1995

Effectiveness of an Interdisciplinary Chronic Low Back Pain Program Based on Return to Work Outcome

John R. Bromfield  
*Grand Valley State University*

Deborah A. Knowles  
*Grand Valley State University*

Stacie M. Schoenberg  
*Grand Valley State University*

Follow this and additional works at: [http://scholarworks.gvsu.edu/theses](http://scholarworks.gvsu.edu/theses)

Part of the [Occupational Health and Industrial Hygiene Commons](http://scholarworks.gvsu.edu/commons/occupational-health) and the [Physical Therapy Commons](http://scholarworks.gvsu.edu/commons/physical-therapy)

Recommended Citation


This Thesis is brought to you for free and open access by the Graduate Research and Creative Practice at ScholarWorks@GVSU. It has been accepted for inclusion in Masters' Theses by an authorized administrator of ScholarWorks@GVSU. For more information, please contact [scholarworks@gvsu.edu](mailto:scholarworks@gvsu.edu).
EFFECTIVENESS OF AN INTERDISCIPLINARY CHRONIC LOW BACK PAIN PROGRAM BASED ON RETURN TO WORK OUTCOME

By

John R. Bromfield
Deborah A. Knowles
Stacie M. Schoenberg

THESIS

Submitted to the Department of Physical Therapy
at Grand Valley State University
Allendale, Michigan
in partial fulfillment of the requirements
for the degree of

MASTER OF SCIENCE IN PHYSICAL THERAPY

1995
EFFECTIVENESS OF AN INTERDISCIPLINARY CHRONIC LOW BACK PAIN PROGRAM BASED ON RETURN TO WORK OUTCOME

ABSTRACT

The purpose of this study was to determine the effectiveness of a Midwestern Hospital's Interdisciplinary Outpatient Chronic Low Back Pain program. Rate of return to work was selected as the outcome measure for effectiveness. For purposes of discussion, the percentage of patients who were compliant with home exercise, who were involved in a vocational rehabilitation program, and who consulted a physician since discharge were analyzed. There were 118 male and female subjects, average age of 43; who successfully completed the 8 week chronic low back pain program between 1992 and 1994. Subjects were then sent questionnaires at 1, 3, 6, and 12 months. Data from these questionnaires was analyzed. The results showed that 54% of the questionnaires indicated return to work at 1 month, 47% at three months, 56% at 6 months, and 63% at 12 months. However, these results were not valid because of a questionnaire return rate below 60%. Due to this and other limitations of this study the authors could not draw any conclusions regarding the effectiveness of this Midwestern hospital's interdisciplinary chronic low back pain program. Hence, future study is necessary before any determination can be made regarding this program's effectiveness.
ACKNOWLEDGEMENTS

The authors would like to extend an appreciation to the following individuals for giving graciously of their time and assistance: Mr. Gordon Alderink, Dr. William Bell, Ms. Karen Burchard, and the clinical specialist at the Midwest Hospital's Interdisciplinary Chronic Low Back Pain Program. The authors wish to extend a special thanks to Dr. Arthur Schwarcz, committee chairman, whose long hours of assistance in organization of this study helped to provide a valuable learning experience.
# TABLE OF CONTENTS

ABSTRACT ......................................................................................................................... i

ACKNOWLEDGEMENTS ............................................................................................. ii

LIST OF TABLES ............................................................................................................. v

LIST OF FIGURES ........................................................................................................... vi

CHAPTER

1. INTRODUCTION ............................................................................................ 1
   Midwestern Hospital's Program ........................................................... 4
   Major Problems Associated with Chronic Low Back Pain .......... 7

2. LITERATURE REVIEW ............................................................................... 9
   Introduction ............................................................................................. 9
   Chronic Low Back Pain ......................................................................... 9
   Psychological Component of Chronic LBP ....................................... 10
   Interdisciplinary Treatment Approach ................................................ 11
   Mayer et al's Interdisciplinary Program ............................................. 13
   Hypothesis .............................................................................................. 15

3. METHODS ..................................................................................................... 16
   Study Design and Sequence .............................................................. 16
   Study Site and Subjects ........................................................................ 16
   Instruments ............................................................................................. 16
   Procedure ............................................................................................... 17

4. DATA ANALYSIS/RESULTS .................................................................... 18
   Techniques ............................................................................................. 18
   Patients Who Completed Program ..................................................... 18
   Characteristics of Subjects ................................................................... 19
   Return Rate of Questionnaires ........................................................... 20
   Return to Work .................................................................................... 20
   Non-Working Patient's Efforts at Returning to Work ....................... 23
   Compliance with Home Exercise Program (HEP) ...................... 23
   Additional Physician Visits Encountered Post-Discharge .......... 24
   Marital Status and Return to Work .................................................... 25
<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. DISCUSSION</td>
<td>26</td>
</tr>
<tr>
<td>Implications</td>
<td>32</td>
</tr>
<tr>
<td>Limitations</td>
<td>34</td>
</tr>
<tr>
<td>Conclusion</td>
<td>35</td>
</tr>
<tr>
<td>Suggestions for Future Research</td>
<td>36</td>
</tr>
<tr>
<td>REFERENCE LIST</td>
<td>37</td>
</tr>
<tr>
<td>APPENDICES</td>
<td></td>
</tr>
<tr>
<td>APPENDIX A Questionnaire</td>
<td>40</td>
</tr>
<tr>
<td>APPENDIX B - Data Collection Form</td>
<td>45</td>
</tr>
</tbody>
</table>
**LIST OF TABLES**

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Number of Patients Who Completed the Program in 1992, 1993, and 1994</td>
<td>19</td>
</tr>
<tr>
<td>2. Demographics: Age and Gender</td>
<td>19</td>
</tr>
<tr>
<td>3. Demographics: Marital Status</td>
<td>20</td>
</tr>
<tr>
<td>5. Marital Status and Percentages of Patients Who Returned to Work</td>
<td>25</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Overall Percentage of Questionnaires Return at 1, 3, 6, and 12 Months</td>
<td>21</td>
</tr>
<tr>
<td>2. Percentage of Patients Working at 1, 3, 6 and 12 Months</td>
<td>22</td>
</tr>
<tr>
<td>3. Percentage of Non-working Questionnaires Indicating HEP Compliance</td>
<td>24</td>
</tr>
</tbody>
</table>
CHAPTER 1

Introduction

Low back pain is a major medical problem in industrialized countries. In the United States it is estimated that between 1971 and 1981 the number of people with disabling or chronic low back pain increased by 168%. During this same period the population of the United States only increased 12.5% (Hazard et al., 1989). In 1982 approximately two million Americans could not work because of low back pain. This equates to an estimated 80% of the working population who will experience low back pain serious enough to interfere with daily activities (Koku, 1992). Back pain is also the second leading symptomatic reason for patients of all ages to visit the doctor in the U.S. (Cypress, 1983).

Along with all the problems chronic low back pain creates for the patient, comes major financial costs for the entire country. Estimates indicate chronic low back pain may consume up to 85% of the total costs associated with back pain compensation, lost productivity, and health care in the United States (Hazard et al., 1989). In terms of health care dollars more than eight billion is spent on chronic low back pain annually (Deyo, & Tsui-Wu, 1987). When lost productivity is figured in, estimates reach as high as 56 billion (Hazard et al., 1989).

Of those who will suffer from acute low-back pain, 80 to 95% of them will recover comfort and function within three months (Hazard et al., 1989). The number of people who do not recover from low back pain in the short duration of three months will ultimately develop a chronic condition that will require increased medical intervention. There is a direct relationship between the duration of low back pain and the potential to return to work. Fewer than 50% of those disabled six months or more ever return to
work, and for those disabled two years or more re-employment is rare (Hazard et al., 1989).

