

A Study of Current Situation of Beijing College Faculty's Physical Health and Countermeasures

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Abstract - This study investigated and analyzed the physical health condition and characteristics of faculties in Beijing Electronic Science and Technology Institute (BESTI), using the questionnaire survey, physical measurement and mathematical statistics. The results showed the normal rate of the faculty's Body Mass Index (BMI) is rather low; the ratio of the overweight and obesity is relatively high; the grip strength of the faculty in different ages is lower than the average of 2010 in China, showing their poor strength quality; the step test showed, their cardiopulmonary functions were poor. It is also found, the physical health of the young teachers aged from 20 to 39 was not optimistic, with many test indexes lower than the national average level.

Index Terms - faculty, physical condition, health

I. Introduction

Institutions of higher education are the educational institutions to cultivate talents. As the foundation stone to support higher education, the health of university teachers is directly related to the implementation of the national strategy for rejuvenating the country through science and education. Meanwhile, it affects the progress of social and economic development. The test results of 11 national physique of 106 teachers from Beijing Electronic Science and Technology Institute were investigated and analyzed in this study in order to understand the basic situation of physical health of university teachers in Beijing. It provides a reference for the teachers as a scientific guidance of physical exercises, through the analysis of characteristics and rules. Meanwhile, it is also a basis for the planning and development of physical exercises of the university teachers.

II. Study Method

A. Object of Study

The serving teachers aged from 22 to 59 from Beijing Electronic Science and Technology Institute were taken as the object in this study. There were 106 teachers in total.

B. Study Method

1) *Method of Literature*: The literatures related with the

subject were consulted and analyzed.

2) *Physical Measurement Method*: The testing indices, age division, instruments and test methods were performed in accordance with "Manual of 2010 National Physique Monitoring". Moreover, all staff participating in the test were strictly trained.

3) *Mathematical Statistics Method*: All the questionnaire data collected were processed by conventional statistical method through EXCEL and SPSS softwares.

4) *Questionnaire Method*: In accordance with the adult's questionnaire specified in "Manual of 2010 National Physique Monitoring", the teachers participating in the national physique test were surveyed by questionnaire. A total of 120 questionnaires were issued, and 106 effective questionnaires were recovered.

III. Results and Analysis

A. Physical Health Status of University Teachers in Beijing

1) *Various Physical Indexes of Male Teachers from Universities in Beijing*: It can be seen from Table 1 that the vital capacity of male teachers aged from 20 to 39 is higher than that of 40 ~ 59 years. Especially, those above the age of 45 show an abrupt decrease of vital capacity. The test result of step index for the age group of 35 -39 is the lowest, while that for the age group of 45 ~ 49 is the highest, i. e. 65.6 ± 10.33 . The test items for the age group of 20 ~ 39 are the vertical jump and push-up. The performance of vertical jump declines gradually with the increasing age. The grip strength first increases, and then decreases. The age group of 40-44 reaches the highest value, namely, 44.1 ± 8.23 . For the sit-and-reach, the age group under 50 ~ 59 has the longest extending distance, which is 10.8 ± 8.29 cm, while the age group of 30 ~ 34 has the shortest distance, which is 4.7 ± 4.91 . The test result of choice reaction time shows that with the increase of age, the time for single leg stance with eyes closed gradually shortens for the male teachers. However, the choice reaction time gradually extends.

TABLE I Physique Test Result of Male Teachers in Different Ages

Gender	Age (Year)	No. of Sample (person)	Push-up (Times)	Vertical jump (cm)	Sit and reach (cm)	Single leg stance with eyes closed (Second)	Choice reaction time (Second)
male	20~24	1	30.0	37.6	9.5	66.0	0.5
	30~34	10	19.1±90.88	36.3±4.14	4.7±4.91	25.0±22.71	0.5±0.08
	35~39	16	20.8±60.9	31.8±5.20	10.4±6.86	23.7±22.48	0.51±0.09
	40~44	11	-	-	8.5±6.85	18.7±22.27	0.52±0.11
	45~49	14	-	-	7.4±6.44	26.4±17.98	0.56±0.11
	50~54	4	-	-	9.2±4.51	22.5±23.44	0.53±0.08
	55~59	4	-	-	10.8±8.29	11.3±4.27	0.59±0.05

