Original Article

Stroke screening and health-related physical fitness testing in medical staff members in Urumqi, China

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Abstract

Objective: Stroke is the leading cause of death and disability, and is closely related to a lack of exercise. Currently, most Chinese medical staff members lack exercise and may be at risk for stroke. We sought to determine the risk factors for stroke and study the significance of health-related physical fitness testing in stroke prevention among Chinese medical staff members.

Methods: A total of 627 subjects from Urumqi, Xinjiang, China, were included in the study and a survey was conducted from 1st January 2016 to 1st February 2016. Stroke screening and health-related physical fitness testing were completed according to the standard protocol, and the related data were analyzed.

Results: Based on the screening, 27.6% ($n = 173$) of the subjects were at high risk for stroke. The top risk factors for stroke in these subjects were dyslipidemia, lack of exercise or mild physical activity, being overweight or obese, and high blood pressure. Body weight, body mass index, body fat, visceral fat area, body fat percentage, and basal metabolic rate were significantly higher ($P < 0.01$) in subjects at high risk for stroke than in subjects who were not at high risk. Lung capacity, step index, grip test, vertical jump, and sit-up/push-up index were significantly lower ($P < 0.01$) in subjects at high risk for stroke than in subjects who were not at high risk.

Conclusions: A large proportion of China's on-the-job medical personnel is at high risk for stroke. This may be related to the nature of the profession and warrants more attention from the society. The health-related physical fitness measurement parameters in subjects at high risk for stroke were significantly different from those in subjects who were not at high risk. Screening and health-related physical fitness testing in medical staff members may contribute to stroke prevention. More rigorous controlled clinical trials will be needed in the future.

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Introduction

Stroke is one of the common diseases that endanger human health. Many factors have been reported to contribute to stroke occurrence, including genetic factors, poor eating habits and lifestyle, being

overweight, dyslipidemia, hypertension, and diabetes.[1−6] Exercise and physical activity play an important role in stroke prevention,[7−10] while on the job, medical staff members lack exercise and moderate physical activity may be risk factors for stroke. However, limited data and occupational characteristics are available in China.[11−13] Screening patients who may be at risk for stroke is very important for stroke prevention.[10,14−18] As a result, a survey of on-the-job medical staff members is needed to identify individuals at risk for stroke as well as the key risk factors.

A health-related physical fitness test is one of the methods used to measure the level of human health, including heart and lung endurance, muscle strength and endurance, body composition, and flexibility.[9,19−23] Previous studies have demonstrated that health-related physical fitness tests and comprehensive evaluations of the health status of the body are important in identifying early risk factors of cardiovascular disease.[21,22,24−29] However, studies investigating the relationship between stroke and health-related physical fitness are still lacking at this time. To determine the risk factors for stroke and explore the significance of health-related physical fitness testing in stroke prevention, we performed a survey in 627 medical staff members using stroke high-risk population screening and a health-related physical fitness test.

Methods

Ethics statement

This study was approved by the First Affiliated Hospital of Xinjiang Medical University Medicine Ethics Committee. Subjects were treated in accordance with the Helsinki Declaration on the participation of human subjects in medical research. Written informed consent was obtained from all the study participants.

Study subjects

This survey was conducted from 1st January 2016 to 1st February 2016. A total of 627 on-the-job medical staff members from Urumqi, Xinjiang, China, were included in the study, including 111 men and 516 women. The age range of the subjects was 20−60 years (mean age, 39.2 ± 9.3 years). According to the standard protocols,[30] stroke screening and health-related physical fitness tests were completed within the time limit and the related data analyzed. The inclusion criteria were as follows: i) normal activity ability; and ii) normal working ability. The exclusion criteria were as follows: i) age outside the 20−60 years range; and ii) serious chronic illness and/or disability.

Stroke screening of the high-risk population

Stroke screening was completed according to special screening protocols and Implementations of the Pilot Program for the Screening and Intervention of High Risk Population in the National Health Care Reform Program in 2011.[30] The specific risk factors included: i) history of hypertension ($\geq$140/90 mm Hg) or use of antihypertensive drugs; ii) atrial fibrillation or obvious pulse numbers; iii) smoking; iv) dyslipidemia or unknown; v) diabetes mellitus; vi) no physical exercise ($\leq$3 times a week, $\leq$ 30 min every time, $\leq$1 year; or workers engaged in mild manual); vii) body mass index (BMI) $\geq$ 26 kg/m^2; or viii) family history of stroke.

Subjects with >3 risk factors for stroke, or a history of stroke or transient ischemic attack, were classified into the high-risk group, and subjects with $\leq$3 risk factors for stroke were included in the non-high-risk group.[30]

Health-related physical fitness test

Individual cardiopulmonary endurance was tested using a Monark 828E bicycle ergometer and classical step test. Data were calculated using related processing software. The test was performed according to the instructions of the instrument. Parameters including height (cm), weight (kg), lung capacity (ml), step test index, sit and reach (cm), balance test (s), nerve reaction time (s), grip test (kg), vertical jump (cm), sit ups/push ups (BPM), BMI, body fat (kg), basal metabolic rate (cal), visceral fat area (cm^2), and body fat (%) were recorded.[31]

A body composition analyzer (bio-impedance indicators, South Korea) was used to test the body fat rate and for other human body composition analyses.

Statistical methods

Data description and analyses were carried out using the SPSS 17 software. The mean ± standard deviation were calculated for continuous quantitative data, and differences between the two groups were compared using the Student's t test. The data were described using percentages (%) and compared using the Chi-square test. Results with P values less than 0.05 were considered statistically significant.