



Minding Our Bodies

physical activity for mental health

Literature Review

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Introduction

Even recently, much of western medical care has treated ailments of the mind and the body as separate fields of study, in a sort of Cartesian dualism. As Timothy Smith points out, "...minds are [too often] left to psychologists and psychiatrists, whereas bodies are the business of other medical specialties and related health disciplines (Smith, 2006)." Recent research in the fields of health psychology, psychosomatic medicine, neuropsychology and behavioural medicine, however, supports the usefulness of the biopsychosocial health model.

The simple fact that mentally ill people experience increased rates of co-morbid medical conditions — and die at higher rates from them, as well — is enough to challenge the validity and usefulness of the health system's separate silos. For instance, the mind–body connection is exemplified well by the grim reality that cardiovascular disease is the major contributor to excess mortality in people with schizophrenia (Casey & Hansen, 2003). Similarly, people with depression and anxiety are at increased risk for developing cardiovascular disease (Suls & Bunde, 2005) and vice versa: People with this physical illness are at increased risk for clinically relevant emotional disorders. Moreover, the realization that people with cardiovascular disease have a worse prognosis if they also have depression (Smith & Ruiz, 2002) strengthens our understanding of the mind–body interconnection. Evidence increasingly suggests that similar relationships exist between mood disorders and various medical ailments (Evans et al., 2005), such as with HIV/AIDS (Stringer, 2005).

Although a notable number of longitudinal and cross-sectional research studies converge on the usefulness of physical activity as a preventative strategy and adjunct treatment for mental illness, the issue still seems unsettled in the eyes of many practitioners and patrons. One reason for this may be the rather cautious and ambiguous clinical recommendations of certain studies that actually found significant positive results. For instance, in their review of 14 randomized, controlled trials concerning the effectiveness of physical activity in the management of depression, Lawlor and Hopker (2001, p. 767) found that the effect of exercise was similar to that of cognitive therapy. Yet, their conclusion was that "the effectiveness of reducing symptoms of depression cannot be determined because of a lack of good-quality research on clinical populations with adequate follow-up." Guy Faulkner is one to challenge such conclusions while at the same time addressing relevant issues about some studies' methodological weaknesses. As he wittily remarked in one of his lectures, "...the placebo effect is a boon to therapy but the bane of research" (Faulkner, 2006). Along the same line of thought, Llewelyn and Hardy (2001) reminded us that "We know psychotherapy is effective, but we also know that different and apparently contradictory theoretical approaches are approximately equally effective in outcome, but very different in content."

Understandably, it pays a researcher to be cautious; the body of research on the impacts of physical activity upon mental health has its gaps. However, as Sir Austin Bradford Hill

insightfully pointed out in 1965, "... all scientific work is incomplete — whether it be observational or experimental. All scientific work is liable to be upset or modified by advancing knowledge. That does not confer upon us as a freedom to ignore the knowledge we already have, or to postpone the action that it appears to demand at a given time" (Hill, 1965, p. 299).

The basis for the Minding Our Bodies: Physical Activity for Mental Health project is that the research evidence for physical activity's beneficial effects upon people's physical and mental health is convincing. Physical activity has been reported to help with a wide spectrum of issues ranging from self-esteem and sense of social inclusion to clinical disorders such as schizophrenia, depression, and anxiety. Overall, there seem to be four avenues for these effects: prevention of poor mental health; improvement in mental health; treatment of mental disorders; and improvement in the quality of life of persons with mental illnesses.

Health factors affected by exercise

Emotion and mood

Physical activity and exercise have consistently been associated with positive mood and affect. A direct relation between physical activity and psychological well-being has been confirmed in several large-scale epidemiological surveys, including in the UK, by means of various measures of activity and well-being.

- Meta-analytic evidence shows that aerobic exercise leads to a small to moderate increase in vigour; a decrease of similar magnitude in tension, depression, fatigue, and confusion; and a small decrease in anger.
- Experimental trials support a positive effect for exercise of moderate intensity on psychological well-being (Biddle, *in* Biddle, Fox, & Boutcher, 2000).

Quality of life

- Higher levels of physical activity were associated with greater health-related quality of life among persons with diagnosed mental disorders. Quality of life was considered across eight dimensions: vitality, social functioning, mental health, role limitations related to emotional health, those related to physical health, bodily pain, physical function, and general health. Researchers (Schmitz et al., 2004) observed a spectrum of improvements and cautiously concluded that "physical activity can be beneficial for people suffering from mental disorders."
- High-intensity aerobic exercise has shown positive effects on the well-being of adolescents (Norris et al., 1992).

