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To the Graduate Council:

I am submitting herewith a thesis written by David Robert Vial entitled "Some Correlates of Vocational Rehabilitation Success Among Lumbar Disk Injured Clients." I recommend that it be accepted for nine quarter hours of credit in partial fulfillment of the requirements for the degree of Master of Science, with a major in Vocational Rehabilitation Counseling.

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SOME CORRELATES OF VOCATIONAL REHABILITATION SUCCESS AMONG LUMBAR DISK INJURED CLIENTS

A Thesis

Presented to

the Graduate Council of

The University of Tennessee

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

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by

David Robert Vial

March 1974

ABSTRACT

The purpose of this investigation was to determine if there were demographic variables related to rehabilitation success of lumbar disk injured clients. The descriptive data provided preliminary information about the lumbar disk injured, vocational rehabilitation client.

The data used in the investigation were obtained from cumulative records maintained by the Tennessee Division of Vocational Rehabilitation. Sixty-six closed cases were studied with no case being closed prior to July, 1969.

Frequency and percentage distributions within successful and unsuccessful closure groups were obtained for twelve of the demographic variables identified. T-tests were applied to determine if there were significant differences (at the .05 level) between the closure groups in relation to ten of the demographic variables identified.

It was found that a significant difference existed for only the variable identified as "duration of disability" at the .01 level. Subjects in the unsuccessful closure status group differed from those in the successful closure status group, consequently, by exhibiting a substantially longer period of disability. It was determined that unsuccessful lumbar disk injured clients in this study were disabled 102 weeks longer than the successful clients prior to application for services. Recommendations for further investigations were also discussed.

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CHAPTER I

INTRODUCTION

Lumbar disk injured clients represent a large percentage of the low back problems who are served by rehabilitation counselors. Individuals with this form of handicap confront employers as well as the rehabilitation counselor. Kester (1969) described the impact of low back problems when she wrote:

> Both lay and medical writers in the past few years have presented more and more statistics supporting the impression that the incidence of low back problems is high and continually increasing. The National Safety Council estimates that injuries of the back causing time lost from work exceed 500,000 a year and cost employers about one billion dollars in sick pay to incapacitated workers in wages for their replacements [p. 525].

The rehabilitation counselor is also confronted with medical factors which are often controversial and unpredictable, when dealing with clients having low back problems. Schneider (1959) comments ". . . the complexity of the problem may lead to errors in diagnoses and treatment which are often responsible for futile management of these difficult cases" [p. 173].

Due to the nature of the medical factors inherent in this type of case, the client's potential for vocational success is often viewed with skepticism by the physician, employer and rehabilitation counselor. Kester (1969) described this skepticism when she wrote:

> There is a considerable degree of pessimism about the success of treatment for low back derangement in the lay press, among patients suffering from the problem, and even in the minds of many medical practitioners [p. 525].

Lumbar disk injured clients are commonly afflicted with degenerative disorders of the invertebral disk, which add to low back cases the stigma of progressive disease. Stevens (1968) comments:

> The commonest cause of low back pain in Ghormley's series were degenerative disorders of the invertebral discs and the synovial joints. These irreversible wear and tear changes leading to functional incompetence increase with the process of aging [p. 62].

This stigma of progressive disease adds to the pessimism for success of treatment in low back problems previously described by Kester.

Unique anatomic and physiologic characteristics form the basis for the incidence, recurrence, and resistance to treatment experienced in lumbar disk injured patients. Schneider (1959) described some of the important characteristics when she wrote:

> The first important fact to recognize is that an intervertebral disc may fissure or crack under almost any minor or major traumatic circumstance and that, in fact, many of them begin to disintegrate without any known trauma except the usual wear and tear. Once fissured or fractured spontaneous repair cannot occur and progressive disintegration inevitably supervenes [p. 177].

Another anatomic and physiologic characteristic contributing to the lumbar disk back problem is the fact that symptoms are treated and relieved while the defect remains. Schneider (1959) comments:

> The reversibility of the causes of radicular symptoms accounts for the characteristic remission and recrudescences of disc syndromes but does not lead to a cure of the underlying defect [p. 178].

The rehabilitation counselor begins to identify many unique medical characteristics inherent in lumbar disk injured clients, when he is dealing with this type of client. The effects of these characteristics and factors influence to a large degree the type of

service provided, success in placing the client in gainful employment, and the overall success of the rehabilitation process.

I. PROBLEM

The lumbar disk injured client often is not developed as a consequence of malingering and the unpredictable nature of lumbar disk recovery.

The purpose of this study was to determine if there were demographic variables related to rehabilitation success of lumbar disk injured clients. Conservative treatment of the lumbar disk injured client seems to be followed by a potential for recurring incidence of pain and days lost from work. Surgical treatment of lumbar disk injury also appears to be followed by a potential for recurring pain and at least a residual handicapping effect.

II. HYPOTHESIS

1. There will be no significant differences (at the .05 level) in the variables identified when lumbar disk injured clients of the assigned population are categorized into unsuccessful closure and successful closure groups.

III. LIMITATIONS OF THE STUDY

This study was limited to an assigned population of lumbar disk injured clients served by the Tennessee Division of Vocational Rehabilitation in the Knoxville, Tennessee, area. The clients were a portion of caseloads of four individual rehabilitation counselors and had been

assigned one of two closure statuses between July 1, 1970, and July 1, 1973. The assertion cannot be made that the results generalize to any other rehabilitation client population. Also, this study measures the relationship of several demographic variables to rehabilitation success and should not be interpreted as predicting employability or future work performance.

