The Series in Health Psychology and Behavioral Medicine

Exercise and Mental Health

William P. Morgan
Stephen E. Goldston

EXERCISE AND MENTAL HEALTH

The Series in Health Psychology and Behavioral Medicine

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EXERCISE AND MENTAL HEALTH

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HEMISPHERE PUBLISHING CORPORATION
A member of the Taylor & Francis Group
New York Washington Philadelphia London

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3 4 5 6 7 8 9 BCBC 8 9 8

This book was set in Times Roman by Hemisphere Publishing Corporation. The editors were Christine Flint Lowry and Eleana Cornejo-de-Villanueva; the production supervisor was Peggy M. Rote; and the typesetter was Cynthia B. Mynhier.
BookCrafters, Inc. was printer and binder.

Library of Congress Cataloging in Publication Data

Exercise and mental health.

(The Series in health psychology and behavioral medicine)
Includes bibliographies and index.
1. Mental health. 2. Exercise therapy. 3. Mental illness—Prevention. 4. Stress (Psychology)—Prevention.
I. Morgan, William P. II. Goldston, Stephen E.
III. Series. [DNLM: 1. Exercise Therapy. 2. Exertion 3. Mental Disorders—therapy. 4. Physical Fitness. WM 405 E96]
RA790.E94 1987 616.89'13 86-14817
ISBN 0-89116-564-9
ISSN 8756-467X

TO THE MEMORY OF

Professor A. H. Ismail

Athlete, scientist, transcendentalist, and pioneer in the investigation of mechanisms underlying the relationship between exercise and mental health.

CONTENTS

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PREFACE

Exercise has been advocated by health scientists and physicians for many years as a means of preventing physical health problems, such as obesity and hypertension. Its efficacy as a therapeutic measure once certain illnesses have occurred has been extolled as well. Although exercise enthusiasts have acknowledged the absence of compelling empirical evidence to support such views, they have maintained that regular exercise has intuitive appeal. The past decade has witnessed the emergence of the view that exercise also can prevent the onset of emotional problems. Furthermore, many health professionals now believe that vigorous exercise is an effective treatment once mental health problems develop. For example, a survey in 1983 of nearly 2000 primary-care physicians revealed that 85 percent regularly prescribed exercise in the treatment of depression.

Given the pandemic nature of such mental health problems as anxiety and depression—in concert with the cost and time associated with traditional psychotherapy, as well as the cost and potential side- or after-effects of various drugs used in the treatment of these problems—it would seem important to quantify the efficacy of exercise as a coping strategy. Indeed, if exercise were found to be effective in the primary and secondary prevention of mental health problems, and if there were no significant after- or side-effects, exercise would hold the potential for becoming the treatment of choice. Unfortunately, no effort has been forthcoming to consolidate existing knowledge on this topic—at least not in a scientifically defensible context.

This volume has been developed in an effort to present a state-of-the-art summary of what is known about exercise and mental health. It is hoped that such information will be of direct value to psychologists, physicians, physical educators, and exercise leaders concerned with both the preservation and restoration of health in their students, clients, and patients. We believe this volume can serve as a desk reference for health professionals interested in using exercise in primary and secondary prevention efforts. The book also addresses the psychobiological impact of exercise on individuals simultaneously receiving medication and/or psychotherapy. Another major purpose of the volume is to identify areas needing research in order to encourage and stimulate individual investigators, as well as funding agencies, in the development of research issues and agendas.

Preparation of this volume has been a labor of love, particularly since the

contributors are the leading authorities in the various subareas dealing with the interfaces between exercise and mental health. Most regrettably, during the preparation of the volume one of the contributors, Professor A. H. ("Ish") Ismail, died unexpectedly. We wish to acknowledge Partrick J. O'Connor for revising and editing Professor Ismail's chapter. Shortly after his death a scholarship fund in honor of Professor Ismail was established at Purdue University. All royalties from this volume will be donated to the A. H. Ismail Scholarship Fund.

Multidisciplinary volumes of this nature require the cooperation and support of many individuals and organizations. Each of the authors are identified by a background statement. We also wish to acknowledge support from the Office of Prevention at the National Institute of Mental Health for convening the state-of-the-art-workshop that enabled the authors to discuss the role of exercise in the development and maintenance of mental health.

The entire manuscript was typed initially by Ms. Sharon Ruch, and revisions of selected portions were prepared by Ms. Vinni Pedersen and Ms. Gloria Scalissi. We wish to express our sincere appreciation to each for their expert secretarial contributions. John S. Raglin of the Sport Psychology Laboratory at the University of Wisconsin coordinated the proofing of the manuscript, and he was assisted in this important work by Joan Tincher and David R. Brown. We are particularly indebted to them for their careful attention to reference citations.

