Study on Health and Physical Exercise of Urban Workers in Gansu Tibetan Area under the Plateau Environment

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Abstract. By means of literature review, expert interview, questionnaire survey and mathematical statistics, through the health survey of 600 male and female workers in Gansu Tibetan area, we find that workers' physical sub-health, psychology sub-health and body diseases are more. In view of the above health conditions, taking physical exercise as a means of promoting health, the corresponding suggestions, and countermeasures are put forward to improve and improve the health of the urban workers in the Tibetan areas.

1. Introduction
Most of the areas in Tibetan area of Gansu are between 3000 and 4000 meters above sea level. It is an alpine humid type with a long cold season and a short warm season. The average annual temperature is minus 0.5 to 3.5 degrees Celsius. The sunshine duration is long throughout the year, and the UV burn ability is strong, especially in the June-September period. The grade is 7-10, and the intensity is the strongest. The area under investigation is a multi-ethnic settlement and multi-religion coexistence area with Tibetan as the main body. This plateau environment has a bad climate, a sparse population, poor infrastructure, and poor living conditions, which seriously affect the work and life of Tibetan workers.

2. Research Objects and Methods

2.1. Research Object
There are 600 urban employees in the Tibetan areas of Gansu (not including physical education teachers, pregnant women and other special populations). Among them, there are 100 males and females in the 25 to 34 age group, 35 to 44 age group and 45 to 54 age group.

2.2. Research Methods

2.2.1. Literature and Data Method. Through the China Journal Net and the library, the relevant books and articles were consulted, and these documents were analyzed and researched, which provided a theoretical basis for selecting topics and designing questionnaires.

2.2.2. Expert Interview. According to the needs of this study, a total of 10 sports theories and medical experts were visited, and a questionnaire on the health status of urban workers in Gansu Tibetan areas was made.
2.2.3. Questionnaire Survey. Before the questionnaire survey, the reliability and validity of the questionnaire were tested and met the requirements. Using a random survey method, a total of 620 questionnaires were distributed, 620 were recovered, and 600 were valid. The recovery rate was 100%, and the effective rate was 96.8%.

3. Research Results and Analysis

3.1. Health Status of Urban Employees in Tibetan Areas

The survey found that of the 600 employees surveyed in the city, 218 workers were overweight, accounting for 36.3% of the total. There were 172 men, 57.3% of the total men, and 46 women, accounting for 15.3% of the total number of women. According to the 《Guideline for Prevention and Control of Overweight and Obesity in Adults in China (Trial)》 formulated by China, from the analysis of average values of various age groups, the female BMI index is within the normal range, while all males are overweight, and males aged 45 to 54 years are partial fat.

| Age Group | Male | Female | Male | Female | Male | Female |
|-----------|------|--------|------|--------|------|--------|
| 25~34     | 100  | 100    | 100  | 100    | 100  | 100    |
| 35~44     |      |        |      |        |      |        |
| 45~54     |      |        |      |        |      |        |
| BMI (kg/m) | 23.57| 19.63  | 2438 | 20.44  | 25.50| 21.49  |

3.2. Body Sub-Health

In the investigation of body sub-health, the most obvious symptom was "hair loss," which accounted for 37.3% of the total, of which men accounted for 18.3% and women accounted for 19%. Studies have shown that the incidence of common hair loss is 0.5%, and the hair loss rate in highland environments is as high as 8% [1]. Second, "dizziness, tinnitus," and "insomnia" accounted for 19.8% and 20.3%, respectively, and the male-female ratio was similar, which was related to the hypoxic environment at high altitude. The oxygen content in the plateau is low, and the ultraviolet rays are strong. In this environment, survival will accelerate the rate of human aging and lead to a series of sub-healthy symptoms.