Conservative, or nonoperative care, is indicated for many patients with less than six months of total disability, or indefinite partial disability. Conservative interventions include modalities, manual therapy, exercise, education, training in functional tasks, and work hardening (Kohles, Barnes, Gatchel, Mayer, 1990). The goal of conservative care is the reactivation of patients through the use of passive or active physical therapy (Mayer, 1991). The majority of patients who suffer from chronic low back pain are off work for an extended period of time. Although they have received conservative treatments for chronic low back pain they do not have significant improvements in pain relief or the ability to cope with their pain, nor do they have any significant improvement in function.

The lack of success in treating chronic low back pain with conservative treatment has spurred the development and implementation of interdisciplinary functional restoration back care programs. One such program is described in the literature by Mayer et al. This program is divided into four phases.

The first phase consists of an intense interdisciplinary evaluation involving physical and psychological measures. After evaluation the patient begins a three week, daily outpatient rehabilitation program of exercise, training in functional tasks, education, and work simulation/hardening. The psychological component of this phase consists of stress management training, cognitive behavioral skills training, and individual, group, and family counseling. All components of this phase demand approximately fifty-seven hours of the patient's time per week.

In Phase Two the patient is discharged from the three week outpatient program and an evaluation similar to the phase one evaluation is performed. This evaluation serves as a guide for the course of phase two treatment. Phase two only requires the patient to spend two hours per day, up to four times per week in the clinic "until they reached
maximum benefit to permit a medical release to return to work" (Mayer et al., 1987, p. 1764). The average length of this phase is five weeks.

Phase Three begins approximately three months post-discharge and consists of a six-hour Post-Program Quantitated Evaluation. Phase four is mainly a follow-up phase where patients are contacted by telephone and interviewed to gather outcome criteria data.

The primary objective of this four-phase program is to address and reverse the deficits in strength, flexibility, coordination, and endurance associated with the chronic low back pain syndrome (Kohles et al., 1990). The program attempts to teach and encourage the patient to participate in activities motivated by personal goals and interests, not by pain (Sanders, 1991). Therefore, the end result of the program should be a patient who is functioning at a higher level with an ability to manage chronic low back pain that may still exist after completion of the program.

A measure of the efficacy of this particular program was determined by a return to work outcome study by Mayer et al. (1987). In this study, 87% of patients who participated in the program had returned to work and were still working at the time of the two-year follow-up. The control group in this research consisted of patients whose insurance companies denied coverage for the program. Only 41% of this comparison group had returned to work after two years.

Two other studies, one by Mayer et al., (1985) and another by Hazard et al. (1989), demonstrated the efficacy of a treatment regimen similar to the chronic low back pain program described by Mayer et al.. These studies also used return to work as their assessment tool for effectiveness, and both had twice the rate of patients who returned to work, relative to the comparison group.

Both Hazard and Mayer have emphasized the need for future efficacy studies on these relatively new interdisciplinary chronic low back pain programs. As Mayer et al.
stated (1985), future studies employing this new approach should make a major impact in areas such as industrial selection, disability determination, methods of spine care, and attitudes toward individuals with low-back pain. In addition, outcomes research is rapidly becoming a necessary entity throughout the entire physical therapy field. Health care professionals are entering an era designated by some as the "Era of assessment and accountability", with a focus on quality and effectiveness of health care (Jette, 1993).

Prior to reimbursement, third-party payers are demanding evidence that physical therapy care will result in improved functional status. Another prominent issue of health care reform is the necessity for research documenting that health care providers are delivering the highest quality care at the least cost possible. Thus, there is a widespread need for efficacy studies in all areas of physical therapy, especially for relatively new components like the chronic low back pain treatment programs.

Midwestern Hospital's Program

A Midwest hospital has utilized an interdisciplinary functional restoration back care program since 1984 in their pain and headache rehabilitation program. Originally this treatment program was designed for an in-patient setting. This program is similar to the program described by Mayer et al. and treats the patient from a holistic perspective. The hospital's staff consists of a physiatrist, orthopedic specialist, family practitioner, psychologist, and physical therapist. The program duration is approximately eight weeks in length and consists of stretching, strengthening, aerobic conditioning, pain management, detoxification, and education. The guiding philosophy of this and other functional restoration programs, as stated by Mayer et al. (1985), is "restoration, mobility, muscular strength, endurance, and conditioning, as well as cardiovascular fitness leading to restoration of the ability to perform specific functional tasks such as lifting, bending, twisting, and tolerance of prolonged static positioning (i.e., sitting and standing)" (p. 483).
Chronic low back pain, as defined by the hospital, is pain lasting more than six months. Patients in this program have typically exhausted all other possibilities leading to recovery, leaving this interdisciplinary program as the patient's last resort to return to work or to a higher functional level.

This hospital's program was not an exact duplicate of Mayer et al's, however, as stated above, the program is similar. The Midwest hospital's interdisciplinary treatment for chronic low back pain, in the tertiary stage of health care, is consistent with other interdisciplinary programs, like Mayer's. The evaluation process that precedes candidate selection for a chronic low back pain program is what distinguishes this hospital's program from Mayer's and others. The hospital evaluates the patient with a team of health care professionals to determine eligibility for their program. The interdisciplinary program described by Mayer et al uses only one professional, the patient's physician, to decide eligibility.

The evaluation team at this hospital consists of either a physiatrist or an orthopedic physician in conjunction with a family practitioner, psychologist and physical therapist. Following their assessment, the team meets to decide the patient's eligibility for the program. There are three admission criteria: first, the patient must not have psychiatric problems that would inhibit participation; second, the patient must appear motivated and have a specific goal to reach (this goal may include returning to work for working age individuals, or improving quality of life for the retired patients); and finally, the patient must not have received a considerable amount of restoration type therapy.

There is no specific criteria for defining a considerable amount of restoration type therapy. The program usually accepts patients only exposed to passive therapies. However, patients may be selected for this program if prior therapy lacked posture/body mechanics education and or a functional emphasis (Clinical Specialist, personal communication, June 1994).
There are four exclusion criteria for the program: first, if the patient shows signs of extensive symptom magnification and does not cooperate well in the examination; second, the patient may voluntarily decide not to participate in the program; third, the insurance company may not approve the patient for treatment; and finally, if the patient needs further diagnostic testing, is a surgical candidate, or has an organic pathology.

Once accepted into the hospital's system, patients then participate in an eight week out-patient program. The length of participation time is variable, and is relative to the individual needs of the patient. As many as ten to eleven patients may be in the program at any one time, but this will also vary.

The hospital's chronic low back pain clinic is staffed by an orthopedic specialist, physiatrist, psychologist, family practice physician, and a physical therapist. Referral to the program may occur through the orthopedic specialist and family practice physician, through a physiatrist or an insurance carrier. Each of the patients will be treated by the physical therapist, psychologist, and the referring caregiver. The length of treatments with each of the professionals will vary depending on the patient's individual needs and the progress of the patient. In the beginning phases of the functional restorative program patients receive extensive one on one treatment. Then, depending on each individual's progress, treatment sessions may be individual, group, or a combination of the two types.

The treatment methods throughout the whole program are more active and aggressive rather than passive. The patient is immediately given guidance about taking responsibility for his/her pain and how to modify daily activities in response to that pain. A main component of the program is to educate patients about anatomy, body mechanics, posture, and how these relate to chronic low back pain.

Throughout the program, patients are reassessed as needed. During these assessments care is taken to avoid reinforcing pain behaviors the patient may exhibit. The health care team meets weekly to discuss each patient's progress, develop common goals
for the patients, and determine if other health care workers' involvement, such as occupational therapists or nutritionists, would be beneficial.

