

Jenna Brinks, MS, and Barry A. Franklin, PhD

Suboptimal Exercise Compliance: Common Barriers to an Active Lifestyle and Counseling Strategies to Overcome Them

Abstract: *Adherence to a structured exercise program provides numerous health benefits, including reductions in body weight, fat stores, and blood pressure, improved blood glucose management and lipid/lipoprotein profiles, increased cardiorespiratory fitness, decreased cardiovascular risk, and enhanced psychosocial well-being. Despite these benefits, many individuals find it difficult to comply with a regular exercise program, predisposing them to an increased risk of chronic diseases and other medical conditions. Several barriers to participation in structured exercise, including time and financial constraints, psychosocial factors, and physical limitations, contribute to low adherence rates. Accordingly, health care professionals should use varied counseling strategies to assist their patients in overcoming habitual physical inactivity and our increasingly hypokinetic lifestyle. Motivational interviewing, goal setting, using stages of readiness to change, and identifying physical/psychosocial limitations are effective ways for helping patients to achieve the health and fitness benefits*

of structured exercise, increased lifestyle physical activity, or both.

Keywords: compliance; barriers to exercise; counseling strategies; motivational interviewing

Cardiovascular disease (CVD) is the leading cause of death in men and women in the United

while another 8% occur in individuals with multiple “borderline” risk factors.¹ Physical inactivity is among the traditional risk factors that, if favorably modified, can dramatically reduce the risk of fatal and nonfatal cardiovascular events. A sedentary lifestyle along with hypertension, hypercholesterolemia, cigarette smoking, obesity, diabetes, selected psychosocial variables, and poor dietary

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States. Approximately 90% of cardiovascular events occur in individuals with ≥ 1 major risk factor for heart disease,

habits account for the majority of cardiac events in adults worldwide.^{2,3} Conversely, those without established risk factors at

DOI: 10.1177/1559827610391971. From the Department of Medicine, Division of Cardiology, Cardiac Rehabilitation and Exercise Laboratories, William Beaumont Hospital, Royal Oak, Michigan; Address correspondence to Jenna Brinks, MS, William Beaumont Hospital, Beaumont Health Center, Preventive Cardiology/Cardiac Rehabilitation, 4949 Coolidge Highway, Royal Oak, MI 48073; e-mail: Jenna.Brinks@beaumont.hospitals.com.

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age 50 years have a very low lifetime risk for CVD (<8% and <5% for women and men, respectively), along with significantly longer survival.⁴ Therefore, a physically active lifestyle serves as a vital intervention for optimizing cardiovascular health outcomes. Obese individuals in particular are often completely sedentary and should be counseled to engage in regular walking, so they can move out of the least fit, least active, high-risk cohort (bottom 20%).^{5,6}

Many individuals find it extremely difficult to comply with lifestyle behaviors necessary for favorable risk factor modification, particularly structured exercise. A recent survey of >150 000 American adults found that only 22.2% of respondents adhered to a regular exercise program, consisting of physical activity ≥ 30 minutes per day for ≥ 5 days per week.⁷ This was the lowest reported adherence rate of the 4 basic healthy lifestyle choices surveyed (regular exercise, maintaining normal body weight, not smoking, and consuming adequate amounts of fruits and vegetables), with almost 10% of respondents adhering to none of these behaviors. Moreover, only 3% adhered to all 4 cardioprotective lifestyle choices. These sobering statistics highlight the need to identify both real and perceived barriers to regular exercise, many of which can be addressed by primary care physicians and allied health professionals who routinely counsel patients. Accordingly, this review examines common barriers that may limit compliance to a regular exercise program and provides research-based strategies for promoting adherence to structured exercise, thereby facilitating cardiovascular risk reduction.

Physical Activity and Exercise Terminology

Structured exercise and physical activity are both critical components for maintaining a healthy lifestyle. The American College of Sports Medicine defines physical activity as bodily movement produced by contraction of skeletal muscle, resulting in an increased energy expenditure.⁸ Walking to and from the car while run-

ning errands, carrying groceries, or taking out the garbage are just a few examples of commonly performed physical activities. Exercise, on the other hand, lies within the scope of physical activity and is “planned, structured, and repetitive body movement done to improve or maintain one or more components of physical fitness.”⁸ Examples of exercise include taking a moderate-paced walk each evening or attending an aerobics class 3 days per week. Incorporating both structured exercise and increased physical activity into daily routines results in positive health outcomes, whereas a sedentary lifestyle is associated with an increased risk of chronic disease.