Self-esteem

- Exercise is a means to promote physical self-worth and other important physical self-perceptions, such as body image. In some situations this improvement is accompanied by

improved self-esteem. Physical self-worth carries mental well-being properties in its own right and should be considered one of the valuable end-points of exercise programs.

- The positive effects of exercise on self-perceptions can be experienced by all age groups, but the strongest evidence for change has been established for children and middle-aged adults.
- Several types of exercise are effective in changing self-perceptions, but most of the supporting research evidence clusters around aerobic exercise and resistance training, with the latter showing greater effectiveness in the short term (Fox, *in* Biddle, Fox, & Boutcher, 2000).
- Exercise showed positive effects on self-esteem, self-concept and depressive symptoms in a nonclinical sample of 399 youth (Garcia et al., 1997).
- Surveyed adolescents who reported that they exercise had significantly higher self-reported levels of self-esteem (Modrcin-Talbott et al., 1998). As depression scores decreased, their self-esteem scores increased. Lower self-esteem in this group of adolescents correlated significantly with more depression, older age, and non-participation in exercise.
- In a study by Hilyer and colleagues (1982) of 60 youthful offenders, physical fitness training was noted to reduce depression and anxiety, elevate low self-esteem, and promote a generally healthier psychological state.
- Participation in a supervised exercise-therapy program improved measures of self-esteem among obese and morbidly obese adolescents over time (Daley et al., 2006).

Social activity/sense of mastery

- Effects of exercise programs included improved body image, feelings of mastery brought about by the completion of a physically demanding program, and a variety of group dynamic effects (Norris et al., 1992).
- Benefits of an exercise program may be attributable, in part, to the social support aspects of the program (Babyak et al., 2000).
- Because solitary exercise does not improve depression (Hughes et. al., 1986), it is critically important that exercise be accompanied by social activity.
- Exercise provides the psychological benefit of self-mastery and social integration (Salmon, 2001).
- “Mastery experiences and successes with physical activity can be meaningful in improving self-esteem, particularly in the developmental stage of adolescence” (Calfas & Taylor, 1994, p. 417).

Sleep

- Individuals who exercise regularly have a lower risk of disturbed sleep, but the causal relations are less well established. Regular exercise training may improve the sleep of persons with disturbed sleep patterns, although there is no clear consensus. Acute exercise elicits a modest improvement in sleep among good sleepers; this effect is greater for longer exercise durations. The influence of acute exercise on sleep is similar

for fit and unfit people. Time of day or intensity of exercise have little moderating influence (Youngstedt & Freelove-Charton, *in* Faulkner & Taylor, 2005).

Cognitive functioning

- Most cross-sectional studies show that older adults who are fit display better cognitive performance than those who are less fit. The association between fitness and cognitive performance is task-dependent, with tasks that are rapid and demand attention (e.g., reaction-time tasks) having the most pronounced effects. Results of intervention studies are equivocal, but meta-analysis of their findings indicates a small but statistically significant improvement in cognitive functioning among older adults who increase their aerobic fitness (Boutcher, 2000).

Exercise as it relates to specific conditions

Dementia

- Physical activity, it has been shown, is inversely associated with cognitive decline. Case-control studies tend to show a slight beneficial influence of physical activity against Alzheimer's disease. Prospective analyses (similar to longitudinal studies) tend to show a more convincing protective effect of physical activity against Alzheimer's as well as against all forms of dementia combined. No evidence of harmful effects from physical activity or exercise (including vigorous exercise) is evident (Laurin et al., 2005).

Depression, anxiety and stress

- Physical activity has been found to improve mental health conditions, particularly anxiety, depression and general well-being (Schmitz et al., 2004).
- Exercise has a low-to-moderate effect in reducing anxiety. Exercise training can reduce trait anxiety; single exercise sessions can reduce state anxiety. Single sessions of moderate exercise can reduce short-term physiological reactivity to brief psychosocial stressors and enhance recovery (Taylor, 2000). The strongest anxiety-reduction effects are shown in randomized controlled trials.
- Exercise decreases depression. Epidemiological evidence shows that physical activity is associated with a decreased risk of developing clinically defined depression. Experimental studies have shown that aerobic and resistance exercise may be used to treat moderate and more severe depression, usually as an adjunct to standard treatment. The anti-depressant effect of exercise can be of the same magnitude as that found for other psychotherapeutic interventions. No negative effects of exercise have been noted in depressed populations (Mutrie, 2000).
- Persons who have experienced coronary heart failure (CHF) undergo a dramatic reduction in their quality of life, which commonly causes them anxiety and depression. Clinical trials involving these patients have observed marked improvements in exercise capacity. The evidence suggests that exercise can play an important role in improving function and quality of life of patients with CHF (Lloyd-Williams & Mair, 2005).
- Aerobic exercise training has anxiolytic and antidepressant effects (Salmon, 2000).