IV. ASSUMPTIONS

It was assumed that the determination of unsuccessful closure and successful closure statuses were made fairly and objectively by rehabilitation counselors who served the cases.

It was assumed that the medical diagnostic services and physical restoration services (if provided) were administered by competent medical practitioners who were equipped to evaluate and provide corrective treatment (if necessary).

It was assumed that counseling and guidance when provided as the only service was designed to meet the individual needs as opposed to standard patterns of advice and information being given to each lumbar disk injured client.

It was assumed that when training was provided as a service that the client's handicap influenced the training choice as opposed to the choice being influenced exclusively by client interest. It was also assumed that any other factor or combination of factors was not the exclusive influence in training choice.

It was assumed that when job placement was provided as a service that the client's handicap influenced the employment choice as opposed

to the choice being influenced exclusively by client interest. It is also assumed that any other factor or combination of factors was not the exclusive influence in the employment choice.

V. PROCEDURES

Sixty-six clients of the Tennessee Division of Vocational Rehabilitation served in the Knoxville, Tennessee, area were used in this study. These clients were carried on one of the three following case loads: Social Security, Welfare, and a private evaluation and work adjustment facility providing rehabilitation services which were funded by the Tennessee Division of Vocational Rehabilitation.

Frequency and percentage distributions were obtained for the demographic variables. Frequency and percentage distributions were obtained within the closure statuses for twelve of the demographic variables. T-tests were used to determine if significant differences occurred (at the .05 level) in the remaining variables identified when the assigned population was categorized into unsuccessful and successful closure groups.

VI. DEFINITION OF TERMS

The following list of terms is an attempt to more clearly define the terminology peculiar to this study.

1. Disk. This has been defined by Cailliet (1962) as

> . . . a self-contained fluid system that absorbs shock, permits transient compression, and, owing to fluid displacement within an elastic container, allows movement. It is quite evident then that the disc is a mechanical shock absorber [p. 2].

The disk is positioned between and separates the vertebral bodies of the spinal column (Cailliet, 1962). This term is used interchangeably in this study with the following terms: disc, intervertebral disk, and invertebral disk.

2. Degenerative disk disorder. This was defined by Cailliet (1962) in the following:

> The disks compose one quarter of the supporting spine structure of the human body and are constantly exposed to compression, torque, and shearing stresses. These tissues under repeated stresses over the years are subject to degeneration from wear and tear. Such degeneration can lead to impaired function and morbidity [p. 77].

3. Lumbar disk injured client. This client is one who has been declared eligible for services from the Tennessee Division of Vocational Rehabilitation with a handicap involving the disks of the lumbar region of the spine. The symptoms of the handicap may originate from an injury of a lumbar disk or from another form of back disorder which has resulted in the injury of a lumbar disk.

4. Unsuccessful closure. This is a type of closure status designated with status number 28 by the Tennessee Division of Vocational Rehabilitation case status code. Status number 28 is assigned when the case is closed after a rehabilitation plan has been initiated and services provided but where the client failed to obtain or remain in employment for thirty days.

5. Successful closure. This is a type of closure status designated with status number 26 by the Tennessee Division of Vocational Rehabilitation case status code. Status number 26 is assigned when the case is closed after a rehabilitation plan has been formulated and

completed, with the client determined to be suitably employed for a minimum of thirty days.

6. Rehabilitation success. A client is determined to be a rehabilitation success when he is a successful closure and is assigned a case status number of 26.

7. Litigation. Clients whose lumbar disk problem involved insurance settlements or legal settlements prior to or during the time they were clients were classified as experiencing litigation.

8. Age. Each client was measured according to his age in years.

9. Race. As used in this study, race included caucasian and Negro.

10. Marital status. Married represented presently married. Unmarried means single, widowed, divorced, or separated.

11. Educational background. Each client was measured according to the number of years completed in formal schooling.

12. Length of unemployment. Each client was measured according to the number of weeks he was unemployed prior to the date of applying for vocational rehabilitation services. If the client had never worked, the weeks were counted from his sixteenth birthday.

13. Height. Each client was measured according to his height in inches.

14. Type of employment. Each client was classified into the categories of heavy manual laborers or other types of employment. The Department of Labor (1968) defined heavy manual labor as "Lifting 100 lbs. maximum with frequent lifting and/or carrying of objects weighing 50 lbs. or more [p. A-1]."

15. Income. Each client was measured according to the number of dollars in his annual gross income.

16. Duration of disability. Each client was measured according to the number of weeks he experienced lumbar disk disability, prior to application for vocational rehabilitation services.

17. Type of vocational objective. Each client was classified into the categories of heavy manual labor or other types of vocational objectives. Heavy manual labor is defined for this term using the Department of Labor's definition mentioned in term fifteen listed above.

18. Length of employment. Each client was measured according to the number of weeks he was employed prior to the date of applying for rehabilitation services. If the client had been employed continuously prior to his sixteenth birthday, the weeks were counted from his sixteenth birthday.

19. Counselor code. Each client was assigned a code letter A, B, C or D which represented the individual counsel or who served his case.

20. Source of referral. Each client was assigned a category which represented the source of his referral to the rehabilitation agency. The categories available were the following: employer, public assistance, employment security office, self, other client or physician.

21. Social Security status. Each client was assigned a category which represented his relationship with Social Security disability benefits. The categories available were the following: never applied, applied--not accepted, and applied--accepted.