The hospital's chronic low back pain program has two primary goals. One is education of the patients so they will be able to appropriately translate treatment into improved function. The education primarily consists of instructing the patient on how to manage flare-ups, and also how to pace activities to avoid flare-ups. The other goal is to return the patient to work or, if the patient is not working, increase the patient's quality of life. Typically, the patients will not report a decrease in pain, but will report a decrease in the use of medications and an increase in their activity level. If the patient meets the above listed goals and does not report an increase in symptoms, this is considered a positive outcome.

The effectiveness of the Midwest hospital's program is assessed on the basis of the patient's change in perception of disability, Sickness Impact profile (SIP), and the patient's disability status pre-treatment versus post-treatment. The assessment tool used at the hospital to determine effectiveness is a questionnaire distributed to the patient at one, three, six, and twelve months post-discharge (See Appendix A). A unique component of the hospital's program is a strong emphasis on psychological assessment and treatment. In the initial evaluation, patients are thoroughly interviewed and complete the Minnesota Multiphasic Personality Inventory (MMPI) and the SIP. During treatment sessions, patients may receive biofeedback and individual or group counseling. The psychologist is a key participant in the weekly staff conferences and provides input to other staff about the patient's psychological state and how this may be effecting the patient.

Major Problems Associated with Chronic Low Back Pain

The absence of the low back injured employee from the work force places a high financial burden on the insurance company in terms of health care management and lost productivity dollars (Mayer et al., 1985). As a result, the insurance companies and
employers are demanding that physical therapists increase their patient's function and return them to work as soon as possible. Long term absences from work may also profoundly effect the psychological state of an individual. As Kermond, Gatchel, and Mayer stated (1991),

For most people, work carries a certain amount of status, is a place to belong, a place to feel productive, and an important social network outside of the family. It is a place to experience feelings of self esteem over a job well done, and a place to establish a self-image as a worker and producer (p. 478).

Although the effectiveness of the type of functional restoration program described by Mayer et al has been demonstrated, the Midwestern Hospital's program, which varies from Mayer et al's program, has not been assessed. Therefore, the purpose of this study was to determine the effectiveness of this Midwestern hospital's version of an interdisciplinary approach to chronic low back pain. In order to determine effectiveness, the percentage of people who completed the program and returned questionnaires indicating return to work was analyzed. Return to work was selected as an outcome measurement based on current demands of insurance companies and employers, and because of the psychological impact work can have on an individual.
CHAPTER 2

Literature Review

Introduction

This chapter provides a definition of chronic low back pain and the interdisciplinary approach to treating this disorder. The various phases of an interdisciplinary program will be described with an emphasis placed on the objectives of each phase. The psychological component of chronic low back pain is also described. The chapter will conclude with the authors' hypothesis.

Chronic Low Back Pain

Chronic low back pain is a loosely defined condition, yet it is very well understood by the millions of Americans who are afflicted with it. There are many definitions of chronic low back pain which offer a wide range of descriptions and criteria. Koku (1992) defined chronic low back pain "both as physical and psychological, being brought on by injury to the low back from lifting excessive loads, direct trauma, or falls" (p. 84). Meilman and Skultety's (1984) definition of chronic pain includes "pain that has been present six months or longer and which is not the result of a life-threatening or function threatening disease process" (p. 305). Mayer stated (1991) that chronic pain is often defined in terms of months of duration, but he suggested that a more useful definition of chronic pain is pain which persists after healing is known to have taken place. The definition of chronic low back pain, used by the Midwestern hospital and this study, is "pain that has lasted for six months duration or longer" (Clinical Specialist, personal communication, July, 1994). Although not specified in the definition, many of the patients in this Midwest hospital's chronic low back pain program have undergone multiple diagnostic procedures and completed some form of physical therapy.
Psychological Component of Chronic LBP

One of the assumptions in the treatment of chronic pain is that "medical, surgical, and pharmacological procedures are no longer effective" (Meilman & Skultety, 1984, p. 310). "When pain has persisted for more than six months and initial treatment regimens proved unsuccessful, the psychological component becomes more obvious" (Meilman & Skultety, 1984). A person may have experienced psychological changes such as loss of independence, anxiety, fear, depression, anger, and overcompensation (Koku, 1992).

Both the behavioral and psychological factors in chronic pain have been increasingly recognized by physicians, causing an increase in behavioral assessment and treatment (Keefe, 1982). Behavioral assessment and treatment have been shown to be important because the patient's clinical treatment depended on the specific subjective complaints, which were impacted by the physical abnormality in addition to the patient's attitudes, beliefs, psychologic distress, and illness behaviors (Waddell, 1987). In some patients pain behaviors persisted for a longer time (even after injured tissues had healed) because the pain behaviors led to positive reinforcement, such as increased attention from family and friends, financial compensation, or avoidance of responsibilities at work or home (Keefe, 1982).

Socioenvironmental factors have also been examined, as they have been shown to be a deciding factor in whether or not pain behaviors exist. In a study correlating acute low back pain and time until return to work, it was discovered that age and marital status played a critical role. "Older patients were more likely to return to work sooner and single patients had longer absences from work than married patients did" (Lehmann, T., Spratt, Lehman, K., 1993, p. 1108). This correlation demonstrated that social issues pertaining to family and financial stability shape a person's attitudes regarding their injury and may motivate them to return to their previous function at an earlier date.
According to Keefe (1982) behavioral assessment serves three purposes, "it identifies behavioral problems more objectively, may help clarify the socioenvironmental factors which control the behaviors, and may succeed in the treatment of chronic patients who do not respond to medical or surgical treatment" (p. 896). Meilman and Skultety (1984) also stated, "viewing all pain as a psychophysiological process permitted a logical explanation as to why some individuals develop a chronic pain syndrome and others do not" (p. 306). If a patient developed a chronic pain syndrome, "the primary problem was no longer the pain, but rather the disability and impairment the pain caused" (Meilman & Skultety, 1984, p. 307). Treatment must be focused on functional abilities and how to cope with pain.

**Interdisciplinary Treatment Approach**

An interdisciplinary approach has been important for chronic pain patients because it addresses the psychological problems the patient may have experienced. This approach included various health professionals that evaluated the patient and then met on a regular basis to establish common goals and treatment programs. The interdisciplinary approach gained popularity because health professionals worked with the patient and each other to accomplish common goals. This way each professional was more abreast of the treatment and interaction provided by the other team members and could, therefore, plan a more effective treatment that encompassed the physical abnormality and the psychological issues.

A majority of programs offered a multidisciplinary approach to chronic pain, based on the assumption that "pain is a complex psychophysiological phenomenon" (Meilman & Skultety, 1984, p. 305). A multidisciplinary approach was beneficial to the patient because they were treated by a variety of health professionals that addressed a different aspect of the patient's problem. The multidisciplinary approach also offered a holistic
treatment. However, the professionals never came together to establish common goals and assess the patient's progress. Each specialty had their own specific goals.

The Clinical Specialist, at the Midwest hospital's Pain Rehabilitation Program, believes that an interdisciplinary approach has been more effective due to the increased communication of the treatment team, and the establishment of common treatment goals (Clinical Specialist, personal communication, July, 1994).

The establishment of common goals ensured that all professionals, who dealt with the patient, provided care that comprehensively addressed the patient's needs. With this interactive form of care the treatments of the various disciplines complimented each other and were more specific to the patient's problem. The end result was a more efficient goal directed treatment and a faster recovery (Clinical Specialist, personal communication, July, 1994).