Gender	Age (Year)	No. of Sample (person)	Height (cm)	Weight (Kilogram)	Vital capacity (ml)	Grip strength (Kilogram)	Step index
male	20~24	1	175.70	70.2	4125.0	47.4	65.6
	30~34	10	173.6±6.16	70.5±8.83	4189.4±620.09	39.7±3.92	54.9±8.52
	35~39	16	168.4±7.99	72.0±9.70	4123.8±739.32	42.7±6.53	50.1±8.68
	40~44	11	171.7±8.10	74.9±11.26	4261±979.97	44.1±8.23	58.8±11.96
	45~49	14	171.6±5.73	73.5±8.42	3857.9±787.26	43.4±8.83	65.6±10.33
	50~54	4	169.4±6.06	81.8±6.99	3995±392.68	42.9±6.83	50.4±4.96
	55~59	4	167.4±2.81	70.3±7.91	3755±354.33	39.3±7.90	55.8±7.14

2) *Various Physical Indexes of Female Teachers from Universities in Beijing:* It can be seen from Table 2 that the vital capacity of female teachers under the age of 30 - 34 is the lowest, that under the age of 40 ~ 59 reaches the highest, which is 3011.3±472.62. After 40 years old, the vital capacity presents a declining trend with the increase of age. The grip strength is on the rise before 39 with the increase of age. It reaches the highest for the period between 35 - 39 years old, which is 27.4 ± 7.48 kg. Later, it has a declining trend with the increase of age, but not significant. The step index before 49 shows an upward trend with the increase of age. After 49, it has an obvious decline. The one minute sit-up and vertical

jump are the test items for the age group of 20 - 39. Both show the increasing trend with the increase of age. For the sit and reach test, the age group under 50 ~ 59 has the longest extending distance, which is 25.3cm, while the age group of 30 ~ 34 has the lowest distance, which is 10.1±5.42. The performance of single leg stance with eyes closed reaches the highest within 35~39 years old, which is 47.9±27.85. After 40 years old, there is a declining trend. In terms of choice reaction time, the age group between 30 and 34 is the fastest, while that between 45 and 49 is the slowest, with maximum time value of 0.58±0.10.

Table II Physique Test Result of Female Teachers in Different Ages

Gender	Age (Year)	No. of Sample (person)	Sit and reach (cm)	Single leg stance with eyes closed(Second)	Choice reaction time (Second)	One minute sit-ups (Times)	Vertical jump (cm)
Female	30~34	13	10.1±5.42	35.6±24.28	0.49±0.09	24.4±7.63	20.8±6.16
	35~39	12	14.1±9.66	47.9±27.85	0.53±0.09	26.5±4.50	22.0±6.24
	40~44	8	11.3±6.36	36.8±24.12	0.52±0.05	-	-
	45~49	10	12.1±9.00	32.5±30.42	0.58±0.10	-	-
	50~54	2	17.2±1.27	32±8.49	0.52±0.07	-	-
	55~59	1	21.3	31.0	0.55	-	-

Gender	Age (Year)	No. of Sample (person)	Height (cm)	Weight (Kilogram)	Vital capacity (ml)	Grip strength (Kilogram)	Step index
Female	30~34	13	163.0±6.34	58.7±6.11	2611.2±634.13	22.8±4.41	55.3±8.34
	35~39	12	160.1±5.95	58.3±7.59	3011.3±472.62	27.4±7.48	56.7±9.76
	40~44	8	158.8±4.81	58.3±9.64	2871.9±468.82	24.6±3.20	58.0±7.46
	45~49	10	157.5±4.52	60.6±9.31	2730.5±1437.81	25.0±6.33	63.5±8.21
	50~54	2	155.7±5.73	56.6±0.92	2767.5±965.20	24.5±0.64	53.1±4.38
	55~59	1	156.60	64.6	1615.0	25.3	54.9

3) *Score of Physical Status of University Teachers in Beijing:* It can be seen from Table 3 that the number of teachers with normal body mass index (BMI) is less than that

of half of the total number of teachers being tested, with respect to body shape. The summed proportion of overweight and obesity of male teachers is as high as 66.66%, which is far

higher than that of female teachers. Although the number of female teachers with normal BMI is the highest, the total number of overweight and obesity accounts for 32.61%. The results indicate that obesity has become a common problem of university teachers in Beijing. There is an even more serious problem of obesity for male teachers.