Physical Inactivity as a Risk Factor for CVD

Habitual physical inactivity is associated with an increased risk of hypertension, diabetes, hypercholesterolemia, myocardial infarction, sudden cardiac death, stroke, and all-cause mortality. A recent prospective examination of 17 013 Canadians (18-90 years of age) who reported their daily sitting time as “almost all of the time,” demonstrated increased all-cause mortality in a dose-response association as compared with those who reported their daily sitting time as “almost none of the time,” “one fourth of the time,” “half of the time,” or “three fourths of the time,” independent of leisure-time physical activity.⁹ Conversely, regular physical activity provides multiple positive health outcomes, including favorable risk factor modification, decreased risk of CVD and congestive heart failure,¹⁰ and a longer lifespan.¹¹ Indeed, recent reports suggest that physically active individuals have blood cells that exhibit molecular evidence of reduced aging (ie, decreased telomere shortening in human leukocytes), indicating that regular exercise has a profound antiaging effect.^{12,13} This striking finding may explain why exercise reduces the risk of acute myocardial infarction, diabetes, cancer, and other degenerative diseases, actually suggesting that active individuals have cells that are measurably younger than those of their age-matched sedentary counterparts.

Furthermore, the Nurses' Health Study, one of the longest running investigations on women's health, confirmed the hypothesis that physically active women have significantly lower all-cause mortality than their sedentary counterparts, regardless of body mass index (BMI).¹¹ Over a 16-year follow-up, participants who performed moderate physical activity for ≥ 1 hour per week reduced their mortality risk by 20% compared with those who were habitually sedentary. This modest weekly exercise goal, attainable for virtually all patient subgroups, significantly decreased all-cause mortality.

Barriers to Regular Physical Activity and Strategies to Overcome Them

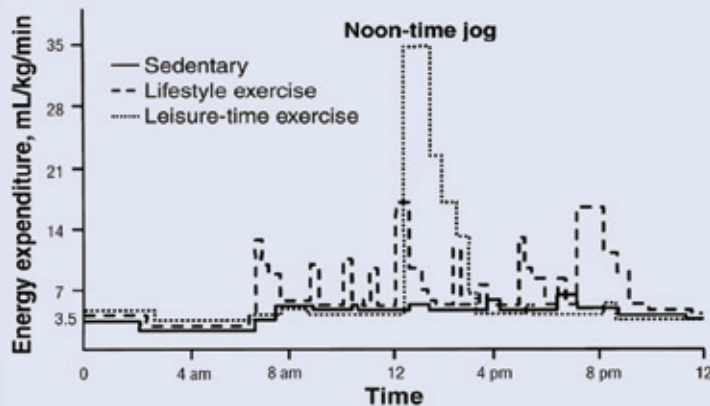
Although regular exercise represents a highly effective, research-based approach to favorably modifying cardiovascular risk, more than 70% of American adults reportedly fail to achieve the recommended frequency, duration, and/or intensity of exercise.⁷ The reasons underlying this dismal participation rate are multidimensional and complex, as individuals may be limited by numerous barriers that prevent them from engaging in regular physical activity.

Time Constraints

One of the most common reported barriers to regular exercise is “lack of time.” Successfully incorporating structured exercise into a hectic lifestyle characterized by increasingly longer work hours and competing family obligations, social events, errands, and religious activities, proves difficult for many individuals. Physical activity falls at the bottom of many priority lists, predisposing patients to an increased risk of chronic diseases. Fortunately, research suggests that individuals who incorporate shorter, more frequent bouts of moderate intensity physical activity throughout the day can achieve similar health benefits, including improved cardiorespiratory fitness and weight loss, as compared with those who complete longer exercise sessions.¹⁴⁻¹⁸ As shown in Figure 1, daily energy expenditure

Figure 1.

Patterns of physical activity for habitually sedentary people (solid line); people who engage in regular, leisure-time exercise, that is, noon jog (dotted line) but are otherwise sedentary; and people who integrate several shorter bouts of lesser intensity lifestyle physical activity into their daily routines (dashed line).



expressed as the “area under the curve” for lifestyle exercisers (those who are physically active throughout the day) may approximate or even exceed that of leisure-time exercisers (those who designate time for weekly exercise bouts but are otherwise sedentary).