Many investigators have attempted to establish the efficacy of an interdisciplinary approach in treating chronic low back pain. Mayer et al. (1985), conducted a prospective one-year study in which 66 chronic low back pain patients were evaluated and compared to thirty-eight patients who were not admitted to the program. The program addressed functional restoration and psychological intervention using a multi-modal pain management program. Follow-up evaluations were conducted at 3, 6, and 12 months after the completion of the program. One year following the program, data available for the treatment group (62 patients) revealed approximately twice the rate of patients who returned to work (86%), compared to data available for the comparison group (33 patients, 55%) (Mayer, 1985). Although the comparison group had similar surgery rates, they experienced an increase in additional health care professional visits.

In a study by Hazard et al. (1989), 59 patients with pain averaging 19 months and without evidence of surgically correctable disease completed a treatment program of functional restoration with behavioral support over a one-year prospective observation.
The treatment regimen was modeled after the study by Mayer et al., and included psychological intervention, physical and occupational therapy, and daily educational seminars. The authors were able to contact all patients one year following the program, and 81% of the graduates had returned to work compared to 29% for the control group (Hazard et al., 1989). Hazard et al's control group consisted of those patients who were denied authorization for treatment by their insurance carriers.

In another two year prospective study conducted by Mayer et al. (1987), 116 patients entered a functional restoration treatment program for low back pain. The outcome of the functional restoration group was compared to 72 patients that were not treated. The functional restoration program was divided into four phases: evaluation, functional restoration, psychological intervention involving a multimodal pain management program, and follow-up sessions at 3, 6, 12, and 24 months. Ninety-eight out of the original 116 treatment group patients were contacted at two years, and 87% (85 of the 98) were working. After two years, only 78% of the non-treatment group was contacted and only 41% had returned to work (Mayer et al., 1987).

Mayer et al's Interdisciplinary Program

Many current interdisciplinary programs addressing chronic low back pain are modeled after the one described by Mayer et al. In order to qualify for this program patients have to meet four requirements. First, a reasonable surgical alternative had to be determined unnecessary by two or more physicians. Second, more than four months had to have passed since the injury. Third, the patient had to speak English, and finally the patient's insurance company had to approve the patient's participation in the program. Mayer et al's program is divided into four phases:

Phase I

During this phase an intense interdisciplinary functional capacity evaluation involving physical and psychological measures is completed by patients. After the
evaluation the patient then participates in a three week, daily outpatient rehabilitation program. This phase requires the patient to spend 57 hours per week at the clinic. During this time participants are exercising, receiving training in functional tasks, being educated, and performing work simulation/hardening interventions.

Phase I also contains a psychological component with four major areas of focus:
1) Behavioral stress management training - muscle relaxation training; 2) Cognitive behavioral skills training - instruction in assertiveness, rational vs. irrational thinking, and the management of stress and crisis during adult development; 3) Individual and group counseling emphasizing a crisis intervention model; and 4) Family counseling - family members are encouraged to take an active part in the rehabilitation process and are provided information about the philosophy and specific details of the Mayer et al. program.

The psychological component of the interdisciplinary functional restoration program fundamentally distinguishes this program from other more conservative means of treating low back pain. The reason this component was added is because psychological distress was shown to be a substantial element of any chronic condition including low back pain. The patient becomes anxious about the pain and depressed because their condition is not improving. Over time the psychological component may eventually overshadow the pain (Waddell, 1987; Meilman & Skultety, 1984). The patient's activities of daily living may become motivated more by pain than by their goals and interests (Sanders, 1991).

Phase II

The patient is discharged from the program and a second comprehensive physical and psychological evaluation is performed. They then enter a follow-up phase in which they return to the clinic two hours per day, from 1-4 times per week, depending on transportation feasibility. This phase continues until they have reached maximum benefit or returned to work (Mayer et al., 1985). The average length of this phase is five weeks.
Phase III

Three months after discharge the patient returns to the program to complete a six hour Post-Program Quantitated Evaluation. This evaluation consists of a structured interview, quantitative physical and psychological testing, and a physician meeting where patients are presented the results of the testing and the changes that occurred.

Phase IV

After a one and two year period, a follow up was conducted to gather outcome criteria data. This was done by attempting to contact all patients for a structured telephone interview. An important component of this interview is whether or not the patient had returned to work, and if the patient was still working.

The Midwest Hospital's program, selected for this study, is a functional restoration program modeled after Mayer et al's. This program was designed to treat patients with diagnoses ranging from degenerative disc disease to nonspecific back pain.

Hypothesis

The Midwestern hospital's program which utilizes an interdisciplinary approach in both the initial evaluation and treatment is a more effective program compared to similar programs in research literature.
CHAPTER 3

Methods

Study Design and Sequence

This research study was designed as a descriptive, retrospective study of a Midwestern hospital's rehabilitation clinic interdisciplinary low back care program's effectiveness. The authors of this study operationally defined effectiveness as the hospital's ability to return patients to work within one year after discharge from the program. The effectiveness of this hospital's approach to chronic low back pain treatment was determined by analyzing follow-up questionnaires returned to the hospital. These questionnaires were sent to all patients who completed the interdisciplinary program at 1, 3, 6, and 12 months after discharge.

Study Site and Subjects

The site selected for this study was a large inpatient/outpatient hospital located in the Midwest. Approval for this study was granted by the hospital's research committee based upon the condition that the hospital's name remained anonymous. Subjects for this study were obtained from questionnaires returned by patients who completed this Midwestern hospital's interdisciplinary chronic low back pain program. Every patient who completed this hospital's program between 1992 and 1994 was sent a questionnaire at 1, 3, 6, and 12 months after their discharge. Confidentiality of patient's names was maintained by use of a numbering system that separated subjects by the year and the time intervals in which they returned questionnaires.

Instruments

In order to accumulate outcomes measures data, the authors of this study collected their data from the completed follow-up questionnaires that had been sent to all patients
who completed this Midwestern hospital's interdisciplinary chronic low back pain program. (See Appendix A).

Procedure

To determine effectiveness of this program the return to work variable of the questionnaire was analyzed. This variable was analyzed by first determining the percentage of patients who returned questionnaires at 1, 3, 6, and 12 months. This percentage was determined by dividing the total number of returned questionnaires at 1, 3, 6, or 12 months for all three years by the total number of patients who completed the program during the three years. Then the percentage of those who returned questionnaires and were working was calculated for 1, 3, 6, and 12 months post discharge.

The questionnaire also contained questions pertaining to vocational rehabilitation and retraining programs. These questions were posed for unemployed individuals who were given a release to work, but due to circumstances, were not working. Additional questions included pain levels and frequency, additional physician visits, and exercise compliance.
CHAPTER 4

Data Analysis/Results

Techniques

From 1992 to 1994 a total of 217 questionnaires were returned. Three of the questionnaires were incomplete and not included in this analysis, therefore 214 questionnaires were analyzed for this study. The data from the questionnaires were entered onto data collection forms by the authors. Raw data were then entered into SPSS/PC+ for calculation of percentages and grouping of subjects characteristics. Data from respondents were analyzed for percentage of returned questionnaires indicating return to work. The data were also analyzed for percentage of questionnaires showing home exercise compliance, vocational rehabilitation after discharge, physician visits since discharge, and percentage of married patients. This secondary data were analyzed for purposes of discussion, and was not intended to further determine effectiveness of the program.

Data regarding the successful program completion rate were obtained from a clinical specialist at the Midwestern hospital. This data compares the number of patients who started the program to those who successfully completed the entire program.

