A Survey of Health-Fitness Evaluation Centers

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SYNOPSIS

Twenty-three medically oriented private healthfitness evaluation centers in the United States were

INTEREST IN PARTICIPATING in aerobic activities has increased greatly in the past few years. This response can be attributed partly to the growing awareness of the general population to the evidence suggesting that the lifestyle of the fit individual may beneficially affect his or her overall health and well being. Unfortunately, many adults begin vigorous physical activity without knowledge or regard for their current health status, without an understanding of the consequences (both pro and con) of participation in physical activities, and without the ability to implement a sound, graduated, personal fitness program. Reasons such as these have led to the establishment of medically oriented fitness programs. These programs are designed to evaluate the person's current health and fitness status and guide the development and implementation of scientifically viable fitness and wellness programs.

Our study was undertaken in an attempt to determine how medically oriented programs evaluated the total fitness and well-being of the individual and the similarities and differences that existed with regard to services offered, protocols used, and the professional preparation and qualification of persons conducting these programs. The study was restricted to private programs available to the general public, and it did not include programs available in specific business and industry settings or within universities. YMCA programs were excluded because we believed that they comprise a large separate group with certain set standards and protocols. Further, in order to limit the survey to medically surveyed to determine the types of tests available, protocols used, the availability of exercise prescriptions, qualifications of employees, and facility use. All centers administered an electrocardiogram exercise tolerance test, but great variability existed with regard to the number and type of other tests given and services available. Questions in the survey explored the availability of cardiovascular, pulmonary function, musculoskeletal, body composition, and lifestyle evaluations. Some centers were restricted to testing solely for cardiovascular function, while others were complete wellness centers. The centers had a range of 8 to 325 patrons per month, and in general, they tested more men than women.

oriented programs, only centers that gave an electrocardiogram (E.C.G.) exercise tolerance test as part of the evaluation were included.

Methods

Addresses of centers were obtained from a variety of sources including listings published in The Jogger (1) and Running Times (2), from advertising in both the advertising media and at professional meetings, and by referral.

A 6-page questionnaire consisting of approximately 100 questions was mailed to 48 health-fitness centers in the United States, and a stamped, selfaddressed envelope was enclosed for the response. The questionnaire was derived from the knowledge gained following comprehensive reviews of the literature concerning the concept of wellness and fitness testing and after consultation with physicians and fitness testing center directors. We believe that each item reflects what authorities in the field have deemed important and significant.

Information was requested regarding the types of health and fitness parameters evaluated, protocols employed, personnel qualifications, exercise prescription methodology, and facility utilization. Replies were received from 27 centers. One center that lacked an exercise E.C.G. tolerance test was eliminated as were three because their emphasis was solely on cardiovascular disease conditions and they accepted only cardiac patients as clients.

Type of evaluation	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Cardiovascular:																							
E.C.G. exercise tolerance test	Х	Х	X	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
Maximum oxygen uptake							Х	Х	Х	Х	Х		Х			Х	Х	Х	Х	Х	Х		Х
Perceived exertion				Х			Х		Х	Х			Х							Х	Х		
Blood chemistry	Х	Х	Х	Х		Х	Х	Х		Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х		Х	Х
Complete blood count	Х	Х				Х		Х		Х	Х	Х	Х	Х	Х	Х	Х		Х	Х		Х	Х
Pulmonary function:																							
Vital capacity							Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х		Х	Х	Х	Х	Х
Forced expiratory volume								. X	Х	Х	Х	Х	Х	Х	Х	Х	Х		Х	Х	Х	Х	
Residual volume							Х		Х		Х		Х	Х		Х			Х				Х
Maximum voluntary ventilation									Х		Х					Х	Х		Х	Х	Х		
Musculoskeletal:																							
Muscular strength					X		Х	Х	Х	Х			Х	Х	Х	Х	Х	Х	Х	Х			Х
Muscular endurance					X		Х		Х				Х	Х	Х	Х	Х		Х	Х			Х
Muscular power							Х		Х	Х			Х	Х	Х	Х							Х
Flexibility					X		Х	Х	Х	Х			Х	Х	Х	Х	Х	Х	Х	Х			Х
Posture					X		Х						Х										Х
Orthopedic examination					Х		Х		Х						Х		Х		Х				
Body composition:																							
Hydrostatic weighing							Х	Х	Х				Х	Х	Х	Х			Х	Х	Х		
Skinfold measures				X			Х	Х	Х	Х		Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
Girths						. X	Х	Х	Х	Х		Х		Х			Х						
Anthropometric diameters				X		Х	Х		Х	Х					Х		Х						
Lifestyle:																							
Dietary	Х				Х	Х	Х	Х	Х	Х		Х	Х	Х	Х	Х	Х	Х		Х		Х	Х
Health hazard appraisal	Х		Х		Х	Х	Х	Х	Х	Х			Х	Х	Х	Х	Х	Х	Х	Х		Х	Х
Psychological								Х	Х	Х			Х		Х					Х			
Optional services available:																							
Chest X-ray			. X					Х			Х	Х	Х		Х		Х		Х	Х		Х	Х
Pap smear								Х			Х		Х				Х		Х			Х	
Tonometry								X			X		X				X		X			X	
Sigmoidoscopy								X			X		X				X					X	
5																							