Jakicic and colleagues¹⁵ studied 56 overweight women who were instructed to perform exercise 5 days per week for 20 to 40 minutes under 2 different conditions: one longer exercise bout per day, or multiple 10-minute bouts throughout the day. Women who performed multiple shorter bouts of daily physical activity demonstrated significantly higher adherence to exercise and a slightly greater weight loss than those who exercised once per day, with comparable improvements in cardiorespiratory fitness. Accordingly, sedentary patients should be counseled to recognize the value in obtaining the recommended quantity of exercise (30 minutes or more of moderate intensity aerobic exercise, 3-5 days per week⁸), even if they are unable to complete the entire duration in a single session. This option may be especially valuable for single parents, a population that is especially prone to having “no

time” for exercise (ie, working full time, household chores, caring for small children). Incorporating shorter bouts of frequent physical activity throughout the day, such as active play with children, walking with a stroller, or going for a bike ride, can provide health benefits and should be encouraged.

Other investigations suggest that shorter exercise bouts at higher intensities may result in greater improvements in psychological variables like self-efficacy and ability to cope. Participants in a 12-week study were randomized to exercise 3 days per week under 1 of 2 conditions: bouts of higher intensity exercise for shorter duration or bouts of lower intensity exercise for longer duration.¹⁷ Those in the former group demonstrated significantly improved confidence in their ability to exercise when fatigued, in a bad mood, or lacking time as compared with the latter group. The high-intensity/short-duration group also reported increased ability to arrange their schedule to accommodate exercise, with similar improvements in cardiorespiratory fitness as compared with the low-intensity/long-duration group.

If a patient identifies time constraints as a primary barrier to exercise, simply counseling him/her on the benefits of exercise may not be enough to facilitate behavior change. Such patients may also appreciate practical examples for incorporating physical activity into their current daily routine (eg, taking stairs when possible, parking further from stores, walking during lunch hours and breaks at children’s activities, planning physically active family outings). Selected individuals may also opt to improve their cardiovascular health by actively commuting to work or other daily errands. Those who live in larger cities where mass transit systems are available, for example, can incorporate additional physical activity by simply walking to and from the bus stop or subway. A recent analysis of a nationally representative United States transportation survey found that individuals who used public transit walked an average of 8.3 minutes more per day, translating into an estimated 25.7 to 39.0 kilocalories burned.¹⁹ Others who live within a reasonable distance from work can choose active commuting on foot, rollerblades, or bicycle. Hu and associates²⁰ examined occupational, commuting, and leisure-time physical activity and reported that hypertensive women who walked or cycled to and from work had significantly reduced cardiovascular mortality. Furthermore, both men and women with moderate or high levels of leisure-time or occupational physical activity demonstrated increased survival. More recently, the Coronary Artery Disease Risk Development in Young Adults (CARDIA) study found that active commuting was positively associated with fitness in men and women and inversely associated with BMI, obesity, triglyceride levels, and blood pressure.²¹ Accordingly, patients should be counseled that walking or biking to work and/or shopping can, over time, lead to significant improvements in cardiovascular health.

Financial Constraints

Many individuals have a common misconception about exercise—that

it requires a significant financial outlay to be effective. After all, the media often portray exercise being performed by attractive persons at a gym, wearing expensive athletic clothing, while under the supervision of a well-compensated personal trainer. The resulting perceptions may lead many individuals, especially those who don't have immediate access to facilities and/or are on a limited income, to conclude that they cannot afford to exercise. Research substantiates this notion, with lower education²² and income levels²³ being associated with poor exercise adherence. Furthermore, socioeconomically disadvantaged survivors of acute myocardial infarction are at greater risk of recurrent cardiac events as compared with their wealthier, more educated counterparts,²³ highlighting the importance of providing inexpensive secondary interventions (eg, lifestyle activity, aspirin) for underserved patients.

