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WEIGHT MANAGEMENT IN CARDIAC REHABILITATION; ASSESSMENT & INTERVENTION: LITERATURE REVIEW

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Obesity as cardiovascular risk factor

Obesity has been determined to be an important risk factor for cardiovascular disease among men and women, although specific data on racial/ethnic minorities are lacking. Obesity appears to interact with or amplify the effects of other risk factors by mechanisms that as yet remain frontiers for further research. Alarming data from the National Health and Nutrition Exam Surveys show that the prevalence of obesity among Americans has increase over the past 20 years, such that an estimated 47 million adults Americans are deemed to be overweight. Thus, obesity should be viewed as a prevalent, serious and to date, refractory health problem.[1,2]

In large consecutive series of patients enrolled in cardiac rehabilitation programs, the prevalence of obesity is nearly 50%.[3,4,5] Surprisingly, weight management and obesity, despite their strong link to other risk factors, have not been a primary focus in cardiac rehabilitation. This is evidenced by the sparsity of scientific data on this subject in the cardiac rehabilitation literature. It is very clear, however, that more data are needed and that additional focused intervention must be performed. Obesity should be viewed as a heterogenous problem that stems from genetic, biologic, and behavioral factors.

Accordingly, the expert Panel of Scientist at the Prevention III Conference called for a new generation of integrated basic and clinical research to focus on the following questions.
-Who should lose weight?
-Who can lose weight?
-How much weight can be lost?
-What is the best approach for an individual?
-How can weight maintenance be enhanced?[6]

Secondary prevention programs need to focus concentrated efforts on the careful evaluation and treatment of overweight patients. Program specialist must identify patients in need of weight management in order to provide further evaluation and focused intervention.[7]

Evaluation of body weight, body mass index and body composition

All patients should have weight and height measured and body mass index (BMI) determined at the initial visit as part of the routine evaluation. Body composition analysis using skin folds or under water weight techniques, girth measurements, waist -to-hip ratios, or other methods may also be incorporated into this evaluation process.[8-10]

Body Mass determination

Well defined and reliable indices of weight and body composition should be assessed at base line, since simple height-weight measures do not adequately assess adiposity.[11] In addition to height and weight, BMI should be determined and waist to hip circumference ratios should be also considered. These anthropometric measurements are easily obtained and provide a gauge for determining levels of obesity and distribution of body fat (table I).

Initial determination of caloric goals for the purpose of exercise prescription also necessitates an estimation of body composition or excess weight.

Clinical research tools such as hydrostatic weighing, computerized tomography (CT), magnetic resonance imaging (MRI) and dual energy absorptiometry (DEXA) are most accurate but not practical for use in secondary prevention setting.[12,13]

Various alternative approaches to estimating body composition have been employed in cardiac rehabilitation programs, including bioelectrical impedance (BIA), near- infrared interactance (NIR), fat fold and circumferential measures. Of These, the validity of (BIA) and NNIR techniques in over -fat or obese adults remains questionable and at the least must be measured under strict conditions. While fat- fold and circumferential measurement are better estimate of percentage of body fat, serial measures for comparative

purposes and estimation of recommended weight from these measures can be problematic.

This is not to say that traditional body composition measurements are necessarily inappropriate. Used as absolute measures rather than for the determination of percent fat, individual fat-fold and/or circumference measures, in addition to BMI can provide meaningful and accurate comparative feedback throughout their participation in the program.[13]

Clinician may find the use of BMI to be a practical approach to determining exercise priorities.
BMI may be calculated as follows.
$BMI=Wt.(kg)/Ht^{2}$ (meters)

In general, a BMI of less than 25 is desirable; BMI above 27 or 28 are associated with increased health risks.[7]

Table I: Indies of body weight measurement.

Body mass index* (kg/m^2)	**Men**	**Women**
Ideal	21-25	21-25
Obese	≥27.8-30	≥27.3-30
Markedly obese	>30-40	>30-40
Morbidly obese	>40	>40
Waist to hip ratio +		
Ideal	<0.90	<0.80
At risk	>0.95	>0.85
% Body fat **		
Ideal	12-18	18-25

*Body weight in Kg divided by (height in meters)[2]
+ Widest circumference measured at waist (level of umbilicus) divided by widest circumference measured at hip (mid-buttock level).
** Can be determined from skin caliper method, hydrostatic weighing, DEXA, or Bio-impedance analysis.

Intervention
Weight management interventions should be targeted to those patients whose weight and body composition place them at increased cardiac risk, and whose weight may adversely affect other risk factor such as diabetes, abnormal lipids, and hypertension. All patients should achieve and maintain an appropriate/desirable weight and should begin diet management and physical activity as appropriate.