22. Welfare status. Each client was assigned a category which represented his relationship with Welfare assistance. The categories available were the following: never applied, applied--not accepted, and applied--accepted.

23. Number of dependents. Each client was measured according to the number of dependents he was presently claiming or acknowledging.

VII. ORGANIZATION OF THE REPORT

This report consists of five chapters, the bibliography, and the appendixes.

Chapter I presents an introduction to the study, the statement of the problem, hypotheses, limitations of the study, assumptions, and definition of terms. The review of the relevant literature is presented in Chapter II. The procedure is described in Chapter III. This chapter includes a description of the sample, methods of data collection, means of computer programming, and analysis of data. Chapter IV presents the results of the study. A summary, conclusions, and recommendations are found in Chapter V.

CHAPTER II

REVIEW OF THE LITERATURE

This study is first concerned with the relationship of demographic variables to rehabilitation success of lumbar disk injured clients. There is a void in the literature and previous research in relation to this specific area of investigation. Very little literature was found that was directly related to this problem. The related literature that was reviewed in this study was concerned with medical rehabilitation of the lumbar disk injured patient as well as the relation of demographic variables to the medical rehabilitation success of lumbar disk injured clients. This literature was reviewed in this study because of the large contribution medical rehabilitation offers in the vocational rehabilitation of all lumbar disk injured clients.

In reviewing the literature litigation was often suggested as a possible correlate in relation to medical rehabilitation of low back clients. Lewin (1944) suggests that the influence of litigation may cancel all previous efforts toward successful rehabilitation of the patient. He described this when he wrote:

> The prognosis of disk injuries under conservative management is always uncertain because of the probability of recurrent attacks of backache, accompanied by sciatic radiation pain. The outlook following an accurate diagnosis in uncomplicated cases, and an early appropriate operation, is excellent. The results depend to a considerable degree on the question of compensation and litigation [p. 403].

The impact of litigation on the medical rehabilitation appears to be overlooked by many medical practitioners. Cave (1958) comments: "Many of the patients with the 'industrial' back are reluctant to admit

improvement because of the ever present insurance problems and the fear of recurrent or permanent disability" [p. 1592]. The incidence of litigation and the influence it has on medical rehabilitation is discussed by Palumbo (1954) in the following:

> Frequently in this group the back disability improves or relents following a satisfactory financial settlement of their case. . . . It is most difficult to disprove that a patient is not having back pain or ache. There are no specific tests or methods to absolutely rule out the patient's complaints about back distress [p. 50].

Kenney and Larson described this problem when they wrote:

> For some unknown reason the back is the commonly chosen area for which fraudulent disability claims are made. Equally difficult to understand is why the back is the commonly chosen area for exaggeration of an admittedly real organic disability [pp. 276-77].

The literature seems to suggest that litigation is a consistent factor in the success of medical rehabilitation. It also suggests litigation may be measured as a correlate of medical rehabilitation.

Tauber (1970), in concluding a study of backache in industry, examined the incidence of new backache cases occurring during one year by age groups. His results are described in Table I. Tauber (1970) attempted to interpret the results when he wrote:

> Regarding the greater number of young persons among those with backaches, one could reason that this might be due to the fact that many individuals of this age group have to become accustomed to regular activity involving the back muscles, and that this takes several years [p. 130].

Tauber summarized that individuals in the younger age groups developed new cases of backaches at a higher rate than individuals in the older age groups (Tauber, 1970). The importance of Tauber's findings in relation to age appear to be the differences in frequency of occurrence

TABLE I

NEW BACK CASES OCCURRING DURING ONE YEAR
BY AGE GROUPS

Age Group	Frequency Among Age Group (percent)
18-24	3.25
25-34	2.34
35-44	1.68
45-54	1.74
55-64	1.68
65	0.00

Source: Reprinted from an article by Joseph Tauber published in April, 1971, Journal of Occupational Medicine. Copyrighted by the Industrial Medical Association, 1971.

in new back pain cases which he found. He pointed out the importance that age may play in considering the initial medical rehabiliation of the industrial worker handicapped by an injured back. The ability to use age as a correlate in relation to the initial medical rehabilitation of the patient is also implied.

Jackson (1971) in reviewing 130 patients with lumbar disk injury examined the incidence of back pain following surgery in various age groups. His results are described in Table II. Jackson attempted to interpret the results from Table II when he wrote:

> The relationahip of low back pain to other factors was of interest. The incidence increased with the age of the patient at the time of the operation [Table I] and it also was directly related to the duration of symptoms before operation . . . [p. 611].

The importance of Jackson's findings in relation to age points out the impact that age may play in medical rehabilitation of the patient. The ability to use age as a correlate in relation to medical rehabilitation of the patient is also implied.

Tauber (1970) in conducting a study of backache in industry examined the incidence of chronic backache cases occurring during one year by height. He comments on the results in the following: "Among chronic backache cases, this study found 46 per cent who were 5'11" tall or taller, and 36 per cent who were 6 feet tall or taller" [pp. 129-20]. Tauber attempted to interpret these results when he wrote:

> The involvement of a greater proportion of tall persons has surely a connection with the mechanics of motions of the vertebral column, of the ligaments and muscles around that column, and of the other musculature of the back [p. 130].