Walking is an undervalued and highly effective exercise modality for many patient populations, including those with limited financial resources. Walking can be performed in varied locations/ environments, at individualized intensities adequate for achieving an aerobic training threshold in both healthy individuals and selected patients with CVD.²⁴⁻²⁶ When outdoor walking is not possible because of inclement weather, location, or security concerns, one can take advantage of many indoor shopping malls that offer designated exercise hours for distance walkers. Communities may offer walking groups that meet at local parks or schools, alleviating concerns about walking alone, while creating a social atmosphere for participants. In a systematic review of randomized controlled trials, pedometer users significantly increased their physical activity by nearly 2500 steps per day more than control participants.²⁷ These relatively inexpensive devices allow individuals to track and gradually increase distance walked (a reasonable goal of 10 000 steps equals approximately 5 miles) to improve cardiorespiratory fitness.^{27,28} Flyers and pamphlets detailing local walking programs and pedometer information can be strategically placed in patient exam rooms or

Table 1.
Cost-Effective Strategies for Increasing Daily Physical Activity Levels

Physical Activity	Strength/Flexibility Conditioning
Walk or ride bike to closer destinations	Purchase yoga/core strength exercise videos
Take stairs instead of elevator/ escalator when possible	Use household items for basic resistance exercises (soup cans, water-filled milk jugs)
March in place or perform calisthenics during commercial breaks	Transform furniture into exercise equipment (triceps dips using coffee table or park bench)
Routinely park in farthest section of parking lot	Perform calf raises on stairs
Walk regularly, outdoors or at local malls (vary intensity by altering speed, incorporating arm movements, lifting knees)	Use area outdoor "fitness trails," which incorporate walking/jogging loops with strength-training exercise stations
Walk instead of using moving walkways at airports and shopping malls	Purchase exercise bands to provide variety to strength conditioning
Walk to coworkers' offices to deliver messages instead of e-mailing or calling	Increase frequency and intensity of household activities (gardening, cleaning)
Obtain pedometer and set "steps per day" goals	Practice good posture while sitting at desk
Walk your dog or your friend's dog	Perform sit-ups, push-ups, lunges, and squats during television commercial breaks
Purchase activity video and recruit a friend or family member to exercise ≥3 days each week	Allocate 10 to 15 minutes daily for stretching, flexibility, and balance exercises

waiting areas to increase awareness and accessibility to these resources.

Finally, resistance training serves to complement an aerobic exercise program and can be incorporated into daily activities without expensive equipment. Household items, such as soup cans or water-filled milk containers, can serve as substitutes for traditional weight training equipment. Additional ideas for patients with limited finances to incorporate increased aerobic and resistance

exercises into their daily routines are detailed in Table 1.

Orthopedic and Other Physical Limitations

According to a survey conducted by the Centers for Disease Control (CDC), self-reported arthritis affects an estimated 27.4% of adults ≥18 years of age and 57.4% of adults with CVD.²⁹ Not surprisingly, patients with diagnosed CVD who also have arthritis are 30% more likely to

be sedentary than their arthritis-free counterparts.²⁹ This common barrier to regular exercise requires health care providers to evaluate patients for this debilitating condition, as arthritis has a more profound disability impact than CVD and can markedly interfere with one's capacity to perform activities of daily living.³⁰ Appropriately modified aerobic and resistance exercise has been shown to be beneficial for osteoarthritis and rheumatoid arthritis sufferers.³¹ Patients demonstrate increased functional capacity, improved ability to perform daily tasks, and reduced reported pain following adherence to a properly prescribed land or aquatic-based exercise program.³²⁻³⁴ Yet, joint pain that accompanies arthritis often discourages an active lifestyle, making proper education and prescriptive modifications critical to achieving long-term exercise adherence in this patient subgroup. Thus, exercise intensity should be reduced and/or physical activity discontinued during periods of joint inflammation to minimize injury or discomfort.³¹

Other populations that may be limited in their ability to exercise include those with orthopedic injuries, balance problems, and selected disabilities. Patients with orthopedic limitations should be referred to specialists (eg, physical therapists, occupational therapists, exercise physiologists) who are properly trained to prescribe exercise for varied medical conditions. Non-weight-bearing exercise (eg, seated arm-leg ergometry) or treadmill walking with handrail support may be appropriate modalities for patients with balance problems. Obese patients with impact arthropathy may also prefer non-weight-bearing exercise modalities, such as the stationary cycle or recumbent ergometer. Water-based exercise, including aerobics, walking, strength training, and balance/range of motion activities, may also effectively address limitations commonly experienced by special populations. Generally, physical disabilities should be individually considered for each patient, with referrals to specialists when appropriate, to properly coordinate care and prescribe activities that are safe and effective.

