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Mini Article

The preventive and predictive value of simple exercises (Stair-climbing, squat, and push-up): An educational article and expert opinion

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Abstract

Cardiovascular diseases including ischemic heart diseases continue to be the leading cause of mortality in Iraq and many other countries in the world.

As early as the 1980s, the relationship between increased physical fitness and reduction of morbidity and mortality from chronic disease, particularly cardiovascular diseases have been increasingly recognized. Therefore, the need for simple preventive exercises and predictive exercise tests has been increasingly demanded.

The aim of this educational mini-review is to highlight the preventive and predictive values of simple exercises (Stair-climbing, squat, and push-up), and also to present the relevant expert opinion.

Keywords: Physical fitness, cardiovascular diseases, expert opinion.

Introduction

Cardiovascular diseases including ischemic heart diseases continues to be the leading cause of mortality in Iraq and many other countries in the world [1,2,3].

As early as 1984, Bruce emphasized the relationship between increased physical fitness and reduction of morbidity and mortality from chronic disease, particularly cardiovascular diseases [4]. Therefore, the need for simple preventive and predictive exercise have been increasingly demanded.

As early as 2002, Kong Chuan Teh (Figure-1A) and Abdul Rashid Aziz from Singapore reported a study which suggested a simple stair-climbing exercise is a feasible exercise for encouraging physical activity for its cardiopulmonary benefits [5].

Figure-1A: Kong Chuan Teh from Singapore

In 2005, Colin Boreham (Figure-1B) from Northern Ireland and his research group reported an eight-week controlled study which included 15 females with mean age of 18.8 years. The study showed that several short sessions of stair climbing during the day can help in reducing cardiovascular risk factors [6].

Figure-1B: Colin Boreham from Northern Ireland

In 2018, Yi Guo (Figure-1C) and his research group from the United States reported a cross-sectional study which included forty individuals (18 males and 22 females) aged 18 to 64 years (Mean age: 31.2 years). The participants performed Ruffier squat test and the Balke maximal treadmill test. The study showed that the squat exercise is a valid clinical test for the evaluation of cardiopulmonary fitness in a primary care setting [7].

Figure-1C: Yi Guo from the United States

In 2019, Justin Yang (Figure-1D) from Boston, Massachusetts and his international research group from the United States, Cyprus and Italy reported a retrospective study which included 1104 male firefighters (Aged 18 years or older) observed during the period from the 1st of January, 2000 to the 31st of December 2010, and had push-up capacity data. The participants were followed for up to ten years and the results of the final analysis available on 11th of August, 2018. The study found an important negative association between higher baseline push-up capacity and cardiovascular disease events. Participants who were unable to perform ten push-ups had the greatest risk of experiencing cardiovascular disease events [8].

Figure-1D: Justin Yang from Boston, Massachusetts

In 2021, Anna C Whittaker (Figure-1E) and her research group from the United Kingdom emphasized the available evidence suggesting that stair climbing exercise and physical activity can be associated with a better lipoprotein profile, a healthier blood pressure, lower body weight, and a higher aerobic physical fitness. They reported a study which suggested that that daily stair climbing can be protect against the metabolic syndrome which is associated with unhealthy lipid profiles, blood sugar levels, blood pressure and obesity [9].

Figure-1E: Anna C Whittaker from the United Kingdom

The Ruffier Squat test which was developed by James-Edward Ruffier (Figure-2) during the early 1950s to test cardiovascular fitness of athletes, and its modified version suggested by Dickson are not particularly suitable for use by physicians caring for non-athletic individuals.

Ruffier Squat test involves recording heart rate before and after performing 30 squats in 45 seconds. Most untrained individuals visiting clinician can never achieve the capacity of 30 squats /45 seconds.

Figure-2: James Edward Ruffier (1875-1965), a French physician Expert opinion

Based on the available evidence and scientific ideas, it is recommended that clinicians keep records of the baseline of simple exercises (Stair-climbing, squat, and push-up) capacity of the individuals under their care to help in the future identification of increased risk of cardiovascular disease and also help in designing an appropriate preventive program.

It is also recommended to encourage people to maintain a good capacity of these simple exercises, which in our opinion include 4 times ascending/descending 15 steps-stair in one minute, 25-30 squats in one minute, and 20-25 push-ups in one minute.

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The author has the copyright of all the sketches included in this paper.

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