TABLE II

RELATIONSHIP OF AGE TO INCIDENCE OF BACK PAIN

Age at Time of Operation (years)	Incidence of Back Pain after Operation (percent)
Under 30	37
30-39	42
40-49	50
Over 50	56

Source: Reprinted from an article by R. K. Jackson published in the fifty-third volume in 1971 of The Journal of Bone and Joint Surgery, British Volume. Copyrighted by The British Editorial Society of Bone and Joint Surgery, 1971.

Tauber summarized that tall people developed new and chronic cases of backache at a higher rate than short people (Tauber, 1970). The importance of Tauber's findings in relation to height illustrates the role height may play in affecting the success of medical rehabilitation of the patient. The ability to use height as a correlate in relation to medical rehabilitation of the patient is also implied.

In Jackson's review of 130 lumbar disk injury cases he examines the incidence of back pain following surgery when patients are categorized by job type. Jackson (1971) described the results in Table III. The impact of job or occupational type on medical rehabilitation of the lumbar disk injured patient can be observed by reviewing Jackson's results. Job or occupational type as a correlate to medical rehabilitation of the lumbar disk injured client is also implied.

Goodsell (1967) in analyzing 402 cases of lumbar disk injury involving surgery examined the relationship between occupation type and the incidence of cases requiring lumbar disk surgery. Goodsell described the results when he wrote:

> Records of 402 patients were reviewed: 302 belonged to men; 100 to women. Of the men, 245 (81%) were laborers. According to my interpretation of the census, 64.9% of employed males in Saginaw County were laborers. The labor group, 64.9% of the male population, had 81% of the operations. Conversely, non laboring men comprised 35.1% of the employed male population but had only 19% of the operations. Obviously, there is a positive relationship between incidence of operation and physical labor. . . . (This proved to be statistically significant by the sigma test) [p. 227].

Goodsell is very complete in his analysis of the relationship of physical labor to incidence of lumbar disk surgery. He examines the

TABLE III

RELATIONSHIP OF OCCUPATION TO INCIDENCE OF BACK PAIN AFTER LAMINECTOMY

Type of Work	Incidence of Back Pain after Operation (percent)
Heavy Manual	54
All others	40

Source: Reprinted from an article by R. K. Jackson published in the fifty-third volume in 1971 of The Journal of Bone and Joint Surgery, British Volume. Copyrighted by The British Editorial Society of Bone and Joint Surgery, 1971.

incidence of unequivocal rupture within the laborer and non laborer categories. He presents the results of this investigation in the following:

> Of the men, 239 had unequivocal rupture; 73 had equivocal surgical findings. Of these 229, 80% were laborers (compared with 64.9% of population), and 20% were non laborers (compared with 35.1% of population). Therefore, a positive relationship exists between unequivocal rupture and physical labor [p. 227].

Goodsell's results do not deal directly with medical rehabilitation, but the occupation of the patient operated on. His analysis does imply the possible effects of returning the patient to his original occupation during his medical rehabilitation following lumbar disk surgery. The ability to use job or occupation type as a correlate in relationship to medical rehabilitation of the patient may be implied by Goodsell's analysis.

The duration of back pain symptoms prior to lumbar disk surgery was compared to the incidence of back pain after surgery by Jackson (1971) in his review of 130 cases of lumbar disk injury. Jackson describes the results of this relationship in Table IV. Duration of pre-operative symptoms appears to be a very clear correlate in relation to medical rehabilitation of the lumbar disk injured client when Jackson's results are reviewed.

The duration of pre-operative symptoms is also complicated by multiple operations on the lower back. Schneider (1959) in talking about the industrial low back cripple described this problem when he wrote:

> Perhaps the most disheartening group of patients are those who continue to have low back and/or sciatic pain despite the fact that they have already had two or more operations on the

TABLE IV

DURATION OF PRE-OPERATIVE SYMPTOMS AND INCIDENCE OF BACK PAIN AFTER LAMINECTOMY

Duration of Pre-Operative Symptoms	Incidence of Back Pain after Operation (percent)
Less than 6 months	30
6 months to 1 year	44
1 to 5 years	45
Over 5 years	61

Source: Reprinted from an article by R. K. Jackson published in the fifty-third volume in 1971 of The Journal of Bone and Joint Surgery, British Volume. Copyrighted by The British Editorial Society of Bone and Joint Surgery, 1971.

> spine. Most neurosurgeons and orthopedic surgeons have encountered some of these, and all of them have been sorely tried to overcome the trouble. . . . Psychoneurosis was an obvious factor in some of these cases and, if it was associated with an organic cause for pain, remained unresponsive to any form of therapy [p. 178].

The matter of duration of symptoms when complicated by one or more surgical operations appears to be an area of controversy in the literature. Speculation as to whether a negative or positive relationship exists with medical rehabilitation of the lumbar disk injured patient is found in many areas of the literature. Ghormley (1957) is quoted by Schneider (1959) in an attempt to promote the positive relationship between lumbar disk surgery and medical rehabilitation that he contends may exist in first and second surgeries. Ghormley's view was quoted as follows:

> We are of the opinion that surgical treatment has much to offer, that a great many patients are satisfactorily relieved by such treatment, and that there will be many more treated with satisfactory results. Failures will occur, and some patients may need second operations to obtain relief; . . . [p. 178].