Depression and Exercise

Psychosocial variables may adversely affect regular exercise participation, particularly depression. In 2006, the CDC reported that 15.7% of Americans had been diagnosed with depression by their health care provider during their lifetime, making this one of the most common psychological conditions in the United States.³⁵ Unfortunately, depression significantly increases the risk for other chronic diseases and/or risk factors, including CVD, asthma, diabetes, and obesity, as well as the likelihood of being a smoker, physically inactive, and an alcohol abuser.³⁵ Using data from the World Health Organization World Health Survey, investigators recently reported that depression was associated with a decrement in composite health score significantly greater than that associated with other chronic diseases/conditions, including angina, arthritis, asthma, and diabetes.³⁶ Moreover, when depression occurred in conjunction with other chronic diseases, it produced significantly greater decrements in overall health than the medical condition alone, particularly in persons with diabetes. Whooley and colleagues³⁷ attempted to identify the mechanisms underlying the link between depression and stable CVD in more than 1000 participants over a 4.8-year period. Investigators found a 50% increase in subsequent cardiovascular events in those with baseline depressive symptoms as compared with their nondepressed counterparts. Interestingly, after adjusting for physical activity and other health behaviors, no significant association between subsequent cardiovascular events and depression remained, suggesting that the increased risk of cardiovascular events in patients with depression could be prevented through behavior modification, particularly exercise. Although it remained unclear whether physical inactivity was a cause or result of depression, the investigators reported that a sedentary lifestyle alone accounted for almost half of the association between cardiovascular events and depression.

The strong link among depression, physical inactivity, and cardiovascular events highlights the importance of eval-

uating patients for depressive symptoms. Several psychosocial screening tools are widely available, easily administered and scored, and provide definitive cut-off scores to assist in identifying patients who may require additional counseling, pharmacological interventions, or both.³⁸⁻⁴⁰ Diagnosing depression at an early stage can lead to timely treatment through pharmacotherapy and/or psychological counseling, which may minimize the deleterious effects of depression and the associated health risks of a sedentary lifestyle. Furthermore, strong encouragement from physicians for selected patients with depressive symptoms to begin or continue a regular exercise program can provide long-term psychological therapeutic benefits similar to pharmacotherapy.^{41,42}

Babyak et al⁴¹ studied 156 men with major depressive disorders, randomizing them among three 4-month treatments: regular exercise, antidepressant pharmacotherapy (sertraline), or exercise plus antidepressant medication. Patients were assessed for depressive symptoms at baseline, after the 4-month intervention, and again 6 months postintervention. All 3 groups demonstrated comparable reductions in depressive symptoms following the 4-month treatment phase, but only those in the exercise groups (who continued exercising) demonstrated attenuated relapse rates at the 10-month follow-up screening. Another large prospective study of both men and women showed that cardiorespiratory fitness was inversely associated with the risk of developing depressive symptoms.⁴³ Participants with low cardiorespiratory fitness at baseline were at significantly greater risk of developing clinical depression, even after adjustment for numerous confounding variables.

Physicians and allied health professionals should consider recommending group-oriented exercise for patients with depression, such as instructor-led exercise classes or cardiac rehabilitation. The associated external support systems can provide instruction, guidance, and a supportive environment for fostering positive relationships. For depressed patients with CVD, exercise-based cardiac rehabilitation not only offers supervised physical

conditioning but often includes support groups, stress management classes, and educational opportunities, and provides referring physicians with valuable serial surveillance data regarding their patient's clinical status. Recently, investigators reported that depressed patients with coronary disease who completed cardiac rehabilitation demonstrated a 73% lower mortality than depressed controls.⁴⁴ Enrollment in cardiac rehabilitation has also been shown to significantly increase adherence to dietary and physical activity recommendations in selected patients,⁴⁵ providing additional support for use of these resources for coronary patients with depression.