TABLE III Rating Form of BMI for University Teachers in Beijing

Content	Underweight (%)	Less weight (%)	Proper weight (%)	Overweight (%)	Obesity (%)
Male	0.00	0.00	33.34	48.33	18.33
Female	2.17	0.00	65.22	28.26	4.35
Total	0.94	0.00	47.17	39.62	12.27

It can be seen from Table 4 that the score of vital capacity is concentrated between 3 and 4, with respect to physical functions. The score of 1 occupies a small proportion. Step test reflects the functional level of human cardiovascular system. The result shows that the scores for step index among the samples are mostly 2. For all the samples scored 2, the male teachers account for 25%, and female teachers account for 34.78%. Nearly 40% of the test performances of male and female teachers are poor or very poor. The overall cardiovascular functions of teachers are worrying. It can be seen that university teachers in Beijing lack exercises with respect to cardiovascular endurance due to work load and all

sorts of pressures. Such situation should be especially concerned.

It can be seen from Table 4 that the scores of grip strength reflecting the strength quality are mostly concentrated between 2 and 3. The average scores in all age groups are lower than the national average levels. The test items such as sit-ups for female teachers and push-ups for male teachers reflect the sustainable working ability of muscles. The test results show that the female teachers are mostly scored in the range of 4 to 5, while the male teachers mostly obtain scores in the range of 3 to 4. The proportion of female with scores between 4 and 5 is significantly higher than that of the male teachers in same score range. The score of vertical jump which reflects the jumping ability is mostly 3 and 4 points for all the samples. However, nearly 30% of female teachers are not qualified according to their scores. In addition, the score of the sit and reach which reflects the flexibility quality is mostly 2 and 3 points among all the samples. The number of samples with scores below the qualified level is rather large. The score of the single leg stance with eyes closed which reflects the balance ability is mostly 4 and 5 points for all the samples. Overall, the scores for female teachers are better than that of male teachers. The score of the choice reaction time which reflects the quick reaction ability of the coordination between human nerve and muscular system is mostly 3 and 4 points. The choice reaction time shows an obvious advantage among the university teachers.

TABLE IV Percentage of the University Teachers Being Scored with Different Physiques in Beijing

Index	5		4		3		2		1	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Vital capacity	35	26.09	40	36.96	18.33	21.74	5	8.7	1.67	6.52
Step index	15.22	10.87	26.67	26.09	21.67	21.74	25	34.78	15	6.52
Grip strength	3.3	4.4	19.7	8.9	13.1	20	44.3	37.8	19.7	28.9
Vertical jump	7.41	20	44.44	28	37.04	24	11.11	12	0	16
Sit-upPush-ups	16.7	44	33.3	45.5	33.3	4.5	8.3	4.5	8.3	0
Sit and reach	13.33	21.74	28.33	26.09	31.67	21.74	21.67	28.26	5	2.17
single- legged standing with closing eyes	8.33	26.09	33.33	34.78	21.67	19.57	30	17.39	6.67	2.17
Choice reaction time	5	10.87	36.67	36.96	33.33	34.78	18.33	17.39	6.67	0

The proportion distribution of each grade of the physical comprehensive assessment for the university teachers in Beijing with different genders is shown in Table 5. It is seen, the excellence rate for male (6.60%) is lower than female (11.32%). However, the qualified rate for male teachers is

significantly higher than that of female teachers. Overall, the excellence rate of the physical comprehensive assessment for the university teachers in Beijing is 17.92%. The fine rate is 37.74%, the qualified rate is 38.68%, and the failure rate is 5.66%. The general physical condition is good.