Patients Who Completed Program

One-hundred sixty-eight patients started the program between 1992 and 1994. Of the 168 who started the program, 84%, or 141 completed it (See Table 1). As indicated in Table 1, the year 1992 had the highest program completion rate (92%) while 1994 had the lowest rate (79%). This shows that over the three years the percentage of patients who were discharged early from the program increased. Reasons for this are many and will be discussed later.
Table 1

Number of Patients Who Completed the Program in 1992, 1993, and 1994:

<table>
<thead>
<tr>
<th></th>
<th>1992</th>
<th>1993</th>
<th>1994</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number Started</td>
<td>52</td>
<td>58</td>
<td>58</td>
<td>168</td>
</tr>
<tr>
<td>Number Completed</td>
<td>48</td>
<td>47</td>
<td>46</td>
<td>141</td>
</tr>
<tr>
<td>Percent</td>
<td>92</td>
<td>81</td>
<td>79</td>
<td>84</td>
</tr>
</tbody>
</table>

Characteristics of Subjects

The study sample consisted of 118 subjects who returned one or more of the questionnaires. There were 65 males and 53 females with a mean age of 42 and 44 years respectively (See Table 2). The ages of the subjects ranged from 21-72. Of this sample 83 were married, 21 were single, and 14 had unknown marital status (See Table 3). Marital status information was obtained from a Pain Rehabilitation Clinical Specialist at the Midwestern hospital.

Table 2

Demographics: Age and Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Number</th>
<th>Average Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>65</td>
<td>42</td>
</tr>
<tr>
<td>Female</td>
<td>53</td>
<td>44</td>
</tr>
<tr>
<td>Total</td>
<td>118</td>
<td>43</td>
</tr>
</tbody>
</table>
Table 3

Demographics: Marital Status

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unknown</td>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td>Single</td>
<td>21</td>
<td>18</td>
</tr>
<tr>
<td>Married</td>
<td>83</td>
<td>70</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>118</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Return Rate Of Questionnaires

The total percentage of those who were discharged from the program between 1992 and 1994 and returned questionnaires at 1, 3, 6, and 12 months, is represented in Figure 1. At 1 month there was a 63% return rate of questionnaires, a 40% return rate at 3 months, a 28% return rate at 6 months, and a 23% return rate at 12 months. The return rate of questionnaires dropped off as time after discharge increased. As noted in Table 4, there was a marked drop in the return rate of questionnaires in 1994 for the 3 and 6 month periods compared to the same periods in 1992 and 1993. On the date the authors collected the data there were no questionnaires returned for the 1994 twelve month interval.

Return To Work

The total percentage of those who returned questionnaires and were working at 1, 3, 6, and 12 months after discharge, for all three years, is displayed graphically in Figure 2. Fifty-three percent of the 88 patients who returned questionnaires one month following discharge from the program were working. One of the questionnaires returned at the
Table 4: Return Rate of Questionnaires for 1992, 1993, and 1994:

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Number Returned</th>
<th>1 Month</th>
<th>3 Month</th>
<th>6 Month</th>
<th>12 Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>91</td>
<td>33</td>
<td>22</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>1993</td>
<td>82</td>
<td>30</td>
<td>25</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>1994</td>
<td>44</td>
<td>26</td>
<td>10</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>217</td>
<td>89</td>
<td>57</td>
<td>39</td>
<td>32</td>
</tr>
</tbody>
</table>

Figure 1: Overall percentage of questionnaires returned at 1, 3, 6, and 12 months.
one month time interval indicated that the patient was retired. At 3 months following discharge from the program 47% of 55 patients who filled out questionnaires were working. Two of the patients in this group (3.6%) indicated retirement. Questionnaires returned at 6 and 12 months following discharge from the program indicated that 56% of 39 patients and 63% of 29 patients were working. At 12 months there was another questionnaire indicating retirement.

Overall, of the 214 total questionnaires returned, 115 indicated patients were working at some time interval following the program, 95 indicated patients were not working at some time interval following the program, and four indicated retirement (1.8%). The questionnaires returned 12 months post-discharge showed the highest percentage of patients who returned to work. However, this time period also coincided with the lowest return rate of questionnaires.

![Figure 2: Percentage of patients working at 1, 3, 6, and 12 months.](image)
Non-Working Patient's Efforts at Returning to Work

With returning to work as the ultimate goal, some unemployed patients who completed this Midwestern hospital's interdisciplinary chronic low back pain program were involved in a job search, a vocational rehabilitation program, seeing a rehabilitation specialist, or involved in a retraining program. Since many people sporadically answered questions 3 to 6 on the questionnaire it was impossible to pinpoint the exact re-employment activity of individuals. Instead, the authors considered patients in active pursuit of employment if they answered yes to one of four re-employment questions. Further, if subjects did not answer yes to at least one of questions 3-6, then the authors concluded this person was not exerting a strong effort to return to work.

The percentage of non-working questionnaires showing involvement in at least one of these re-employment agendas was 39%. Three percent of the non-working population failed to answer this question.

Compliance with Home Exercise Program (HEP)

Home exercise compliance was another variable examined for purposes of discussion only. The Midwestern hospital's questionnaire contained three questions addressing home exercise compliance. From these HEP questions, the authors of this study established specific criteria for determining if patients were compliant with home exercise programs. Patients met the exercise compliance criteria if they performed stretching and strengthening exercises at least three times a week and hiked and or walked 1-3 days per week. Patients who did not answer all three questions regarding HEP compliance were regarded as inconclusive. The authors considered an exercise compliance rate above 70% as high compliance, between 50-70% as moderate compliance, and below 50% as poor compliance.

For all the 214 questionnaires that were returned, the percentage that showed compliance in HEP following discharge was 74%. Twenty-one percent of questionnaires
did not meet established criteria for HEP compliance, and 4% of questionnaires had an inconclusive status. Two questionnaires (1%) had no response to the questions regarding HEP compliance.

Home exercise compliance in the population of questionnaires indicating no return to work was also analyzed. The percentage of questionnaires showing patients who were not working and compliance with a HEP was 76%. The percentage of those indicating not working and non-compliance with an HEP was 22%. None of the responses for the not working questionnaires had inconclusive status, and the remaining 2% did not provide answers to the questions regarding home exercise compliance (See Figure 3).

Additional Physician Visits Encountered Post-Discharge

Some patients who completed the program returned to a physician post-discharge. Sixty-one percent of all the questionnaire responses indicated no further physician visits

![Figure 3: Percentage of non-working questionnaires indicating HEP compliance.](image)
following discharge from the program. Thirty questionnaires had no response to the question. When isolating the population of patients who were not working, 60% of the questionnaires indicated no further visits to a physician, which parallels the overall total of questionnaires. Only 39% of questionnaires indicating not working reported a physician visit. This question on the questionnaire was not answered by 1% of the patients.

Marital Status and Return to Work

The percentage of married working patients may be biased because the majority of the overall population in this study were married (70%) (See Table 3). When analyzing the number of patients that did return to work, it was found that 71% of these people were married (See Table 5). The percentage of single people that returned to work was 22%. The marital status of 7% of the working patients was unknown.

Table 5

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>Number Returned to Work</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td>43</td>
<td>71</td>
</tr>
<tr>
<td>Single</td>
<td>13</td>
<td>22</td>
</tr>
<tr>
<td>Unknown</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>60</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
CHAPTER 5

Discussion

The purpose of this study was to determine the effectiveness of this Midwest hospital's interdisciplinary approach to chronic low back pain. In order to determine effectiveness, the percentage of people who completed the program and returned questionnaires indicating return to work was analyzed. Based on the survey data, the results of this study do not appear to support the effectiveness of this Midwest hospital's interdisciplinary low back pain program.

The most important factor limiting support for the hypothesis involved the questionnaire return rate. A detailed analysis and discussion of these results is warranted. In this discussion the authors examined questionnaire return rate and other variables which could have contributed to these comparably low return to work outcomes. Other variables included patient's efforts to seek employment, patient compliance with a home exercise program, and the number of subjects who consulted a physician after discharge from the program. Program completion rate was also analyzed and will be discussed as a possible variable of credibility for this interdisciplinary system of treatment.