Other Psychosocial Factors

Other psychosocial variables that may limit adherence to long-term exercise are attitude and self-efficacy. Attitude toward exercise can be a difficult barrier to overcome in selected patients because many adults may perceive regular physical activity to be purposeless, uncomfortable, or unachievable. If such misperceptions are identified, education and appropriate counseling by medical professionals can help the patient better understand the benefits of regular exercise and motivate them to adhere to a structured exercise program, increased lifestyle activity, or both. In fact, research suggests that one of the most powerful predictors of participation is the strength of recommendation by the primary care physician to engage in a regular exercise program.⁴⁶ Often, resistant patients have a myriad of excuses as to why they "can't," "shouldn't," or "don't need to" exercise. Therefore, health care professionals may also consider assessing the patient's "readiness for change," a widely accepted psychological tool that assists in providing an individually tailored course of treatment to patients struggling with permanent behavior change.^{47,48} This theory, also referred to as the Stages of Change Model, describes 6 stages of behavior modification with varying techniques for progressing patients along the continuum (Table 2). For example, if a patient is not currently considering starting an exercise program (precontemplation), a counsel-

Table 2.

Application of Prochaska's Transtheoretical Model of Behavior Change: Counseling Techniques

Stage	Characteristics	Counseling Techniques
Precontemplation	Not presently considering a lifestyle change within the next 6 months	<ul style="list-style-type: none"> • Validate lack of readiness • Clarify that the decision is the patient's • Encourage exploration and explain/personalize risks of inaction
Contemplation	Ambivalence toward lifestyle change, intention of making change within 6 months	<ul style="list-style-type: none"> • Encourage patient to evaluate pros and cons of making change • Validate lack of readiness and reclarify that the decision is the patient's
Preparation	Intention to make a change within the month, steps taken to initiate behavior change	<ul style="list-style-type: none"> • Identify potential barriers • Identify social support • Verify the patient has the skills necessary to achieve behavior change • Set small goals initially to track success
Action	New behavior put into practice for 3 to 6 months	<ul style="list-style-type: none"> • Encourage self-efficacy for dealing with barriers to behavior change • Reiterate long-term benefits
Maintenance	Continuing commitment to the new behavior from 6 months to 5 years	<ul style="list-style-type: none"> • Reinforce internal rewards for new behavior • Discuss identifying and coping with relapse
Termination	No possible relapse into previous behavior, total commitment to change	<ul style="list-style-type: none"> • Reassess obstacles to continuing new behavior • Develop new coping strategies

ing strategy may be to consider validating their lack of readiness, clarifying that the decision ultimately lies with the individual, assisting in reevaluation of health risks associated with physical inactivity, and encouraging the patient to self-explore the benefits of exercise. This approach, over time, may result in progression to contemplation, where health care professionals may use different techniques to ultimately assist the patient in

achieving compliance with an exercise program (maintenance/termination).

Another useful tool for fostering change in health behavior, motivational interviewing (MI), is a client-centered approach that uses 4 underlying principles to enhance motivation.⁴⁹ Expressing empathy, a principle that facilitates change through acceptance of a patient's thoughts and feelings, requires reflective listening without judgment or

criticism. Developing discrepancy then enables patients to recognize how their current behavior deviates from their broader health-related objectives and goals. For example, a health care provider may identify numerous risk factors predisposing the patient to initial or recurrent cardiovascular events and then reinforce the degree to which a sedentary lifestyle contributes to their disease progression. Third, MI requires “rolling with resistance,” an approach that actively involves the patient in problem solving as opposed to an argumentative, combative, or imposing approach. Finally, supporting a patient’s belief about his/her ability to change, or self-efficacy, is an important predictor of successful behavior modification. Medical professionals possess an understanding of each patient’s comprehensive medical history, affording them the unique opportunity to identify strengths and resources, as well as potential barriers and limitations, to encourage positive behavior change.

Considerable evidence supports the effectiveness of MI in facilitating adherence to cardioprotective exercise and dietary behaviors. Generally, patients who receive MI demonstrate reported improvements in self-efficacy related to exercise,⁵⁰ BMI,⁵¹ and increased physical activity⁵¹⁻⁵⁴ as compared with controls. A recent 6-month investigation monitoring the physical activity, BMIs, and dietary habits of 218 adults at risk for CVD was conducted to determine the effectiveness of MI.⁵¹ Both the intervention and control groups received educational materials on exercise and nutrition; additionally, participants in the intervention group were provided with up to five 20- to 30-minute MI counseling sessions. Although both groups reported an improvement in dietary habits, only the intervention group demonstrated a significant increase in physical activity and an associated decrease in BMI. Carels et al⁵³ evaluated the effectiveness of superimposed MI on 19 obese, sedentary adults who were concurrently enrolled in a behavioral weight loss program. Participants who received the adjunctive MI lost significantly more weight and were more physically active over the 18-week

period than their counterparts in the behavioral weight loss program alone.