- Habitual exercise in adolescents correlates with low depression scores (Norris et. al., 1992). A study of 16,483 university undergraduates likewise found that exercise correlated with lower levels of depression (Steptoe et al., 1997).
- In a general population sample of 55,000 a self-reported correlation between recreational physical activity and better mental health was found, including fewer symptoms of depression and anxiety (Stephens, 1988).
- Aerobic activity shown to specifically reduce depression in two well-controlled studies of 10–11 weeks of walking and running in two populations selected for exposure to stress or high anxiety (Steptoe et al., 1989; Roth et al., 1987, as cited in Salmon, 2000).
- Exercise training (in comparison to strength and flexibility training) reduced anxious mood in subjects with high anxiety. Follow-up revealed that the effect persisted over three months (Steptoe et al., 1989).
- Symptoms of anxiety and depression gradually increased over the two weeks after the cessation of regular running (Morris et al., 1990).
- Exercise therapy is significantly associated with therapeutic benefit among people with major depressive disorder, particularly if it is continued over time. It may in fact be at least as effective as standard pharmacotherapy. Participants in the exercise group were less likely to relapse than those in other groups receiving medication. Each 50-minute increment of exercise per week was associated with a 50% decrease in the risk of being classified as depressed (Babyak et al., 2000).
- Regular aerobic exercise alone is associated with clinical improvement in patients suffering from panic disorder, but one that is less than treatment with clomipramine. Depressive symptoms were also improved by exercise and clomipramine treatment (Broocks et al., 1998).
- Regular exercise can have positive effects on psychopathologic outcomes (i.e., anxiety, depression and self-esteem) in adult and non-obese child populations (N. Mutrie, 1998, and A. Steptoe, 1996, as cited in Daley et al., 2006). Obese adolescent girls who participated in aerobic exercise have lower depression scores than girls allocated to other types of exercise or to usual care (S. G. Stella, 2005, as cited in Daley et al., 2006).
- Physical activity was associated with a decreased likelihood of depression in a survey of 9,938 school-age children. Male youths were more likely to participate in physical activity and less likely to feel depressed (Goodwin, 2006).
- In a population sample of 19,288 adolescent and adult twins and their families, exercisers were found on average to be less anxious, depressed and neurotic (DeMoor et al., 2006).
- Sufficient evidence has been found for the effectiveness of exercise in the treatment of clinical depression. Exercise has a moderate reducing effect on state and trait anxiety. Aerobic and resistance exercise enhance mood states (Fox, 1999).
- Aerobic exercise training protects against the emotional and physiological consequences of stress (Salmon, 2000).
- Balance of evidence suggests that sensitivity to stress is reduced after exercise training (Salmon, 2000).

- The negative impact of life events was significantly lower among students who exercised regularly than among those who rarely exercised (Brown & Lawton, 1986).
- Adolescents who reported exercising more also self-reported less stress and depression. Adolescents in the study who were part of the high-intensity exercise group reported less perceived stress than those groups that participated in moderate-intensity exercise, flexibility training, or no exercise program at all (the control group). In the high-intensity exercise group, the relationship between perceived stress and anxiety and depression was considerably weakened after the exercise program (Norris et al., 1992).

Eating disorders

- Exercise was found to be more effective than cognitive-behavioural therapy (CBT) in reducing drive for thinness, bulimic symptoms (both binge eating and vomiting) and body dissatisfaction among subjects with eating disorders (Sundgot-Borgen et al., 2002).
- Women participating in exercise groups significantly reduced obligatory attitudes toward exercise relative to the comparison group. Moreover, anorexic women in the exercise group gained one-third more weight than those in the comparison group (Calogero & Pedrotty, 2004).
- Studies have found that exercise has a positive effect on the success of cognitive behavioural therapy (Fossati et al., 2004; Pendleton et al., 2002).