Table 1. Overview of tests performed at 23 health-fitness evaluation centers

No attempt was made to determine the reason for a lack of response from the 21 nonresponding centers.

Results and Discussion

Questions about the health and fitness tests explored the centers' evaluations of cardiovascular, pulmonary, and musculoskeletal systems; body composition; and lifestyle. Table 1 gives a comprehensive list of the type of testing available at each of the 23 centers.

A physical examination by a physician was required before other forms of health fitness evaluation in 19 centers. This examination was performed by the individual's personal physician in 3 centers, by the staff in 11, and by either the personal physician or the center staff in the remaining 5. Five clinics required referral by or permission from a client's physician before acceptance into the testing program.

A typical E.C.G. exercise tolerance test was administered at all centers, but the protocols used varied considerably. To cater to an individual per-

Table 2.	Protocols	for	electrocardiogram	exercise	stress
			tests		

Protocol and reference No.	Number of centers using protocol				
Bruce treadmill test (3)	. 14				
Balke (substandard) treadmill test (4)	. 9				
Naughton treadmill test (5)	. 3				
Ellestad treadmill test (6)	. 2				
center	. 6				
Astrand bicycle ergometer test (7)	. 5				
Y.M.C.A. bicycle ergometer test (8) Bicycle ergometer test protocol derived by	. 3				
individual center	. 4				

NOTE: Centers used between 1 and 4 protocols depending upon individual circumstances.

son's circumstances, 14 centers used two to four different protocols; the other 9 used only one protocol. In many cases, the protocol was a recognized treadmill or bicycle ergometer test; however, in six treadmill tests and four bicycle ergometer tests, a protocol was used that had been developed by the staff of the individual center. The Bruce treadmill protocol (3) appeared to be the most popular and was used in 14 centers. The protocols used are shown in table 2.

Thirteen centers collected data on the direct determination of oxygen consumption. Of these, 10 centers additionally recorded respiratory exchange ratio (R.E.R.), 7 breathing frequency, and 8 maximum ventilaton. The Borg scale (9) measuring perceived exertion was used in six centers, and the respondent for one center indicated that the facility used its own scale for the determination of this factor.

Symptom-limited maximum effort was listed in all instances as one criterion for termination of a test, but five centers had additional limitations and stopped the test in certain nonspecified cases at either 85 percent or 90 percent of estimated maximum heart rate. One center also reported utilization of ventilation and R.E.R. response as criteria for test termination.

Blood chemistry was routinely determined at all except three centers, and it included analysis of blood glucose, triglycerides, total cholesterol, and high density lipoprotein levels. Eighteen centers routinely evaluated uric acid levels and 12, low density lipoprotein levels. A complete blood count was recorded in 16 centers. One center obtained post E.C.G. exercise tolerance blood samples for lactic acid level evaluation.

Only 16 centers did pulmonary function testing, and all of them tested for vital capacity or forced vital capacity. Other types of pulmonary function tests and the centers using them are shown in table 1.