Other interventions have also been shown to enhance exercise adherence. Goal setting remains an extremely effective strategy for modifying behavior and should include realistic short-term goals to encourage immediate behavior change and combat recidivism,⁸ as well as long-term goals to promote continued adherence to the new lifestyle behavior. To illustrate this, Duncan and Pozehl⁵⁵ assigned selected patients to either an exercise-only group or an exercise with adherence facilitation group for 12 weeks of home-based physical conditioning. Those in the intensive intervention group engaged in goal setting, received graphic depictions of their actual participation, and reviewed their exercise goals every 3 weeks, whereas those in the exercise-only group received no follow-up guidance. Patients in the adherence facilitation group demonstrated significantly greater compliance to exercise than those in the exercise-only group as well as increased confidence in their ability to continue exercising independently.

Although patients may have a clear understanding of the benefits of exercise, the activity must be not only tolerable, but enjoyable, to encourage adherence. Emphasis should be placed on determining each individual’s interests and preferences to formulate the most appropriately tailored exercise program. Traditional physical conditioning activities, such as walking, jogging, cycling, and resistance training, are all highly effective, but not if the patient is adverse to them. Patients should therefore be encouraged to add variety to their exercise regimen, exercise with a partner, sign up for a group class, train for a race, join a recreational sports team, or participate in other activities they may enjoy, like dancing or gardening. Newer technology devices (ie, WiiFit, Dance Dance Revolution) provide entertainment and can simultaneously enhance cardiorespiratory fitness and energy expenditure in adolescent children and adults. A recent study examining acute physiological responses to performing Dance Dance Revolution, Wii Sports, and varied-pace treadmill walking in children

demonstrated a 2- to 3-fold increase in energy expenditure during gaming activities over television watching, which was comparable with moderate-paced treadmill walking.⁵⁶ In another investigation, overweight children participated in 12 weeks of Dance Dance Revolution and were compared with nonexercising controls.⁵⁷ At the study’s conclusion, children using the gaming equipment significantly improved aerobic fitness and mean arterial pressures. As stated by the American College of Sports Medicine, exercise prescription is as much an art as it is a science,⁸ and clinicians should think creatively to find the best ways to incorporate increased physical activity into the lives of their patients.

A final psychosocial modulator of exercise programming that requires evaluation and serial assessment is cognitive decline, which often accompanies the aging process. The prevalence of dementia rises exponentially after the age of 65 years, affecting as many as 1 in every 2 people older than 80 years. Alzheimer disease, memory loss, and other forms of dementia require prescriptive modifications because these patients have an impaired ability to follow and remember exercise instructions. In such patients, exercises should be kept simple, and it should be suggested that they exercise with a partner, usually a caregiver or spouse, who can assist with monitoring intensity and proper technique and equipment usage.

Conclusion

Although exercise is a simple and effective intervention for cardiovascular risk reduction, adherence to structured exercise, like many other health-related behaviors, is often difficult to maintain. Time and financial constraints, physical limitations, and psychosocial variables represent common barriers to engaging in a physically active lifestyle. Unfortunately, these barriers can outweigh the numerous health benefits that regular exercise affords, resulting in an increasingly hypokinetic lifestyle often accompanied by other unhealthy choices. Medical professionals who

regularly counsel patients have the unique opportunity to use research-driven strategies, such as MI, readiness for change, and goal setting, to promote adherence to structured exercise. Furthermore, physicians and allied health professionals can assess each patient's individual risk, determine if preliminary screening is appropriate (eg, lipid/lipoprotein profile, electrocardiogram, exercise stress testing), discuss basic exercise guidelines, identify orthopedic limitations and/or barriers to physical activity, refer to specialists when necessary, and provide counseling and education to patients to increase the likelihood of exercise compliance. These strategies, when appropriately used, can elicit favorable behavior change and associated cardiovascular risk reduction in patients struggling with adherence to a regular exercise regimen. **AJLM**

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