As stated in the results section of this study, between 1992 and 1994 eighty-four percent of the patients successfully completed the program. However, the program completion rate has dropped 13% from a high of 92% in 1992 to a low of 79% in 1994. The authors attributed this decrease in program completion to the increased number of early discharges from the program. According to a Pain Rehabilitation Clinical Specialist at the Midwest hospital, early discharge from the program became more common and was
secondary to a patient's lack of compliance, lack of progression, a pending lawsuit, or a patient's voluntary discharge (Clinical Specialist, personal communication, July, 1994). The overall number of patients discharged also depended on the appropriateness of patients who were admitted through the selection process. A large number of early discharges was expected if a high number of inappropriate patients were admitted.

Although this program showed a decrease in program completion rate from 1992 to 1994, the authors of this study believed an 84% completion rate reflected positively on the credibility of this hospital's program. These were unbiased results because this statistic was independent of questionnaire return rate. These results compared favorably to Mayer et al's and Hazard et al's studies, where both showed an approximate 90% completion rate. A larger number of subjects may have accounted for this Midwestern hospital's slightly lower completion rate.

The only analyzed variable not dependent on questionnaire return rates was program completion rate. Statistically speaking, a questionnaire return rate of 60% was necessary before classifying data as significant. According to Miller (1991), a 60% return rate of questionnaires is barely adequate to conduct research. The only time interval to reach a significant return rate was the 63% rate of the first month time period. During the last three time periods, this figure significantly dropped until the questionnaire return rate for 12 months was only 23%.

Besides the return rate dropping from 1 month to 12 months, a significant decrease in return rate of the questionnaires also occurred throughout each year from 1992 to 1994. The most significant drop in returned questionnaires was at the 3, 6, and 12 month intervals in 1994. Unavailability of any questionnaires from patients who completed this hospital's program in mid to late 1994 provided a possible explanation for this significant decrease. The possibility of how this led to bias is explained in the limitation section of this chapter.
Possible explanations for the decreased return rate over the months may be influenced by the time interval between completing the program and receiving the questionnaire. At the time patients received the questionnaires they may have been too busy to fill out the form, have moved and not received the questionnaire, have believed their status was unchanged and had nothing new to report, or had developed negative feelings about the program and did not want further aggravation with the questionnaire.

The poor questionnaire return rate also may have been a direct result of the procedures used by the Midwestern hospital to gather this outcomes data. Other similar studies by Hazard et al. and Mayer et al. had high patient follow-up rates one and two years after discharge when gathering outcomes criteria data. For example, one year after Mayer et al.'s treatment group completed the program, 94% of patients were contacted to gather data for outcomes analysis (Mayer et al., 1985).

Possible explanations for Mayer et al.'s high contact rate were the aggressive follow-up procedures utilized in that study. One year following the program these researchers used a structured telephone interview to contact patients. If these researchers experienced difficulty locating patients, they contacted patient's physicians, attorneys, insurance companies, rehabilitation and other federal/state agencies, and relatives. In some cases investigators also utilized international telephone calls or local home visits (Mayer et al., 1985). The Midwestern hospital's failure to achieve a return rate greater than 63% was due to a lack of aggressive follow-up on questionnaires by either telephone or other means.

The poor questionnaire return rate became the primary limiter of obtaining significant results in this study, which would allow confirmation of the authors' hypothesis. The potential bias caused by this low return rate of questionnaires is why many analyzed variables, including return to work, cannot contribute to any conclusions regarding the effectiveness of this hospital's program. Return to work was the most important variable
affected by the potential bias, because return to work was selected as the primary outcome variable for supporting or refuting the authors' hypothesis. Despite discovering this bias, the authors still attempted to compare the percentage of patients who completed the questionnaires and returned to work to other outcomes research of similar programs.

Keeping in mind the possible bias the poor questionnaire return rate caused, the authors of this study made cautious comparisons to studies performed by Mayer et al. and Hazard et al. when evaluating the results of the return to work outcomes. In Mayer et al's study (1985) 86% of the 62 patients who completed the program and were contacted, returned to work, in some capacity, after one year. Hazard et al's study (1989) revealed similar results with 81% of 59 graduates working after one year. Unlike this study, both of these studies included control groups for comparison. Mayer et al's control group had a 55% return to work rate, and Hazard's comparison group, which consisted of 17 patients, had a 29% return to work rate at one year (Hazard et al., 1989).

The percentage of patients working one year following discharge from the Midwestern hospital's program was 63%. This is 23% less than what Mayer et al. found in their study. However, this may not be a valid comparison due to the poor questionnaire return rate. When looking at the questionnaire return rate for the 12 month interval in 1992 and 1993 (none were available for 1994), only 33% (32 out of 95 patients who completed the program in 1992 and 1993) of the questionnaires were returned.

A Pain Rehabilitation Clinical Specialist at the Midwestern hospital offered potential explanations for these dissimilar return to work rates at one year. When a patient completed the Midwestern hospital's program a release to work was granted. However, patients still may not have returned to work due to such reasons as a pending lawsuit or the patient's ability to contact another physician to write a no return to work order. Working with a vocational specialist also resulted in a time lapse before re-employment (Clinical Specialist, personal communication, July, 1994).
Another reason for questionnaires indicating a not working response one year following the program was if patients were participating in some type of vocational rehabilitation for work re-entry. In other studies, patients involved in a training program to learn an employable job skill were considered having returned to work (Mayer et al., 1985). The authors of this study considered having the return to work variable include those who were involved in a vocational rehabilitation program at one year. This would allow an equal comparison between this study, Mayer et al's study (1985), and Hazard et al's study (1989). However, including the patients who were participating in a vocational rehabilitation program, the number of questionnaires indicating return to work only increased by three patients. Although this increased the percentage of patients who returned to work at one year from 63% to 72%, the authors did not believe this was significant because of the low number of patients who returned questionnaires at the one year interval. Therefore, the authors did not include those patients involved in vocational rehabilitation with the return to work category in the results section.

Another reason patients involved in a vocational rehabilitation program were not considered having returned to work was because patients who returned questionnaires were not specific enough in answering questions 4 to 7 on the questionnaire to make a conclusion regarding their involvement in a retraining program. Even if this was considered, only 39% of questionnaires indicating no return to work showed that patients were involved in a job search or vocational rehabilitation program. This would not have made a significant difference in the return to work rate. In other words, the actions of a majority of patients who remain unemployed after discharge from the Midwestern hospital's program did not reflect individuals who were actively seeking employment.

The authors decided to investigate HEP compliance to determine if there was any relationship between non-compliance and not returning to work. The authors speculated that patients who did not return to work might have had a higher incidence of non-
compliance. For those questionnaires showing no return to work, there was a 76% compliance rate with HEP. Even though patients may not have returned to work, they were performing exercises that would increase or maintain low back strength, flexibility, and endurance. Therefore, the authors speculation was incorrect as the results of this study indicated that compliance in a HEP was not a critical variable in return to work. In addition, when all returned questionnaires were analyzed for HEP compliance, the results showed that 74% of all patients were compliant with their home exercise programs while 21% were not. The remaining 5% either did not answer these questions on the questionnaire or their status was inconclusive. Both the not working and overall high HEP compliance rate's clearly demonstrated the program's effectiveness in convincing patients to follow through with home exercise programs.

Another variable analyzed for discussion purposes was the percentage of questionnaires indicating patients who consulted a physician after discharge from the program. Of all questionnaires in the study, 38% indicated that the patient consulted a physician post-discharge for their low back pain. Similarly, only 39% of the questionnaires indicating the patient did not return to work showed patients who visited a physician after discharge. These overall results are slightly higher than the results of Mayer et al's study which showed that 29% of those patients contacted at one year required additional physician visits for low back pain (Mayer et al., 1985). The authors of this study did not know if this was a significant enough difference to warrant further discussion.