Figure 1. Body sub-Health
3.3. Psychology Sub-Health
The survey shows that the most obvious symptoms of psychological sub-health are: "irritability, irritability," and "responsiveness" are more obvious, accounting for 32% and 28.7% each, and the situation is less optimistic as the age increases. This kind of mental sub-health not only represents the general psychological status quo of employees in modern society, but also relates to the special living environment in the Tibetan areas of Gansu Province. The altitude of the plateau is high, the oxygen partial pressure is low, the climate is harsh, the area is remote, the population is sparse, and the infrastructure is backward. The land limits the social interaction and social life of workers living in Tibetan areas, leading to psychological imbalances and even more serious mental illnesses. [2]

![Figure 2. Psychology sub-health](image)

3.4. Illness
The results showed that 52.5% of the respondents had no illness, which was more optimistic. The survey of the symptoms of the disease found that the selection of "joint" and "breathing" were more than 107 and 60, each accounted for 17.8% and 10%. A major reason for the large proportion of workers' joint diseases is related to the abrupt changes in the plateau environment and the cold and hypoxia. Similarly, alpine, dry climate determines the life and eating habits, mainly in the Zan butter rake, milk, meat with high fat, high protein, low fiber diet. [3] Studies showed that when the body intake of high fat and high protein, the cholesterol content of the body increased. When bile was concentrated in the gallbladder, too high cholesterol could be precipitated from the solution and accumulated to form [4].

![Figure 3. Illness](image)
3.5. Site Selection for Physical Exercise
Physical exercise site selection should consider the effects of SO$_2$, NO$_2$, PM$_{10}$ and automobile exhaust, especially for physical exercise in the morning to stay away from the road, SO$_2$, NO$_2$, PM$_{10}$ and other factories and automobile exhaust emissions serious area, because the content of pollutant levels can be extended to the traffic line distance of 18~27 meters. Therefore, we should try our best to choose the parks that are fresh air, beautiful environment and away from pollutants, so as to avoid causing harm to human liver, respiratory tract, lung and other organs.

3.6. Time Selection for Physical Exercise
A variety of pollutants will appear in peaks during the day, and SO$_2$, NO$_2$, PM$_{10}$, and automobile exhaust will show two peaks. At 6-8 in the morning, SO$_2$, NO$_2$, and PM$_{10}$ will reach their peak values at 5-7 pm. The Tibetan Plateau has more frequent winds, usually occurring at 3-4 pm. Therefore, the PM$_{10}$ value during this period is relatively high. Due to the high altitude of Tibetan plateau, the content of ozone is the highest between 11 am and 3 pm in the hot summer. Ultraviolet radiation in sunlight is also the strongest and it easily burns the skin. In view of the above contaminants, outdoor sports should avoid periods of more serious pollution and scientifically select time.

3.7. Appropriate Ways of Physical Exercise
It is particularly important to carry out physical exercise in the highland environment of Tibetan areas and scientifically design appropriate exercise prescriptions. For different groups of people, different physical conditions and different health conditions, the intensity, exercise time, and exercise capacity of exercise prescriptions must be strictly controlled. Oxygen in the plateau environment is thin. Studies have shown that for every 100 meters above sea level, the gas pressure is reduced by 1 KPa. As the altitude rises, the oxygen content in the air decreases, and as a result, the partial pressure of oxygen in the alveoli decreases, the oxygen diffusing into the blood of the pulmonary capillaries decreases, and the oxygen partial pressure and saturation of arterial blood also decreases. Oxygen deficiency in various organ tissues.

3.8. Physical Exercise follows the Law of Climate Change
From the perspective of environmental science, the meteorological factors are integrated into the human body, interconnected and restricted to each other to control the heat and cold feeling of the human body. From the air cooling index WCI, it can be seen that the change of one meteorological factor can aggravate or reduce the influence of another meteorological factor. The cold intensity of the environment mainly depends on the temperature, the lower the temperature, the stronger the environment cold. The air cooling index WCI=$4.184 \times (10+10.45 \times V) (33-Ta)$ can accurately calculate the level of environmental cold intensity, that is, the heat dissipation rate of human exposed surface under certain temperature and wind speed. [5] WCI in this study area is all above the "extreme cold". Therefore, cold prevention and warm keeping is an essential precaution for physical exercise. Especially, try not to exercise in the morning. Gansu Tibetan Plateau has low temperature, low humidity and low comfort level. Most of the time is uncomfortable. When exercising, we should keep warm and exercise time according to the four seasons.

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