Kane and Lane (1955) summarize that the decisions and views on the relationships between surgery on the low back and medical rehabilitation are clouded by a lack of research on the lumbar disk injured client. Kane and Lane comment:

> . . . comparing surgical and nonsurgical treatment where the diagnoses seemed certain, show remarkably little advantage of surgery at least for the lumbar herniations.
>
> This probably indicates that despite the very considerable experiences of a large number of investigators with this entity over the past 20 years, we still have much to learn about the varied mechanisms of production and relief of associated symptoms and signs in herniated disks [p. 1481].

The literature continually suggests that the duration of symptoms prior to surgery may be used as a correlate in relation to medical rehabilitation. The positive or negative nature of the relationship is hypothesized in both directions, especially when previous incidences of surgery exist.

Westrin, Hirsch, and Lindegard (1972) examined the relationship between litigation (in the form of sick list pay) and work conditions. They constructed a control group which was not receiving sick list pay but was composed of back patients just as the experimental group. They describe their results in Table V. These results affirm the value of litigation as a correlate in relation to the medical rehabilitation success of the back patient. This analysis of litigation also shows that it may develop interrelationships with other variables (in this instance, work conditions).

One factor which the literature suggests as an effect on the medical rehabilitation of the back patient is the personality or general mental state of the patient. McBride (1953) described this factor when he wrote:

> There often appears a nervousness or a neurosis greatly complicating recovery in the so called "chronic strains" of the back. There are many sources for such complications: the psychological background, influences of depression, apprehension from litigation procedures, focal infections, general debility, and associated systematic disturbances [p. 486].

McBride contends that nervousness or neurosis may have substantial impact on medical rehabilitation (McBride, 1953). He implies that neurosis or nervousness may be used as a correlate in relation to medical rehabilitation of the back patient. McBride also suggests

TABLE V

WORK CONDITIONS

Work Characteristics	Patients (percent)	Control (percent)
Working in the sitting position		
0*	59	43
1	13	11
2	28	46
Work necessitating moving from one place to another		
0	19	24
1	7	13
2	74	63
Work requiring altering of body position (turning, creeping, etc.)		
0	23	41
1	7	11
2	70	48
Work requiring lifting, pulling, pushing, etc.		
0	53	60
1	8	10
2	39	30
Subordinate position in job hierarchy	81	68
General job satisfaction either not very good or bad	21	11
Duration of stay at most recent working place less than two years	33	20

*0 = never or seldom; 1 = sometimes; 2 = often or mostly.

Source: Reprinted from an article by Claes-Goran Westrin, Carl Hirsch and Bengt Lindegard published in the September, 1972, Clinical Orthopedics and Related Research. Copyrighted by the W. B. Saunders Co., 1972.

that the medical practitioner's management of this type of case may affect medical rehabilitation to the same degree as the actual symptoms exhibited by the patient.

The literature offers ideas for correlates related to vocational rehabilitation success of lumbar disk injured clients. It appears that medical rehabilitation success, in the case of complex or puzzling physical handicaps such as lumbar disk injury, may be almost synonymous with vocational rehabilitation success.

In summarizing the literature reviewed in Chapter II, emphasis is on the applicability of studying demographic variables and their impact on the rehabilitation of the lumbar disk injured client. Emphasis is also found on the applicability of studying demographic variables and their impact on the development of lumbar disk disabilities and handicaps. The literature is statistical in nature and emphasizes the need for more experimental study.

CHAPTER III

DESIGN OF THE STUDY

Sixty-six clients of the Tennessee Division of Vocational Rehabilitation served in the Knoxville, Tennessee, area were used as subjects in this study. Each subject had been assigned a closure status number of 26 or 28 between July 1, 1969, and July 1, 1973. The subjects made up portions of caseloads of four individual vocational rehabilitation counselors. Simultaneously these subjects were designated as being carried on one of the three following types of caseloads: Social Security, Welfare, and a private evaluation and work adjustment facility providing rehabilitation services which were funded by the Tennessee Division of Vocational Rehabilitation for each client receiving service from this agency.

The information gathered for each client was collected from the cumulative records contained in the closed (in status number 26 or 28) files which are maintained by the Tennessee Division of Vocational Rehabilitation. Each client was assigned a category or value for each of 22 variables. A classification was assigned for the variable identified as litigation. A "yes" was assigned to those clients involved in litigation and a "no" was assigned to those clients not involved in litigation prior to or during the time they were vocational rehabilitation clients. A classification of male or female was assigned to each client for the variable identified as sex.

A value was assigned for each client by measuring the client's age in years. This value was for the variable identified as age. A classification of White or Black was assigned to each client for the variable identified as race. A classification of married or unmarried was assigned to each client for the variable identified as marital status. Married represented presently married and unmarried meant single, widowed, divorced, or separated.

Each client was assigned a value by measuring the number of years completed in formal schooling. This value was assigned for the variable identified as educational background. A value was also assigned by measuring the number of weeks the client was unemployed prior to the date of applying for vocational rehabilitation services. This value was assigned for the variable identified as length of unemployment. If the client had never worked, the weeks were measured from his sixteenth birthday. A value was assigned by measuring the height of each client in inches. This value was assigned to each client. The Department of Labor's (1968) definition of heavy labor was used for this classification. It defines heavy manual labor as "Lifting 100 lbs. maximum with frequent lifting and/or carrying of objects weighing 50 lbs. or more" [p. A-1]. This classification was assigned in relation to the types of work the client had performed prior to the application for vocational rehabilitation services. A value was assigned by measuring the number of dollars in annual gross income of each client. This value was assigned for the variable identified as income. A value was also assigned by measuring the duration of lumbar disk disability, in number of weeks, prior to application for vocational rehabilitation

services. This value was assigned for the variable identified as duration of disability.