Finally, we affirm that prevention, not treatment, offers the best solution to the pandemic mental health problems that characterize modern society—the present volume focuses on one potential coping strategy, *exercise.*

William P. Morgan
Stephen E. Goldston

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BACKGROUND

1

INTRODUCTION

William P. Morgan and Stephen E. Goldston

The subject of stress has received considerable attention in recent years. It is now widely recognized that prolonged stress may cause a variety of problems such as allergic reactions, dermatitis, gastrointestinal upsets, hypertension, depression, and anxiety. However, we do not know why some individuals seem to be predisposed to respond with such reactions when stressed, nor is it clear why other persons are essentially resistant to the same stressors. Further, it is clear that individual coping strategies can play an important role in the mediation of stress responses.

The Institute of Medicine conducted a project involving the study of research on stress in health and disease in 1981, which resulted in the publication of *Research on Stress and Human Health* (Hamburg, 1981). It is recognized by stress researchers that substantial individual differences exist in the ability to cope with, and tolerate stress, and it is also known that these differences are due in large part to the "coping strategies" employed by stressed individuals. Hamburg (1981) pointed out in the above cited report, however, that ". . . how individuals attempt to cope with stress has been a neglected area of great potential importance." It has also been noted by Hamburg (1981) that a deeper understanding of human coping behavior will be useful in developing both therapeutic and preventive interventions. There is considerable cross-sectional evidence, and some longitudinal data, suggesting that physical activity of a vigorous nature represents a natural, inexpensive, and effective means of coping with mental stress (Morgan, 1981, 1982, 1984, 1985). In a survey of 1,750 primary care physicians, conducted by the *Physician and Sportsmedicine Journal,* (Ryan, 1983) it was found that 85% of the physicians surveyed regularly prescribed exercise in the treatment of depression. While comparable statistics are not available, many psychiatrists, psychologists, and workers in the exercise and sport sciences routinely prescribe exercise for the same reason.

Unfortunately, the actual efficacy of vigorous exercise in the management of anxiety and depression continues to be based largely on indirect and correlational evidence. There have actually been few attempts to demonstrate that exercise intervention, in a controlled, experimental context, results in improved affect. In those cases where experimental trials suggest that exercise is equal or

superior to traditional forms of therapy and placebo treatments, there has been no evidence that exercise interventions actually *caused* the observed mood states. In other words, the observed changes have merely been *associated* with the introduction of exercise. While this sort of research has provided important information, the data offer *necessary,* not *sufficient* evidence, in support of the hypothesis that exercise improves mood state.

Little attention has been paid to the question of whether or not an exercise prescription might be contraindicated for some individuals. This is somewhat surprising, given the widespread use of beta-blocking agents in the management of hypertension, and the use of various pharmacologic agents in the treatment of anxiety and depression. Also, little attention has been paid to the issue of exercise "dosage" (i.e., frequency, duration, and intensity).

Furthermore, it is also known that approximately 50% of those individuals who adopt an exercise program discontinue within six to eight weeks. Therefore, even if exercise were proven to possess affective benefits, compliance problems might minimize the overall efficacy of such a coping strategy.

While the *potential role* of exercise as a coping strategy is reasonably well documented, it is necessary that the conditions and circumstances under which such effects occur be delineated in order that exercise intervention effects might be maximized. It is equally important that the limitations and contraindications be elaborated as well. It is known, for example, that an inverse relationship exists between physical fitness and mental health; that is, the higher the physical fitness level, the lower the degree of psychopathology (Morgan, 1981, 1984). Supporting data are largely cross-sectional, but there is limited intervention research supporting the concept of causality. Greist and his associates (1979) at the University of Wisconsin demonstrated, for example, that vigorous aerobic exercise performed for twelve weeks not only reduced depression, but exercise was found to be superior to one form of psychotherapy and equal to a second in its anti-depressant action. This research is significant for several reasons. First, rather than comparing exercise with "nothing" (i.e., a control group), a comparison was made with traditional forms of psychotherapy. Second, considering the time and money required for psychotherapy, in contrast to the "economy" of exercise therapy, an added benefit is seen. Third, all but one of the patients in the running group were free of depressive symptoms at twelve months of follow-up, whereas half of the psychotherapy patients had returned for treatment. This particular investigation, along with subsequent research, is described in this volume.

Physical activity also has potential value because of its efficacy in contrast to drug treatment. The advances in psychopharmacology have played an important role in the treatment of major mental health problems such as depression and anxiety state. Unfortunately, many individuals do not benefit from antidepressive and/or anti-anxiety medications, and the side-effects and aftereffects associated with many psychopharmacologic agents, especially when

used with individuals who have mild to moderate disturbances, contraindicate the use of such medications. Reviews of the pharmacology and exercise physiology literatures suggest that attention has not been directed toward an understanding of the interactive or synergistic effects of physical activity and selected psychopharmacologic agents. Another issue concerns the interaction between exercise and various beta-blocking agents. Several years ago it was reported that acute physical activity is comparable to meprobamate, a commonly prescribed tranquilizer at that time, in reducing tension states (deVries and Adams, 1972). This finding has not been replicated, however, and there is also a need to compare exercise with newer benzodiazepine anxiolytics.

The *prevention* of depression and anxiety represents a far more effective health strategy than does *treatment.* This is true whether treatment involves psychotherapy, drug therapy, or a combination of psychotherapy and drugs. Up to this point in time, however, prevention efforts in the mental health field have been limited almost entirely to psychological and social interventions. There is now a research base to permit experimentation with exercise intervention as well, and this volume explores the potential efficacy of exercise.