Schizophrenia

- The high incidence of obesity and other morbid conditions is strongly related to physical inactivity in this population. Existing research on the psychological benefits of exercise participation has many methodological flaws and tends to be of pre-experimental design. There is tentative evidence that participating in exercise is associated with an alleviation of negative symptoms associated with schizophrenia, such as depression, low self-esteem, and social withdrawal. There is less evidence that exercise may be a useful coping strategy for dealing with positive symptoms, such as auditory hallucinations (Faulkner, 2005).

Drug and alcohol rehabilitation

- When administered as an adjunct in alcohol rehabilitation, exercise regimens definitely have positive effects on aerobic fitness and strength. Evidence for the benefits of exercise during drug rehabilitation is less substantial. In either field of rehabilitation, the links at present between exercise and improved self-esteem, better abstinence, controlled consumption levels, and reductions in anxiety and depression are equivocal (Donaghy & Ussher, 2005).
- Physical exercise was found to be associated with health-related quality of life among persons with anxiety, affective, substance abuse or dependence disorders (Schmitz et al., 2004).

The importance of physical activity in mental-health research

Considering the wealth of the research results mentioned above, it is worthwhile to mention that the growth rate of this interdisciplinary field is so great that an international, peer-reviewed journal has recently been created for this subject alone. In their inaugural editorial, the co-editors of the *Journal of Mental Health and Physical Activity* (MENPA), Adrian H. Taylor and Guy Faulkner, state that beyond the research evidence pointing at the effectiveness of physical activity in the prevention and treatment of mental illness, there are four additional reasons why physical activity should be considered a potential mental-health promotion strategy:

- 1) Physical activity is more cost-effective than either psychopharmacological or psychotherapeutic interventions. If appropriate, “physical activity may be a cost-effective alternative for those who prefer not to use medication or who cannot access therapy.”
- 2) “In contrast to pharmacological interventions, physical activity is associated with minimal adverse side-effects.”
- 3) “Physical activity can be indefinitely sustained by the individual, unlike pharmacological and psychotherapeutic treatments, which often have a specified endpoint.”
- 4) “Physical activity stands apart from more traditional treatments and therapies for mental health problems because it has the potential to simultaneously improve health and well-being *and* tackle mental illness.”

This last point is especially important when one considers issues like the cardiovascular and diabetes comorbidity problems experienced by people with mental illness. For example, persons with schizophrenia tend to die not from schizophrenia, per se, but rather from comorbid cardiovascular problems — which may be directly improved through regular physical activity (Faulkner, 2006).

Physical activity plays role in the recovery of mental health. Richardson and co-authors (2005) add two further reasons why physical activity program should be included in psychiatric services:

- The opportunity for individuals with mental illness to have frequent contact with their mental health service providers. As Richardson and colleagues wrote, “... changing health behaviours can be difficult, and frequent reinforcement can play a critical role in the successful long-term adoption of regular physical activity (p. 328).”
- Specific mental illness barriers may be best addressed by people trained in the mental health field.

Barriers to implementing and accessing physical activity programs

The consensus in the research community that regular physical activity is fruitful in the prevention and treatment of mental illness is strengthening. Nevertheless, there are few programs that implement these research suggestions, and those that exist are often fragmented (Richardson et al., 2005). In their insightful article, “Exercise and Mental Health: It’s Just Not Psychology!” Faulkner and Biddle (2001) identified three challenges to the integration of physical activity into mental health programs:

- Mental health clinics’ lack of knowledge about the therapeutic benefits of exercise
- The perceived simplicity of these programs
- An incompatibility of exercise programs with traditional treatments

During a “Mental Health and Physical Activity” workshop in Alberta (Berry, 2006), various mental-health practitioners added to that list of challenges. They argued that “quality of life, normalization of the disease, and recognition of mental illness as a chronic problem [are] key to moving forward. This group recognized that for many of these clients, obesogenic environments (i.e., environments that foster physical inactivity and poor diet) [are] a problem. They recommended emphasizing small, manageable changes. This group felt that ‘the system’ (i.e., policy-makers) needs to be educated on this topic and recommends forging links between researchers and practitioners and using an integrated teamwork approach” (Berry, 2006, p. 4).