A classification of heavy manual labor or other types of vocational objective was assigned to each client. Heavy manual labor is defined for this variable using the Department of Labor's definition which was used for the variable identifying type of previous employment. This classification was assigned for the variable identified as type of vocational objective.

A value was assigned by measuring the number of weeks the client had been employed prior to his application for vocational rehabilitation services. This value was assigned for the variable identified as length of employment. A classification of A, B, C or D was assigned each client which represented the individual counselor who served the client's case. This classification was assigned for the variable identified as counselor code. A classification of referral source was assigned for each client. The referral source categories used were the following: employer, public assistance agency, employment security office, self, other client, and physician. This classification was assigned for the variable identified as referral source.

A classification was assigned for each client which represented his relationship with Social Security disability benefits. The categories available for this classification were the following: never applied, applied--not accepted, and applied--accepted. This classification was assigned for the variable identified as Social Security status. A classification was assigned for each client which represented his relationship with Welfare assistance. The categories available for

this classification were the following: never applied, applied--not accepted, and applied--accepted. This classification was assigned for the variable identified as Welfare status.

A value was assigned by measuring the number of dependents the client was presently claiming or acknowledging. This value was assigned for the value identified as number of dependents. A classification was assigned which represented the client's occupational type. The categories used for this classification were developed by the Department of Labor (1965) and were listed as

> . . . Professional, technical, and managerial occupations . . . Clerical and sales occupations . . . Service occupations . . . Farming and related occupations . . . Processing occupations . . . Machine trades occupations . . . Bench work occupations . . . Structural work occupations . . . Miscellaneous occupations . . . [p. 1].

This classification was assigned for the variable identified as the client's previous occupation.

A value was assigned for each client by measuring the number of weeks between the application for services and the closure of the case. This value was assigned for the variable identified as "weeks from application to closure." A value was assigned for each client by measuring the number of weeks between the referral date and the writing of the vocational rehabilitation plan for each case. This value was assigned for the variable identified as "weeks from referral to writing of plan."

A classification was assigned for the variable identified as "pain with no etiological cause." A "yes" was assigned to those clients whose file contained medical information indicating that no etiological

cause could be found for pain following medical or surgical treatment. A "no" was assigned to the client when no such medical information was present.

The material was recorded on a data sheet for each client. The data sheet appears in Appendix A. The information needed for this thesis was coded directly onto coding forms provided by the University of Tennessee Computer Center (UTCC). These coding forms were then used to punch the data cards used in the thesis.

The frequency and percentage distributions for the demographic variables were obtained by use of a standard statistical program available at UTCC. The t-tests also were obtained by use of statistical programs at UTCC. The computational formula for the t-tests is presented in Appendix B.

The t-tests were used when the following demographic variables were involved in the analysis: age, educational background, length of unemployment, height, income, duration of disability, length of employment, number of dependents, weeks from application to closure, and weeks from referral to writing of plan. Frequency and percentage distributions within the closure groups were obtained when the remaining demographic variables were involved in the analysis. When the clients were categorized into unsuccessful and successful closure groups, the t-test was applied to determine if there were significant differences (at the .05 level) between the groups in relation to ten of the demographic variables identified. The classification of the clients into unsuccessful and successful categories was accomplished by placing all clients with closure number 26 in the successful group and all clients with closure number 28 in the unsuccessful group.

CHAPTER IV

RESULTS OF THE STUDY

The initial purpose of this chapter was to present the distribution of the population in relation to the twenty-three demographic variables employed in the study. The results of this distribution are described in Table VI. The second purpose is to present results relevant to the hypothesis which was defined in Chapter I. The criteria for categorizing the subjects in relation to the demographic variables were defined in Chapter III as well as the criteria for categorizing the subjects in successful and unsuccessful groups.

The frequency and percentage distribution was computed for twelve demographic variables for both closure statuses. This distribution was computed for the following variables: sex, litigation, race, marital status, type of employment, vocational objective, counselor code, referral source, social security status, welfare status, previous occupation, and pain without etiological cause. The results of this distribution within the closure statuses are described in Appendix C.

It was hypothesized that there would be no significant difference in the ten variables identified when lumbar disk injured clients of the assigned population were categorized by status in unsuccessful closure and successful closure groups. The demographic data were collected from accumulated records and reported on data forms. This hypothesis was rejected because one significant difference was revealed. The data are included in Table VII.

TABLE VI

FREQUENCY DISTRIBUTION OF CLIENTS

Name	Frequency	Percent
CLOSURE STATUS		
26	45	68.2
28	21	31.8
Total	66	
AGE		
17-19	4	6.1
20-29	26	39.4
30-39	17	25.7
40-49	12	18.2
50-60	7	10.6
Total	66	
SEX		
Male	50	75.8
Female	16	24.2
Total	66	
LITIGATION		
Yes	3	4.5
No	63	95.5
Total	66	
RACE		
White	58	87.9
Black	8	12.1
Total	66	
MARITAL STATUS		
Married	40	60.6
Unmarried	26	39.4
Total	66	
EDUCATION		
0-3	8	12.1
4-6	3	4.6
7-9	25	37.8
10-12	27	41.0
13-15	1	1.5
16-18	2	3.0
Total	66	

TABLE VI (continued)