An extremely perplexing problem, and one that is only partially understood, relates to the matter of exercise compliance. For various reasons, some known and some not known, about fifty percent of all individuals who begin formal exercise programs stop exercising within a short period of time. Indeed, most adherence curves suggest that drop-outs stop exercising before the major psychological and physiological effects can occur (Dishman, 1982; Martin and Dubbert, 1985). This particular problem is examined in Chapters 3 and 5.

NIMH WORKSHOP

The potential and limits of exercise intervention as a means of coping with mental stress were explored in a state-of-the-art workshop which was sponsored by the Office of Prevention of the National Institute of Mental Health and convened in the Spring of 1984 (Morgan, Note 1). This workshop was one of over two dozen such meetings held during the period 1981–1984 to discover the cutting edges of prevention research. The present volume is based on a revised version of the reports given at this gathering. The workshop was based on research evidence, and an effort was made, when and where possible, to consider the potential for application. The workshop was also structured so that resulting materials involving the potential and limits of exercise as a coping strategy could eventually be communicated to primary care physicians, psychologists, psychiatrists, and workers in the field of exercise and sport science, as well as the general public. This volume is based on the workshop papers and discussions.

The workshop was held at the National Institute of Health campus during the period April 25–27, 1984. Papers were prepared and distributed in advance to all participants. A planning and orientation session held on the evening pre-

ceeding the opening formal session reinforced the objectives and scope of the workshop, by creating closure and generating a common set of expectancies.

The formal presentation of papers took place over the following day and a half. Since the participants had read each paper in advance, presentors highlighted and summarized the essence of their documents. This format permitted a minimum of 30 minutes focused discussion following each presentation. A more general discussion followed the presentation of each set of papers. Participants joined into working sub-groups during the afternoon of the second day for the purpose of formulating consensus statements regarding "what we know" and "what we need to know" about the relationships between exercise and mental health. The sub-groups dealt with "state-of-the-art" evidence involving anxiety, depression, and programmatic issues. The participants reconvened as a committee of the whole, and spokespersons presented consensus statements for each of the three groups. A verbatim transcript of these statements was prepared and mailed to each participant following the workshop, and he/she was asked to agree or disagree with the statements as formulated. In those instances where disagreement took place, participants indicated the basis for their disagreement, and they also offered suggestions for revision. These consensus statements are presented in Chapter 15, and they reflect the collective and edited versions that eventually emerged.

SUMMARY OF CONTENTS

Following this introductory chapter is an overview of stress, emotions and health by Dr. Charles Spielberger which provides a conceptual basis for the other chapters. Having an agreed upon theoretical foundation is quite important since stress researchers often differ dramatically in their conceptualization and operationalization of these constructs.

Chapter 3 by Dr. Daniel Kirschenbaum deals with the prevention of sedentary lifestyles. Young children are inherently active, but it is widely recognized that progressive inactivity is associated with the aging process. Therefore, rather than focus on the adoption of coping strategies such as regular exercise, a more profitable approach would be to focus our efforts on identification of the factors involved in remaining active.

It is recognized, of course, that many active children go on to become sedentary adults, and the challenge for many workers in the health professions involves the development of an activity plan for individuals in primary or secondary prevention programs. This issue is covered in the following Chapter (4) by Dr. William Haskell. It is imperative that health professionals responsible for developing and supervising exercise programs, adhere to sound guidelines such as those presented in this chapter.

Unfortunately, it is now recognized that adoption of these guidelines will not necessarily prevent all individuals from "dropping out" of exercise programs. For this reason, Chapter 5 by Dr. Rod Dishman deals with the factors

involved in exercise adherence. This chapter offers useful insights concerning adherence and drop-out patterns that characterize most adult fitness programs.

This section of the book concludes with Chapter (6) by Dr. Egil Martinsen involving the interaction of exercise and drug therapy in psychiatric patients. This review is relevant since many individuals who are eligible for exercise programs may be receiving various psychopharmacologic agents. While concerns have been raised previously about the wisdom of employing exercise with individuals receiving such medications, this chapter represents the first comprehensive overview on the subject.

The next eight chapters were written by Doctors deVries (7), Morgan (8), Ismail (9), Greist (10), Harris (11), Brown (12), Berger (13), and Sime (14). These contributors possess competencies and research specializations in various fields such as exercise science, psychology, psychiatry, and physical education. The chapters in this section each summarize the results of systematic research programs involving the influence of acute and chronic exercise on anxiety, depression, and personality structure. This section is followed by a Summary Chapter (15) prepared by the editors. The purpose of this chapter is to present a series of consensus statements dealing with the related issues of "what we know" and "what we need to know." The former concerns identify the basis for *intervention efforts,* and the latter provides a *research agenda* for consideration by interested scientists and funding agencies.

The final Chapter (16), prepared by Dr. Michael Sachs, discusses information retrieval models specific to exercise and mental health. This chapter also contains a comprehensive bibliography, including each reference cited in the volume.