Even after problems about the implementation of physical activity programs in institutional settings are settled, mentally ill people may encounter other barriers. Issues such as motivation, fear of injury, childcare support (Edwards, 2000, p. 22), transportation, available time, social support, and stigma (Berry, 2006) may need to be dealt with. Indeed, in her insightful public presentation, “Reality Check,” Val Mayes (2006) identifies similar barriers that she encountered while trying to implement a diabetes prevention program for persons with chronic mental illness. One additional, emerging issue that came to her attention has to do with the changing health care system, and how it disrupted the mental health workers’ schedule to such a degree that they could not appropriately engage in the program. She concludes that staff who are overworked and stressed constitute an additional barrier, for they are not in the position to adequately support their clients’ integration into new programs such as those promoting physical activity.

Elements of a successful program of physical activity

Val Mayes (2006) draws upon her experience as the executive director of the Edmonton Chamber of Voluntary Organizations to recommend affordable (preferably free) physical activity programs that are accessible, close to public transportation, and non-threatening (in the sense that no special skills are required for participation). She also maintains that the importance of appropriately trained staff who know how to support and motivate mentally ill clients (e.g., by using reinforcements such as prizes) cannot be underestimated. In terms of the psychoeducational component of such a program, she promotes the use of plain

language and visual models. Another identified doorway to success is to partner with other mental health organizations: “Collaborations do bring more resources to the table and do enrich those who take part” (Mayes, 2006, PowerPoint slide 17).

Mayes (2006) and Camann (2001) both mention that a program that takes into consideration Prochaska and Diclemente’s (1992) stages-of-change model and its various facilitative processes (consciousness-raising, social liberation/societal support, dramatic relief, and stimulus control) is a step closer to success.

In harmony with that model, Camann (2001) advocates that making the program voluntary would be vital to its success. Richardson and colleagues (2005) summarize several additional factors (p. 327):

- “Programs that deliver exercise prescriptions or motivational messages in printed form or by computer are more effective than face-to-face counselling alone.”
- “Participants need to set goals and self-monitor achievement in order to successfully change their behaviour — use daily paper logs, Web-based logging systems, plus objective monitoring devices such as pedometers and heart rate monitors.... Feedback is a critical component of self-monitoring and self-regulation.”
- Facilitators need to take advantage of “opportunities for some individualized attention and recognition.”
- “Enthusiastic, knowledgeable and supportive exercise leaders are as important as the actual exercise program.”
- Decreasing the perceived risk of injury can improve attendance.

When formulating community-based interventions, it is also worthwhile to take into account “the infrastructure and social structures around individuals that greatly affect both collective and individual change” (Edwards, 2000, p. 22). Indeed, change interventions are more successful when individual, network, organizational, community and societal levels are supportive of the new program (also p. 22).

Issues of adherence

In the general population, adherence to physical activity programs drops off after six months to half of the original number of participants. It would be unreasonable to expect better from programs for mentally ill persons, who have additional barriers to regular attendance (e.g., illness exacerbation, issues surrounding autonomy/independence, increased motivational problems) (Richardson et al., 2005, p. 328). Martinsen (1993) found that if physical activity programs are integrated into psychiatric services, then the adherence rate is similar to that of the general public.

How much exercise is required for mental health?

Most of the studies surveyed in this literature review reported that their treatment groups generally participated at least three times a week in around 30 minutes of moderate-intensity exercise. The DOSE study (Dunn et al., 2002, 2005) suggests that an accumulation

of 30 minutes on five or more days a week is the minimum dose needed to reduce depression. This is congruent with what Blair and Connely (1996) found in their review of studies examining the amount of exercise needed for a clinically significant reduction in coronary mortality. Indeed, a steep decrease in people's cardiovascular-related mortality risk (around 60%) occurs when their activity level changes from sedentary to low-moderate. These convergent findings are rather encouraging news, for they illustrate how marked improvements in both mental and physical health are attainable by ordinary people who may not have time for the challenges of an athletic lifestyle. Moreover, both aerobic and anaerobic exercises have been shown to reap beneficial health effects (Stathopoulou et al., 2006).

For safety reasons, it is important to mention that the majority of research studies that were reviewed spoke of the necessity for a professional physical assessment before enrolment in any physical activity program.

Useful definitions

Physical activity: Any movement that results in energy expenditure. Alternatively, any musculoskeletal activity that increases the organism's energy expenditure above its resting rate.

Mental health: A state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community — WHO (from the Alberta Centre for Active Living). The capacity of each and all of us to feel, think, and act in ways that enhance our ability to enjoy life and deal with the challenges we face; a positive sense of emotional and spiritual well-being that respects the importance of personal dignity, culture, equity, social justice, and interconnections (Hood et al., 1996).

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