TABLE V Physical Comprehensive Evaluation for University Teachers in Beijing

Categories	Statistic								Total number of people
	Excellent		Fine		Qualified		Unqualified		
	Number of people	Percentage							
Total	19	17.92%	40	37.74%	41	38.68%	6	5.66%	106
Male	7	11.67%	22	36.67%	28	46.67%	3	5.00%	60
Female	12	26.09%	18	39.13%	13	28.26%	3	6.52%	46

B. Status of University Teachers' Participation in Physical Activity in Beijing

1) *Objective of University Teachers for Participating in Physical Activity:* The university teachers in Beijing have explicit objective of participating in the physical exercises. A total of 85.5% of teachers consider that physical exercises can invigorate health effectively. Meanwhile, they also consider that it is necessary to participate in physical activities besides working. A total of 28.9 % of teachers consider that it is a kind of recreation to participate in the physical exercises. Another 24.1% of teachers participate in the physical exercises because they are conscious of the lack of exercises. However, the people participating in the physical exercises are less than 20% due to their interests and habits.

2) *Behavior Characteristics of Teachers Participating in the Physical Exercises:* The frequency is low for the university teachers in Beijing to participate in the physical exercise. There are 31.58% of teachers who take exercises for more than three times a week, but mainly in a short term and with medium strength. The teachers who take exercises for less than 30 minutes account for 60%. The teachers who choose exercises with medium - low strengths account for 74.7%. The number of university teachers in Beijing who are qualified for the requirements in sports is less than 20% of the total number.

3) *Main Factors Affecting Teachers' Participation in Physical Exercises:* The factors influencing the physical exercises for the university teachers in Beijing is stated as follows: no time (53.25%), inertia (50.65%), lack of venues and equipment (22.08%), no interest (10.39%) and vacancy of organizers for exercises (9.09%) and so on.

IV . Conclusions and Suggestions

A. Conclusions

1) The normal rate of BMI for the university teachers in Beijing is low, while the proportion of overweight and obesity is high. Obesity has become a common problem for the university teachers in Beijing. It is even more serious among the male teachers.

2) In the various levels of physical comprehensive assessment for the university teachers in Beijing, the excellence rate is 17.92%. The good rate is 37.74%. The qualified rate is 38.68%, and the unqualified rate is 5.66%. The qualified level of physical comprehensive assessment is higher than national average level in 2010 and the average level of Beijing.

3) The index of physical function for the university teachers in Beijing is at a medium level. The absolute strength quality is poor. The grip strength for both the male and female teachers in different ages is lower than that of the national average. The level of cardiopulmonary function is low. The unqualified rate of step index is high. Among the 10 test items for the teachers in the age group of 20 ~ 39, the performance of six items for male teachers and that of five tests for female teachers are lower than that of the national average. The overall physical health for young teachers is worrying.

4) The proportion of sports population is low for the university teachers in Beijing. The teachers taking exercises for more than three times a week account for only 20%. The choice of strength in physical exercises is mainly the medium-low strength for the teachers, and their duration of exercises is mostly 30-60 minutes, which means most of the teachers have not yet developed good habits in exercising.

B. Suggestions

1) The physique and health of teachers should be highly focused. The propaganda on knowledge of sports should be promoted continuously. The change of traditional concept of health in the teachers should be encouraged, and their consciousness of disease prevention should be improved. Thus, the correct and positive attitudes towards physical exercises can be formed.

2) The exercise prescription should be determined according to the specific physiques of the teachers. The aerobic endurance activities should be chosen for the teachers with poor cardiopulmonary function or obesity. The strengthening exercises should be adopted for the teachers with weak muscular strength. The all-around development prescription should be adopted for the teachers with balanced health levels. The functions of cardiovascular and respiratory systems should be fully valued and improved. Proper aerobic exercises should be arranged. The exercises for cardiovascular function should be enhanced, so that the vascular function can be delayed. Proper anaerobic exercises should be arranged in order to maintain their physical speed and strength quality.

3) Guidance to scientific exercises for the teachers should be provided in order to help them in experiencing the charm of sports. Physical activities with various forms should be organized with a combination of voluntary participation and administrative means to meet the needs of health of the university teachers.

4) It is suggested that a feasible exercise plan is made for the teachers by appropriate departments of universities such as the labor union of school, department of physical education and the school hospital, for the purpose of establishing a highly efficient health service system.

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