from diseases of immobilization, and others are from lumbago and arthralgia by over-training in a healthy life style.

Category b (fatigue-related symptoms) showed a low p value (nearly 0.000) between the athletes and the control group. One of the reasons of this result would be the physical superiority of athletes compared with the control group. Athletes have larger maximal oxygen uptake, larger amounts of muscle volume, and lower fat volumes compared with regular healthy people<sup>8)</sup>. Average Japanese men show a 12% decrease in knee extension power in 10 years<sup>9)</sup>, but athletes show less age-related decrease<sup>10)</sup>, due to continuous daily training.

Generally speaking, people who perform daily regular exercise have lower prevalence rates of heart disease, hypertension, and diabetes, and lower death rates<sup>11)</sup>. As the exercise intensity increases by 1 MET, the survival rate increases by 12%, which indicates that the strongest risk factor of ischemic heart disease would be exercise ability<sup>12)</sup>. There is obvious evidence that athletes have lower arteriosclerotic disease<sup>13)</sup>. Therefore, athletes seem to have less physical symptoms or problems, which leads to lower points in the AAQOL.

Similarly, category e (loss of self-confidence) showed a p value of nearly 0.000. This is also due to athletes' characteristic tendency to experience life as meaningful and to show a positive attitude in daily life. The relationship between personality and exercise habits has been investigated and the scores of extraversion and conscientiousness, and low scores of neuroticism were related to the degree of exercise<sup>14)</sup>. These reports indicate that athletes tend to have less psychological symptoms or problems and seem to be consistent with the lower total value of category e in the athlete group.

In summary, we conclude as follows:

- 1) We attempted to categorize the AAQOL, and evaluated the QOL in athletes. Further evaluation and discussion concerning the categorization is needed.
- 2) Athletes had less physical and mental symptoms than control subjects, probably due to continuous exercise habits continued for many years.
- 3) This method is an experimental one, and its statistical significance, validity and reliability cannot be determined. These results, however, provide fundamental data for further application and evaluation methods for the AAQOL in the future.

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## Tables

Table 1. Categorization and symptoms

	Category	Symptom		Category	Symptom
a	VDT-related symptoms	tired eyes blurry eyes eye pain stiff shoulders muscle pain/strain lethargy headache	e	Loss of self-confidence	loss of motivation no feeling of happiness nothing to look forward to daily life is not enjoyable loss of confidence pessimism anxious before sleeping
b	Fatigue-related symptoms	shortness of breath overweight lethargy no feeling of good health appetite loss early satiety epigastralgia	f	Anxiety-related symptoms	lapse of memory inability to concentrate inability to solve problems inability to decide a sense of tension anxiety without reasons vague feeling of fear
c	Persistent neurological symptoms	palpitation thirst headache dizziness tinnitus lumbago arthralgia	g	Autonomic nerve-related symptoms	dizziness tinnitus edema sweating frequent urination hot flush cold sensation
d	Depression-related symptoms	irritability short temper reluctance to talk depression feeling of uselessness shallow sleep difficulty falling asleep	h	Fragile constitution	weight loss skin problems weak chest coughing and sputum diarrhea constipation cold sensation

Table 2. Results of each category in athletes and controls and P values for differences between the 2 groups

	Athletes	Healthy controls	P value
Age	56.83 ± 10.78	54.51 ± 14.69	0.234
a VDT-related symptoms	13.77 ± 4.64	16.30 ± 4.98	0.001 **
b Fatigue-related symptoms	12.00 ± 3.36	14.77 ± 4.28	0.000 **
c Persistent neurological symptoms	13.10 ± 3.82	14.75 ± 4.73	0.012 *
d Depression-related symptoms	13.47 ± 4.09	16.10 ± 5.91	0.001 **
e Loss of self-confidence	12.81 ± 4.04	15.39 ± 5.48	0.000 **
f Anxiety-related symptoms	13.64 ± 3.83	15.88 ± 5.00	0.001 **
g Autonomic nerve-related symptoms	12.68 ± 4.01	14.57 ± 5.10	0.007 **
h Fragile constitution	12.30 ± 3.56	14.08 ± 4.35	0.003 **

N=88 each, mean ± SD, t-test, \*\* p<0.01, \* p<0.05

The homoscedasticity was tested (Levene test).

Unless homoscedasticity was supposed, the Welch method was applied.