

Physical activity and depressive symptoms in cardiac rehabilitation: Long-term effects of a self-management intervention

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Abstract

Long-term effects of a self-management intervention on physical activity and depressive symptoms were studied in 198 men and women after cardiac rehabilitation in Germany. Participants were randomly assigned to either an intervention group or a standard-care control group. The intervention group received brief self-regulatory skills training that focused on exercise planning strategies. Four and 12 months later, physical exercise levels were half a standard deviation higher in the intervention group. Depressive symptoms 12 months after discharge were almost half a standard deviation lower in the intervention group than in the control group. Mediation analyses were performed to study the potential mechanism that accounted for the reduction in depression. Perceived attainment of exercise goals, but not physical exercise itself, emerged as a mediator between the intervention and the reduction of depressive symptoms. As such attainment of personal goals appears to be of particular importance for lowering depressive symptoms during health-behavior change. Thus, self-management strategies to help patients attain their goals should be part of rehabilitation programs.

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Introduction

This study was conducted to examine the effects of a brief intervention on physical exercise and depressive symptoms of cardiac patients in the year following rehabilitation treatment. A theory-guided

treatment was designed to improve self-regulatory skills that are supposed to improve exercise maintenance and to lower depressive mood. Particular emphasis lies on the possible mechanisms that translate skills into emotions.

Coronary heart disease, physical exercise, and depressive symptoms

Coronary heart disease (CHD) is mainly caused by modifiable unwholesome lifestyle habits, such as inactivity, smoking, and unhealthy diet (Donker,

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2000). Our study focuses on two commonly inter-related risk factors for CHD: physical inactivity and depressive symptoms (Grundy, Pasternak, Greenland, Smith, & Fuster, 1999; Salmon, 2000).

Physical exercise is an essential part of cardiac prevention and rehabilitation programs (Ades, 2001). For cardiac rehabilitation patients, regular aerobic physical activity is associated with lower mortality, lower cardiac relapses, and reduced symptoms (Ades, 2001). Patients with established CHD are recommended to exercise on an individually adapted level of intensity that accommodates the patients' personal capacity without causing pain or ailment (Williams, 2001).

Approximately 20% of CHD patients report depressive symptoms. Even minor signs of depressive symptoms are related to a worse outcome and a higher risk of mortality in persons who already suffer from CHD (e.g., Frasure-Smith, Lespérance, & Talajic, 1993).

There is compelling evidence that physical activity is associated with lower depressive symptoms and higher positive mood. Prospective studies spanning up to 25 years underscore the beneficial effects of physical exercise on depression (Camacho, Roberts, Lazarus, Kaplan, & Cohen, 1991; Paffenbarger, Lee, & Leung, 1994). The effects of physical exercise on depressive symptoms usually persist even after controlling for sex, age, socioeconomic status, and physical illness (Stephens, 1988).

Possible mechanisms connecting physical exercise with reduced depressive symptoms are not yet well understood. Whereas many of the discussed pathways primarily center on physiological mediators between exercise and depression, in our study we alternatively focus on a cognitive pathway, that is, on subjective goal attainment.

Goal attainment and depressive symptoms

Depressive symptoms and negative affect are often related to perceived failures in goal attainment (Carver & Scheier, 1990). Likewise, success in goal attainment has been found to be positively related to subjective well-being or to the absence of depressive symptoms (e.g., Brunstein, 1993; Emmons, 1996). For example, a study on the effects of cognitive therapy on depression found increased independent goal attainment associated with lowered depressive symptoms in depressed adults (Bieling, Beck, & Brown, 2004). Pomerantz, Saxon, and Oishi (2000) could demonstrate that the positive

effect of goal investment on positive emotions was mediated by perceived accomplishment of the respective goals. Furthermore, Nelson and Craighead (1981) established that even goal attainment in laboratory tasks (i.e., tasks with low personal relevance) was negatively related to depressive symptoms when persons attributed their success internally.

The attainment of personal goals is difficult. Thus, self-regulatory skills play a crucial role, especially for complex, effort-demanding, and long-term goals, such as changing one's sedentary lifestyle into a physically active one.

Goal attainment and self-regulation

Cardiac rehabilitation patients usually report strong intentions to become physically active on a regular basis (e.g., Johnston, Johnston, Pollard, Kinmonth, & Mant, 2004). Results of longitudinal studies, however, indicate that there is a discrepancy between the intentions and the subsequent behavior of these patients (e.g., Johnston et al., 2004). For example, in the aftermath of cardiac events, patients often initiate lifestyle changes, but they maintain these changes less often (Dusseldorp, Van Elderen, Maes, Meulman, & Kraaij, 1999). This is further supported by studies showing that, for example, attrition in post-rehabilitation physical exercise programs is generally high and increases over time (Moore, Ruland, Pashkow, & Blackburn, 1998). Thus, reporting high intentions might not suffice for actual changes in behavior. This phenomenon is known as *intention-behavior gap* (Sheeran, 2002).

In order to account theoretically for this gap between intentions and behavior, self-regulatory processes following intentions help to initiate and maintain behavior change (Luszczynska & Schwarzer, 2003; Schwarzer, 1992). One self-regulatory skill is *planning* (Gollwitzer, 1999; Leventhal, Singer, & Jones, 1965; Sniehotta, Schwarzer, Scholz, & Schüz, 2005). Sniehotta et al. (2005) propose the subdivision of planning into action planning and coping planning. Action planning specifies exactly *where, when, and how to act* (Leventhal et al., 1965). It has consistently been found to predict goal attainment in various domains, including physical activity (Gollwitzer, 1999). Coping planning refers to planning exactly *what to do when barriers come into view* (e.g., Lippke, Ziegelmann, & Schwarzer, 2004; Sniehotta, Scholz, & Schwarzer, in press). A coping plan might read, "If I want to go running

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