Fourteen centers provided some form of musculoskeletal evaluation and all of them also tested muscular strength and flexibility or joint mobility. Muscular endurance tests were given in 11 centers, muscular power in 8, posture in 4, and orthopedic evaluation was given in 6 centers. Strength testing was done by utilization of Cybex isokinetic apparatus (5 facilities), by grip strength dynamometer (3), by use of free weights (2), or by an unspecified methodology (4). Muscular endurance was evaluated by use of the Cybex isokinetic apparatus or by a 60-second situp test. One center used a jump test and one administered the Margaria anaerobic power test (10) for the determination of muscular power. The other five centers utilized the Cybex apparatus for determination of this factor.

All of the centers that administered flexibility tests used a sit and reach test for trunk flexion evaluation. Two centers gave either one or two additional flexibility tests, and another performed a total of nine tests for range of motion determination. Posture was evaluated in one center by six tests of body symmetry, one claimed a cursory evaluation during the physical examination by the physician, and one evaluated posture during both treadmill and stationary running.

The most popular method of body composition analysis was by use of skinfold measurement. Eighteen centers utilized this method, and the number of individually measured skinfold sites varied between two and nine. Although 11 centers determined body composition by means of hydrostatic weighing, only 7 were equipped to measure residual volumes. Presumably, the other four centers used either equations or tables to estimate residual volume. Other types of body composition analysis included girth and anthropometric diameter measurement.

In evaluation of lifestyle, questionnaire items pertained to dietary analysis, health hazard appraisal, and psychological tests for stress detection. Dietary analysis was provided at 17 centers, and some form of health hazard appraisal was given at 18 centers, but psychological testing was limited to 5 centers. The types of psychological tests administered included the life change index (11), the personality inventory (12), and the profile of mood states (13). One center had a clinical psychologist on staff for testing and counseling purposes.

A number of centers reported that their staffs were able to give other medical screening tests when indicated or requested. These tests included a chest X-ray, tonometry, sygmoidoscopy, and Pap smear. Centers where these tests were available are shown in table 1.

There were wide differences in the complexity of the tests administered (table 1). All centers gave the E.C.G. exercise tolerance test. However, as indicated previously, this test was the prime criterion for denoting a medically oriented facility. Eleven of the centers were comprehensive and did testing in all major areas—the cardiovascular, pulmonary, and musculoskeletal system; body composition; and lifestyle. Another two centers offered evaluation in all areas except pulmonary function. In contrast, three centers were limited to evaluation primarily of the cardiovascular system with additional tests in areas that may affect cardiovascular function such as lifestyle.

Exercise prescription can be termed an integral part of the total services offered since it was offered by all except one center. The basis for intensity of exercise was either a percentage of maximum heart rate (12 centers), percentage of heart rate reserve as determined by the Karvonen (14) method (8 centers), or a percentage of maximum oxygen uptake (3 centers). The percentage of maximum heart rate used varied between 50 percent and 90 percent. Both a warmup and cool-down prescription were given in 19 centers, muscular strength and endurance exercises were prescribed in 10 centers, muscular power exercises in 5 centers, and remedial exercises, if needed, in 13 centers.

The response to questions dealing with professional qualifications was difficult to evaluate, possibly due to a reluctance by the person filing the return, to divulge such information. As a result of the lack of responses, staffing patterns were difficult to assess. However, the diversity of specialty qualifications can be observed. Of the 20 centers responding to this section of the questionnaire, all had some form of physician coverage either full or part time. Seventeen centers employed a cardiologist. Persons with some degree of expertise in exercise physiology were employed in 16 centers, and at least 1 or more registered nurses were employed in 13 centers. The majority of the centers employed secretarial staff, and eight had either sales, marketing, or public relations personnel. One center employed registered physical therapists. Table 3 shows the numbers of the various disciplines and the number holding American College of Sports Medicine qualifications. Although the professional background of American College of Sports Medicine certification holders was not queried specifically, it was deduced from responses to the questionnaire that medical and physical education personnel were included.

