Journal of Epidemiology and Global Health (2014) 4, 261–268

http:// www.elsevier.com/locate/jegh

Evaluation of physical fitness and weight status among fisherwomen in relation to their occupational workload

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Received 26 September 2013; received in revised form 15 March 2014; accepted 21 March 2014
Available online 30 April 2014

KEYWORDS
Physical fitness;
Harvard step test;
Anaerobic power;
Body fat;
Visakhapatnam

Abstract *Background:* Fisherwomen contribute significantly to the coastal economy of Eastern India; however, data about their physical fitness and weight status are scant.

Objectives: The present cross-sectional study was designed to investigate cardiorespiratory fitness and weight status of fisherwomen, which may be influenced by their occupational workload, using morphometric and anthropometric measures.

Methods: The study was conducted among young fisherwomen (mean age 23.7 years) randomly selected from Araku, Visakhapatnam, Andhra Pradesh, and among young women who are not engaged in the fishing industry but are residents of Araku, who served as controls (mean age 21.3 years). Measurements of body composition included several anthropometric variables, while physical efficiency parameters included a physical fitness index (PFI), VO_{2max}, total energy expenditure, and anaerobic capacity.

Abbreviations: BC, Buttock Circumference; BMI, body mass index; BSA, body surface area; CC, Calf Circumference; CED, chronic energy deficiency; CHD, coronary heart diseases; FPA, female physical attractiveness; HST, Harvard step test; MUAC, Mid Upper Arm Circumference; PBF, Percentage of body fat; PFI, physical fitness index; SDA, specific dynamic action; TC, Thigh Circumference; TEE, total energy expenditure; VO_{2max}, maximal aerobic capacity; WC, Waist Circumference; WHR, waist-to-hip ratio.

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http://dx.doi.org/10.1016/j.jegh.2014.03.005

Results: A significant difference ($p < 0.05$) in body mass index (BMI), body surface area (BSA), body fat percentage, diastolic blood pressure, fitness index, total energy expenditure, and anaerobic power was found in fisherwomen compared with controls. Analysis of collected data showed that the majority of the fisherwomen studied have a normal range of BMI (42%), but 6% of them were found to be mildly overweight. They also showed lower fat mass (13.5 [±3.87] kg) and lower waist-to-hip ratio (WHR) and conicity index. Additionally, they were found to have a moderate level of physical fitness (64.3 [±1.97]%) and a higher total energy expenditure (4.92 [±0.52] k.cal.min^{-2}).

Conclusion: This study implies that physical fitness and weight status of young fisherwomen in Eastern India are influenced by their occupational workload.

1. Introduction

The fisheries sector occupies a very important place in the socioeconomic development of a country [1]. It has been recognized as a powerful income and employment generator as it stimulates the growth of a number of subsidiary industries. It is also a source of cheap and nutritious food besides being a foreign exchange earner. Most importantly, it is the source of livelihood for a large section of the economically backward population of a country. Thus, fisheries form the most important resource for communities inhabiting coastal regions, and it provides a major source of livelihood for them [1].

In India, women constitute about 50% of the population and comprise one-third of the labor force. Women contribute significantly to the fishery sector of the Indian economy. Out of the 5.4 million active fisher folk in India, 3.8 million (70.4%) were fishermen and 1.6 million (29.6%) were fisherwomen [2]. Besides attending to routine family chores, coastal women also support the fisheries sector through their involvement in various operations of small-scale fisheries (Table 1). Women constituted an estimated 25% of the labor force in pre-harvest activities of fish, 60% in export marketing, and 40% in internal marketing [3]. Women are also actively involved in the collection of bivalves and their marketing to ornamental dealers and lime collectors [1]. In Visakhapatnam (*the Jewel of the East Coast*), the residents are mainly engaged in agriculture, fishery, animal husbandry and industries. Fishery is an important economic activity of this district; the fisher population is spread over about 59 fishery villages and hamlets along the coastline stretching to a length of 132 km, covering 11 coastal mandals (districts). About 13,000 fisher families eke out their livelihood from marine, inland and brackish water fishing [4]. Fishing communities are almost solely dependent on the sea resources for their livelihood and the roles a fisherwoman plays are integral to the maintenance and economic prosperity of the family. Women are mostly engaged in peeling, trading, processing and various other activities in the post-harvest sector of fisheries.

The people residing in the coastal regions of Visakhapatnam who are engaged in the fishing industry are supposed to be affected by the workload of this energy-demanding occupation on their physical fitness [5]. Thus, it is evident that their occupation demands a higher level of physical fitness, but the physical fitness data of fisherwomen of India are quite scanty. In adults, a low level of physical fitness (mainly cardiorespiratory fitness) seems to be a stronger predictor of both cardiorespiratory and all-cause mortality than any other well-established risk factors [6,7]. Thus, the present study focuses attention on determining the physical efficacy of the local people engaged in the fishing industry and also on determining the influence of the occupational workload over certain fitness parameters of young women engaged in the fishing industry and who reside in Araku valley in Visakhapatnam district. Thus, this study was carried out to test the hypothesis that physically demanding occupations have an influence over the physical fitness pattern of workers.

2. Methods and materials

Respondents of this small-scale study included young women of Araku valley, Visakhapatnam. Respondents were divided into two groups: for the first group, 50 young fisherwomen (aged 23.7 ± 2.85 years) of the Araku valley of Visakhapatnam District, Andhra Pradesh, were randomly selected to participate. In the second group, 50 age- and sex-matched control subjects (aged 21.3 ± 2.34 years) were also randomly selected from the Araku Valley to minimize the ethnicity