The last variable included for discussion involved the role that socioenvironmental factors played in chronic low back pain patients. A study with acute low back pain patients was done by Lehmann et al. (1993). One of the purposes of the study was to "evaluate the ability of various personal, medical, occupational, and psychological factors to predict predisposition to disabling chronic low back pain" (Lehmann et al., 1993, p.
The study showed that age and marital status contributed to return to work outcomes. The study found older patients were more likely to return to work sooner, and single patients had longer absences from work than married patients did (Lehmann et al., 1993). In the authors' study of 118 subjects, 70% were married, 18% were single, and 12% had unknown status. Of the patients that returned to work, the authors found that 71% were married, 22% were single, and 7% had unknown status. Thus, marital status did not appear to effect the return rate in this study. Because of this study's low questionnaire return rate the authors did not attempt to correlate the role of age and marital status in return to work.

Implications

With the era of assessment and accountability gaining momentum many health care establishments are forced to provide outcomes statistics on treatments provided within their institutions. Insurance companies are the driving force behind these quality control measures as they are requiring research supporting all aspects of treatment. Insurance companies have started denying coverage for treatments they deem unnecessary, and many times the basis for denial is a lack of research.

Another trend being instituted by insurance companies in health care is a major emphasis on returning patients to previous functional levels. In this context a patient's insurance company may deny coverage for treatment if the health care provider did not provide evidence of increased patient function.

Although low back pain may cost society as much as 56 billion dollars annually, it remains one aspect of health care lacking substantial outcomes research (Hazard et al., 1989). A major cost associated with low back pain involves individuals who developed a chronic condition. As stated previously, researchers like Mayer et al. and Hazard et al. have attempted to address this costly proportion of low back pain patients by providing outcomes research on interdisciplinary chronic low back pain programs. Insurance
companies' and employers' strong emphasis on restoration of functional levels motivated these researchers to select return to work as one of their outcome variables for effectiveness.

Similarly, the authors of this study believed return to work coincided with insurance companies' and employers' current demands of returning patients to previous functional levels. In addition, the authors believed this variable would provide significant evidence of the effectiveness of this Midwestern hospital's chronic low back pain program if it was determined that a high percentage of the patients who completed program also returned to work.

The authors also believed that if this was a valid study, it would have contributed additional evidence for using a program design similar to Mayer et al's when attempting to counter the effects and costs of chronic low back pain. As Mayer et al. stated (1985), the cost of long-term disability payments for a patient who could not return to work is estimated at "$300,000 for Social Security and more than $600,000 for private disability insurance for an individual in the United States becoming disabled at age 30" (p. 492). In this era of assessment, accountability, and emphasis on function, this study, if valid, would have provided additional evidence for utilizing a program design that could solve a problem that has both societal and economic implications.

Although this study was not valid the authors discovered one variable of importance to the field of physical therapy. This variable was home exercise compliance. The findings in this study suggested patients who completed this program gained significant insight on the importance of home exercise programs in managing low back pain problems. Overall, even when the patients who did not return to work were considered, there was a high incidence of HEP compliance.

Overall this study has significant implications for the Midwestern hospital's data collection procedures with no follow-up analysis. First, appropriate data collection
procedures and outcome measures must be selected before making any attempts at analyzing the data to prove effectiveness of their program. Secondly, this hospital should now realize that saying and believing a program is effective, and collecting data without analyzing it, will not be adequate if their physical therapy program is to be reimbursed and survive.

Limitations

The authors found many limitations in this study. The first limitation was that no control group was utilized for comparison between the patients who completed the program and those who received no treatment. Therefore, there was no means of comparing those who went through the program and those who did not. The nature of this retrospective study design prevented the use of a control group.

Another limitation was that the Midwestern hospital did not validate their follow-up questionnaire to remove any ambiguous questions, therefore patient responses to certain questions may have been inaccurate. The hospital also changed a small amount of the wording in the questionnaires from 1992 to 1994. Therefore, the consistency of the results may have been effected because not every patient received the same questionnaire.

The tendency of the questionnaire return rate to drop as time after discharge increased is another limitation of this study. This prevented the authors from gathering the predetermined questionnaire return rate of 60% to report the significance of the results. Thus, no significance could be attributed to the results because the poor questionnaire return rate may have lead to bias in the results when claiming the percentage of people who returned to work at the 1, 3, 6, and 12 month time intervals. For example, at 1 month 57% of patients completing the program returned questionnaires, and of this group 53% returned to work. This left 43% of the patients who completed the program, unaccounted for. If these 43% had returned questionnaires maybe a higher percentage of
subjects would have been found to be working one month following discharge from the program.

Another factor which could lead to bias is the return rate of questionnaires for 1994. Data for this study was collected in January of 1995, therefore many questionnaires may not have been sent to patients who completed the program in mid to late 1994. As alluded to previously this became apparent when looking at the 1994 three and 6 month return rate which significantly decreased compared to 1992 and 1993, and when no questionnaires were returned for the 12 month period in 1994.

One phase of the selection criteria for the program was another limitation of this study. The third selection criteria of this program was based on subjective input of the selection team. There were no objective parameters set for this third criteria which may have led to inappropriate patient selection for the program. Inappropriately admitted patients might have accounted for some of the early discharges from the program. If this was the case distortion of the program completion rate might have occurred.

The final limitation of this study involved hospital filing errors with regards to the outcomes questionnaires. The authors discovered that a few of the questionnaires were placed in the wrong year or month file. If this error had occurred, then a few questionnaires would have been filed and analyzed in inappropriate time frames. The authors attempted to eradicate this problem by double checking the name on the questionnaire and matching it to the corresponding month or year in the sequence.

**Conclusion**

This hospital's patient completion rate of 84% for their chronic low back pain program was comparable to research studies of similar programs. However, the effectiveness of their program when measured by the number of patients that returned to work, can not be supported based on the data collected by the hospital through their own questionnaire. Their program may indeed be very effective but in this new age of health
care it is incumbent upon the provider to justify the treatment effectiveness and costs to the employers and insurance companies. The hospital needs to dramatically improve their data collection procedure. If the hospital is able to significantly improve their data collection rate and show that their program is effective, then they have proof to back their claims. If the data does not support the effectiveness of their program, then they need to make the appropriate changes to their program.

**Suggestions for Further Research**

In order to truly evaluate the effectiveness of this Midwestern hospital's program future studies should focus on producing a validated questionnaire and utilizing a more aggressive means of collecting follow-up data. These means could include the ones employed by Mayer et al..

In addition to the above suggestions, future researchers should determine if 1 and 3 month follow-up time intervals are appropriate. Maybe more emphasis on the 6, 12, and 24 month follow-up periods would be more appropriate for comparisons to other studies. These time intervals may also be more appropriate for considering return to work as an outcome variable of the program's effectiveness. In the opinion of Mayer et al and Hazard et al., the 1 and 3 month time interval does not allow enough time between program completion and return to work. In Hazard et al's study (1989), the average time between program completion and return to work was 7.4 weeks. Mayer et al's treatment group required an average time of approximately 10 weeks between program completion and return to work (Mayer et al., 1985).

A prospective study design would be a more appropriate one for future researchers to utilize because it allows the use of control groups for comparison. Suggestions for control groups include patients not admitted to the program, those admitted but not approved by their insurance company, those refusing to participate in the program, and or those who dropped out of the treatment program.
REFERENCES


APPENDIX A

Questionnaire
DATE: ____________________  PATIENT'S NAME: ____________________

AGE: ____________________

MEDICAL RECORD #: ____________________

TREATMENT START DATE: ____________________

DATE OF DISCHARGE: ____________________

Please fill out the information or circle the most appropriate response.