The number of clients using the services of the centers varied greatly. Nineteen centers responded to this set of questions and reported a total number of patrons ranging from 8 to 325 per month, with

Table 3. Summary of personnel staffing health fitness evaluation centers

Type of personnel	Total employed at 23 centers			
Medical staff:				
Cardiologists	. 17			
Doctors of medicine with other specialties .	. 24			
Doctor of osteopathy	. 1			
Doctor of dental surgery	. 2			
Nurses	. 18			
Exercise physiology staff:				
Doctor of philosophy	. 7			
Master of science	. 21			
Bachelor of science or arts	. 3			
American college of sports medicine certification	ז²:			
Program director	. 7			
Exercise specialist	. 5			
Exercise technician	. 11			

No distinction is made between full time and part time personnel.
Both medical and exercise physiology personnel are included.

a mean of 64. Generally, more men were tested at each center than women (the average was 48 men and 16 women), although 3 centers reported testing equal numbers of both sexes, and 1 tested twice as many women as men.

Other information obtained from the questionnaire and not reported in the tables included the fact that 17 centers produced their own exercise manual; 15 had facilities for onsite exercise classes; and 7 offered computerized evaluations.

Conclusions

In this survey of 23 medically oriented healthfitness evaluation centers, prime emphasis was given to documenting the diversity of testing available and of the services offered. Some centers appear to be clinics devoted solely to the evaluation of cardiovascular function, while others were much more elaborate and were considered to be wellness centers similar to those recommended by Carpenter (15). He suggested that a hospital fitness center should have the three major operational divisions of fitness counseling services, fitness facilities, and fitness research. Fitness counseling services included health hazard appraisals, preventative and rehabilitative cardiac clinics, nutritional counseling, sports medicine clinics, selective screening for pulmonary function, body composition tests, lower back pain programs, and behavior modification programs for weight control, smoking, and stress. Such programs have been established in various hospitals (16). The evaluation phase of our study indicated that the comprehensive centers tended to test for those items advocated by Pollock (17), the essential components being the evaluation of cardiovascular, pulmonary, and musculoskeletal systems and lifestyle and body composition analysis. Some form of exercise prescription was given in all but one center. Many centers had facilities available for onsite exercise classes. All centers had some form of physician involvement, and the majority employed people with some academic qualification in exercise physiology.

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Reducing the Health Consequences of Smoking—a Progress Report

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SYNOPSIS

Smoking has been identified as one of the health priority areas to be addressed by the Public Health Service's Objectives for the Nation initiative. Several gains in moving toward the 1990 goals for smoking and health have been recorded. Only 32.6 percent of the U.S. population over 16 years old were smokers in 1980, compared with 41.7 percent in 1965. The proportion of high school seniors who were daily smokers fell from nearly 30 percent in 1977 to 20 percent in 1981. Changes in smoking prevalence were related to critical events, such as the Surgeon General's reports on smoking. A variety of information and education programs aimed at specific groups are being carried out by Federal, State, and local governmental agencies and voluntary health organizations.

GIGARETTE SMOKING IS CURRENTLY RECOGNIZED as the largest single preventable cause of premature death and disability in our society. The death rate for those who smoke two or more packages of cigarettes a day is twice as high as the death rate for people who do not smoke. On the average, smokers have a risk of lung cancer death that is 10 times greater than that of nonsmokers; a risk of fatal heart attack that is 2 times greater; and a risk of death from chronic obstructive lung disease that is 6 times greater than for nonsmokers.

In light of these serious health risks, smoking and health has been identified as 1 of the 15 health priority areas to be addressed through the Public Health Service's Objectives for the Nation initiative (1). The 10 priority objectives related to smoking and health are aimed at reducing risk factors, increasing public and professional awareness of the health hazards of smoking, increasing services and protection, and improving surveillance and evaluation (see box). Overall, public and private efforts to meet the 1990 objectives for smoking and health appear to be on target.

Progress Towards 1990 Objectives

Reducing risk factors. Perhaps the most important of the four sets of goals, reducing risk factors, can be attained by reducing cigarette consumption. Adult per capita consumption has been going down since 1964, and this decline appears to be continuing. Cigarette smoking in the United States reached its zenith in the early 1960s, just before publication of the 1964 Report of the Surgeon General's Advisory