Name		Frequency	Percent
UNEMPLOYMENT			
Weeks	0-30	35	53.0
	31-60	6	9.1
	61-90	6	9.1
	91-120	5	7.6
	121-150	5	7.6
	151-180	1	1.5
	181-210	2	3.0
	210 and over	6	9.1
	Total	66	
HEIGHT			
Inches	60-62	5	7.6
	63-65	9	13.6
	66-68	21	31.8
	69-71	21	31.8
	72-75	10	15.2
	Total	66	
EMPLOYMENT TYPE (Before injury)			
Heavy		1	1.5
Other		65	98.5
	Total	66	
INCOME (Before injury)			
Dollars	None	4	16.1
	1,000-1,999	17	24.7
	2,000-2,999	12	18.2
	3,000-3,999	16	24.2
	4,000-4,999	6	9.1
	5,000-5,999	7	10.6
	6,000-6,999	1	1.6
	7,000-7,999	3	4.5
	Total	66	
DISABILITY DURATION			
Weeks	0-52	34	51.5
	53-104	15	22.7
	105-156	6	9.1
	157-208	3	4.6
	209-260	1	1.5
	261 and above	7	10.6
	Total	66	

TABLE VI (continued)

Name	Frequency	Percent
VOCATIONAL OBJECTIVE		
Heavy work	0	00.0
Other	66	100.0
Total	66	
EMPLOYMENT		
(Before injury)		
Weeks None	3	4.5
1-99	11	16.8
100-199	12	18.2
200-299	9	13.6
300-399	4	6.1
400-499	9	13.6
500-599	3	4.5
600-699	4	6.1
700-799	1	1.6
800-899	1	1.6
900-999	3	4.5
1,000 and above	6	9.1
Total	66	
COUNSELOR CODE		
Counselor A	29	43.9
B	4	6.1
C	31	47.0
D	2	3.0
Total	66	
REFERRAL SOURCE		
Employer	2	3.0
Public Assistance	28	42.5
Social Security	1	1.5
Self	3	4.5
Other	20	30.3
Physician	12	18.2
Total	66	
SOCIAL SECURITY STATUS		
Never applied	47	71.2
Applied--not accepted	15	22.7
Applied--accepted	4	6.1
Total	66	

TABLE VI (continued)

Name	Frequency	Percent
WELFARE STATUS		
Never applied	39	59.1
Applied--not accepted	3	4.5
Applied--accepted	24	36.4
Total	66	
DEPENDENTS		
None	23	34.8
1-3	25	37.9
4-6	14	21.2
7-9	4	6.1
Total	66	
PREVIOUS OCCUPATION		
Sales	5	7.6
Service	21	31.8
Farming	1	1.5
Processing	14	21.2
Machine Trades	3	4.6
Structural work	2	3.0
Miscellaneous	20	30.3
Total	66	
PAIN WITHOUT ETIOLOGICAL CAUSE		
Yes	1	1.5
No	65	98.5
Total	66	
WEEKS TO CLOSURE		
1-30	12	18.2
31-60	15	22.7
61-90	13	19.7
91-120	7	10.6
121-150	2	3.0
151-180	11	16.7
181 and above	6	9.1
Total	66	
WEEKS TO PLAN		
1-10	29	43.9
11-20	17	25.8
21-30	8	12.1
31-40	2	3.0
41-50	2	3.1
51-60	4	6.0
61-70	3	4.6
70 and above	1	1.5
Total	66	

TABLE VII

COMPARISON OF T VALUES FOR 26 AND 28 CLOSURES

Variable	Status 26[a] M	Status 26[a] SD	Status 28[b] M	Status 28[b] SD	Mean Difference	+[c]
Age	32.40	10.77	36.04	13.05	3.64	-1.20
Education	9.42	3.03	8.00	4.34	1.42	1.35
Unemployment	63.26	98.14	136.76	230.62	73.49	-1.40
Height	67.73	3.47	68.47	3.17	.7429	-0.83
Income	3182.82	1785.31	2815.61	1945.04	367.20	0.76
Disability Duration	67.60	81.38	170.57	159.29	102.97	-2.80[d]
Employment	373.62	362.30	426.95	437.18	53.33	-0.52
Dependents	2.24	2.30	2.42	2.59	.18	-0.29
Weeks to Closure	80.40	50.83	128.19	112.85	47.79	-1.85
Weeks to Plan	18.17	17.84	18.76	21.56	.58	-0.12

[a] N = 45.

[b] N = 21.

[c] Two-tailed t-test of significance; 64 degrees of freedom.

[d] Significant at the .01 level.

The data analysis employed a two-tailed test with 64 degrees of freedom. A pooled variance estimate and a separate variance estimate was computed for each variable, and the more conservative estimate was selected after reviewing the analysis for each variable. A t-value beyond 1.980 was required for significance at the .05 level of confidence; a t-value beyond 2.617 was required for significance at the .01 level of confidence; and a t-value beyond 3.373 was required for significance at the .001 level of confidence. The analysis revealed that a significant difference existed for the variable identified as duration of disability at the .01 level. Subjects in the 28 closure status differed from subjects in the 26 closure status, consequently, by exhibiting a higher mean number of weeks of disability. Under the assumption that a low correlation exists among the ten demographic variables employed, the probability of significant differences occurring by chance alone on one or more variables is .010.