1. Were you working at the time of discharge from our program?  Yes  No

2. Are you presently working?  Yes  No

   If yes, list employer, job title, length of employment, toleration of job duties, and hours worked per week.

3. If not working, are you actively involved in a job search or job club?  Yes  No

ANSWER QUESTIONS 4-7 ONLY IF YOUR COVERAGE WAS THROUGH WORKER'S COMPENSATION OR AUTO-NO-FAULT.

4. If you are not working, are you involved with vocational rehabilitation?  Yes  No

   If no, explain ____________________

5. Are you working with a rehabilitation specialist?  Yes  No

6. Are you involved in a retraining program?  Yes  No

   If yes, list type and length: ____________________

7. Have you obtained second injury certification?  Yes  No
8. Rate the intensity of your pain on a 0-100 scale where 0 is no pain and 100 is pain as bad as it could be.

- A. Average pain over past week
- B. Worst pain over past week
- C. Least pain over past week
- D. Present pain intensity
- E. Comfort level

9. Some of the words below describe your pain. Circle all those words that describe your pain at any time during the last week. Leave out any group where there are no words that describe you pain.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flickering</td>
<td>Jumping</td>
<td>Pricking</td>
<td>Sharp</td>
</tr>
<tr>
<td>Quivering</td>
<td>Flashing</td>
<td>Boring</td>
<td>Cutting</td>
</tr>
<tr>
<td>Pulsing</td>
<td>Shooting</td>
<td>Drilling</td>
<td>Lacerating</td>
</tr>
<tr>
<td>Throbbing</td>
<td></td>
<td>Stabbing</td>
<td></td>
</tr>
<tr>
<td>Beating</td>
<td></td>
<td>Lancinating</td>
<td></td>
</tr>
<tr>
<td>Pounding</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pinching</td>
<td>Tugging</td>
<td>Hot</td>
<td>Tingling</td>
</tr>
<tr>
<td>Pressing</td>
<td>Pulling</td>
<td>Burning</td>
<td>Itchy</td>
</tr>
<tr>
<td>Gnawing</td>
<td>Wrenching</td>
<td>Scalding</td>
<td>Smarting</td>
</tr>
<tr>
<td>Cramping</td>
<td></td>
<td>Searing</td>
<td>Stinging</td>
</tr>
<tr>
<td>Crushing</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dull</td>
<td>Tender</td>
<td>Tiring</td>
<td>Sickening</td>
</tr>
<tr>
<td>Sore</td>
<td>Taut</td>
<td>Exhausting</td>
<td>Suffocating</td>
</tr>
<tr>
<td>Hurting</td>
<td>Rasping</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aching</td>
<td>Splitting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fearful</td>
<td>Punishing</td>
<td>Wretched</td>
<td>Annoying</td>
</tr>
<tr>
<td>Frightful</td>
<td>Grueling</td>
<td>Blinding</td>
<td>Troublesome</td>
</tr>
<tr>
<td>Terrifying</td>
<td>Cruel</td>
<td></td>
<td>Miserable</td>
</tr>
<tr>
<td></td>
<td>Vicious</td>
<td></td>
<td>Intense</td>
</tr>
<tr>
<td></td>
<td>Killing</td>
<td></td>
<td>Unbearable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spreading</td>
<td>Tight</td>
<td>Cool</td>
<td>Nagging</td>
</tr>
<tr>
<td>Radiating</td>
<td>Numb</td>
<td>Cold</td>
<td>Nauseating</td>
</tr>
<tr>
<td>Penetrating</td>
<td>Drawing</td>
<td>Freezing</td>
<td>Agonizing</td>
</tr>
<tr>
<td>Piercing</td>
<td>Squeezing</td>
<td></td>
<td>Dreadful</td>
</tr>
<tr>
<td></td>
<td>Tearing</td>
<td></td>
<td>Torturing</td>
</tr>
</tbody>
</table>
10. Are you using the stress management techniques which you learned in the program?
   Frequently _____; Sometimes _____; Seldom _____; Never _____;

11. Have you had periods of time since leaving the program where you have been depressed or anxious to the point where it interfered with your daily functioning? (If you have not been depressed or anxious since you last completed a follow-up questionnaire, answer No.)
   Yes    No

12. Are you currently using any pain medications:
   Yes    No
   If yes, please list:
   
<table>
<thead>
<tr>
<th>Medications</th>
<th>Dosage</th>
<th>How Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

13. Have you seen a physician for your pain problem since discharge?
   Yes    No
   If yes, how many times? ______________________________

14. Are you sleeping well at night?
   Yes    No

15. Have you developed any new pain problems?
   Yes    No
   If yes, explain. ______________________________________

16. Have you had any further surgery for your pain problem or are you planning on it?
   Yes    No

17. Does stretching help relieve muscle tension?
   Yes    No

18. How often do you do your stretching exercises?
   Every day _____; 4-6 time per week _____; 1-3 times per week _____; Never _____;

19. How is your flexibility?
   Continues to improve _____; Staying the same _____; Is decreasing _____;

20. How often do you do your strengthening exercises?
   5-7 times/week _____; 3-4 times/week _____; 1-2 times/week _____; Never _____;
21. How often do you walk or bike for exercise:

Every day _____; 4-6 time per week _____; 1-3 time per week _____; Never _____.

How far do you usually walk or bike? (time or distance) __________________________

22. Where do you use learned body mechanics techniques:

At home _______; At work _______; Neither _________.

Please indicate below how your activity levels changed following participation in the treatment program.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Increased</th>
<th>Decreased</th>
<th>Stayed the Same</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light cleaning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meal preparation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laundry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy cleaning (including vacuuming)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yardwork/outdoor maintenance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreation/leisure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

30. Have you used your notebook as a reference? Yes No

Which handouts are the most helpful? ____________________________________________
APPENDIX B

Data Collection Form
DATA COLLECTION FORM

Chart #: __________

GENERAL INFORMATION
Age: ____________
Gender: M  F  Marital Status: M  W  S
1 Month  3 Month
6 Month  12 Month
Treatment start date: ____________  Discharge date: ____________

Did the patient complete the program? YES  NO
If no, how long did the patient participate in the program? ________

WORK STATUS INFORMATION
1. Was the patient working at time of discharge from the program? Y  N
2. Was the patient presently working? Y  N
   If yes, describe the patient's job. (employer, job title, length of employment, toleration of job duties, and hours worked per week)
3. If not working, was the patient actively involved in a job search or job club? Y  N
4. If not working, was the patient involved in a vocational rehabilitation program? Y  N
5. Was the patient working with a rehabilitation specialist? Y  N
6. Was the patient involved in a retraining program? Y  N
7. Has the patient had further treatment since discharge? Y  N
   physician ____________ surgery ____________
8. Pain scale (0-100, 0 is no pain and 100 is pain as bad as it could be)
   Average pain over past week: ______
   Worst pain over last week: ______
   Least pain over last week: ______
   Present pain intensity: ______
   Comfort level: ______

COMPLIANCE WITH HEP INFORMATION
9. Did the patient use the stress management techniques learned in the program? Frequently  Sometimes  Seldom  Never
10. How often did the patient perform stretching exercises?
    Every day  4-6 times per week  1-3 times per week  Never
11. How often did the patient perform strengthening exercises?
    5-7 times/week  3-4 times/week  1-2 times/week  Never
12. How often did the patient walk or bike for exercise?
    Every day  4-6 times per week  1-3 times per week  Never
13. Where did the patient use the learned body mechanics techniques?
    At home  At work  Neither