Dietary evaluation is an essential component of a weight management program. Individual should be assessed for total daily caloric intake, fat and cholesterol intake and adequate nutrient and fiber content of their diet. Evaluation of eating habits including time of day, portion sizes, snacking, triggers, and social-cultural influences are important. Caloric expenditure during domestic, occupational and leisure tasks as well as during exercise is helpful to determine caloric balance. The presence of underlying metabolic abnormalities (including hypothyroidism, Cushing's disease, and other endocrine disorders) should be noted. Family history of obesity as well as patient's weight history should be assessed to evaluate possible genetic influences. Finally, assessment of the patient's personal perception of weight and appearance can be helpful in setting reasonable short term and long term goals.[14]

Intervention to promote weight loss in patients determined to be an undesirable body weight and composition should focus on the following areas.
-Identifying and treating underlying metabolic disorders when possible
-Adjusting caloric intake via dietary counseling
-Increasing caloric expenditure via increased daily physical activity and a regular program of exercise.
-Implementing behavioral interventions to promote long term adherence and.
-Considering medical interventions in patients, whose obesity has been determined to be seriously detrimental to their health, and only as adjustment to comprehensive weight control program.
Secondary prevention program that combines exercise, dietary education, counseling and behavioral interventions designed to reduce body weight can help patients lose weight. These multifactorial cardiovascular risk reduction interventions are recommended as components of secondary prevention.

Because of the potential adverse effects of appetite - suppressant medications, these drugs should only be considered for the markedly obese and only under close and careful surveillance of a physician who is well trained and experienced in the appropriate users of these drugs.[14]

Individualized recommendations for dietary modification should be made with consideration of reasonable goals and likelihood of compliance. Spousal or living -partner involvement in nutritional counseling sessions is important to foster compliance and support, particularly if this person is primarily involved with food shopping and meal preparation. Nutrition instruction should emphasize helping the patient to establish a new eating style that is low in sugar, fat, and cholesterol and high in nutrients, complex carbohydrates, and fiber. In the initial stages of weight loss, both total daily caloric intake and percentage of fat calories should be reduced.

Most women do well in 1,200 to 1,500 calories a day and men on 1,500 to 2000 calories a day, depending on their age, height, and activity level. Much of the calorie moderation tends to occur spontaneously as patients focus on higher nutrient choices. A rate of weight loss of one to two pounds per week or 1% of body weight per week is considered safe.[1] A multivitamin/mineral supplement is recommended since it is difficult to ensure nutritional adequacy on diets of less than 1,800 calories a day.

Patients should be counseled to avoid skipping meals or undertaking periods of nutritional deprivation. Instead, they should adopt a regular eating pattern that begins with breakfast and includes four to six small feedings per day spaced three to four hours apart. In addition to improving metabolic regulation, this recommended eating pattern eliminated the intense feelings of physical deprivation that may characterize erratic, large-meal eaters and commonly lead to discriminate food choices and recurrent binges.[1] The use of very low-calorie diets (VLCD) is beyond the scope of typical cardiac rehabilitation programs.

Exercise Implementation

As with all patients, increased daily physical activity should be recommended. Walking, stair climbing, gardening, recreational activities (e.g., bowling, golf, tennis) can be incorporated into the daily and weekly schedule to promote general health and caloric expenditure. The exercise program should be designed to promote at least 250 to 300 calories of energy expended per session by the point of completing 12 weeks of early outpatient training, aiming for 1250 calorie a week, which would include additional daily physical activity.[15] This may be difficult to attain in cardiac patients who may have a low exercise capacity. Therefore, additional or lengthier exercise sessions may be useful in these patients. The choice of exercise modalities is particularly important for the individual aiming to lose weight. Weight-bearing activities appear to provide the greatest caloric expenditure and should be recommended whenever possible after considering any musculoskeletal limitation.[16,17] Other concerns include body weight limits for use of treadmills and stair - climbers, increased difficulty of obtaining adequate ECGs during telemetry monitoring; and modification of training equipment to optimize efficacy and comfort for the obese individual.

Larger seats for stationary and recumbent cycles and a platform step to utilize equipment are suggested. Some patients may have to walk in hallways or on adjacent track (if available) until they reach a weight appropriate for the treadmill. If the overweight individual cannot use a treadmill or stationary cycle to perform the initial exercise test, a six- minute walk test may be used for exercise prescription and functional capacity assessment.

Behavioral Intervention

The use and type of specific behavioral interventions, beyond basic educational sessions, are important. Additionally, measures of patient compliance should be assessed, including attendance rates and activities during session. Structured outcome measures should be made periodically to assess both short-term and long-term results and the factors that may affect them.[7]

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