By observing the t-values it was determined that the unsuccessfully closed clients showed a trend toward more weeks of unemployment prior to application than the successfully closed clients. Although this difference was evident it was not significant at the .05 level.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

I. SUMMARY

The problem investigated in this study concerned the identification of relationships between certain demographic variables when 66 clients of the Tennessee Division of Vocational Rehabilitation were categorized as successful or unsuccessful clients. The literature review presented in this study suggested that many demographic variables exist which may be used as correlates of medical rehabilitation. In addition, it seemed reasonable to investigate the relationship of several demographic variables in relation to vocational rehabilitation success, because of the dynamic relationship between medical and vocational success in lumbar disk injured clients.

A sample of 66 clients, mostly white, male, unemployed, with less than a high school education was used in this study. The information produced on the client data sheet was provided to the researcher by the Tennessee Division of Vocational Rehabilitation. This information was recorded and punched onto IBM cards and the indicated statistical analysis was performed by the University of Tennessee Computer Center staff.

II. CONCLUSIONS

The results of this study indicated that there were some significant differences between 26 and 28 closures in regard to ten selected

demographic variables. There was little evidence, however, that the two closure statuses were significantly different in more than one of the demographic variables selected.

The data suggested the following conclusions:

1. Unsuccessful lumbar disk injured clients were disabled 102 weeks longer than the successful clients prior to application for services. This was a significant difference between the two groups.

2. Significant differences were not obtained for the other variables under study.

III. RECOMMENDATIONS

This descriptive study has served as a preliminary investigation of the lumbar disk injured client. Study findings have implications for further investigation into various aspects of specific disability client groups as well as the lumbar disk injured client. Some specific recommendations for further research include:

1. An investigation should be made to determine if lumbar disk injured clients, unsuccessfully closed, have significant problems in counseling when they have been disabled for more than two years prior to application for services. This could include client attitude, motivation, and self-concept.

2. A study should be made to determine the practicality of initiating Vocational Rehabilitation Services with lumbar disk injured clients who have been disabled for more than two years prior to application for services.

3. A descriptive investigation of lumbar disk injured clients using a substantial sample size should be conducted. This would allow statistical analysis to be conducted for a wide range of variables to determine significant differences between successful and unsuccessful clients.

4. An attempt should be made to describe all vocational rehabilitation clients as successful and unsuccessful according to disability type. A description would be helpful if it identified significant demographic differences between successful and unsuccessful clients who had been closed after receiving rehabilitation services.

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APPENDIXES

APPENDIX A

CLIENT DATA SHEET

1. Client number _____ Closure status _____
2. Age _____ years
3. Sex _____
4. Litigation _____ yes _____ no
5. Race _____ white _____ black
6. Marital status _____ married _____ unmarried
7. Educational background _____ years completed
8. Length of unemployment _____ weeks
9. Height _____ inches
10. Type of employment _____ heavy manual _____ other types
11. Income _____ dollars
12. Duration of disability _____ weeks
13. Type of vocational objective _____ heavy manual
    _____ other types

    Job name _____
14. Length of employment _____ weeks
15. Counselor code ____ A ____ B ____ C ____ D
16. Referral source _____ employer
    _____ public assistance agency
    _____ employment security office
    _____ self
    _____ other
    _____ physician

17. Social Security status _____ never applied

_____ applied--not accepted

_____ applied--accepted

18. Welfare status _____ never applied

_____ applied--not accepted

_____ applied--accepted

19. Number of dependents _____

20. Client's previous occupation _____ Professional, technical, or managerial

_____ Clerical or sales

_____ Service

_____ Farming and related occupations

_____ Processing

_____ Machine trades

_____ Bench work

_____ Structural work

_____ Miscellaneous

Job name _____

21. Weeks from application to closure _____ weeks

22. Weeks from referral to writing of plan _____ weeks

23. Pain with no etiological cause _____ yes _____ no

APPENDIX B

T-TEST

$$t = \frac{\bar{X}_1 - X_2}{S_p(1/N_1 + 1/N_2)}$$

Df = N + N

t = computed statistic

$\bar{X}_1$ = mean of the first sample

$\bar{X}_2$ = mean of the second sample

N_1 = sample size of the first sample

N_2 = sample size of the second sample

S_p = standard deviation of the first and second samples combined

Df = degrees of freedom

The t-tests used in this thesis utilized standard package statistical programs that are available at the University of Tennessee Computing Center.

APPENDIX C

TABLE VIII

CLOSURE DISTRIBUTIONS FOR TWELVE DEMOGRAPHIC VARIABLES

Name			Frequency	Percent
SEX				
Status 26	Male		32	71.1
	Female		13	28.9
		Total	45	
Status 28	Male		18	85.7
	Female		3	14.3
		Total	21	
LITIGATION				
Status 26	Yes		0	0.0
	No		45	100.00
		Total	45	
Status 28	Yes		3	14.3
	No		18	85.7
		Total	21	
RACE				
Status 26	White		39	86.7
	Negro		6	13.3
		Total	45	
Status 28	White		19	90.5
	Negro		2	9.5
		Total	21	
MARITAL STATUS				
Status 26	Married		27	60.0
	Unmarried		18	40.0
		Total	45	
Status 28	Married		13	61.9
	Unmarried		8	38.1
		Total	21	
EMPLOYMENT TYPE				
Status 26	Heavy work		0	0.0
	Other		45	100.0
		Total	45	
Status 28	Heavy work		1	4.8
	Other		20	95.2
		Total	21	

TABLE VIII (continued)

Name		Frequency	Percent
VOCATIONAL OBJECTIVE			
Status 26	Heavy work	0	0.0
	Other	45	100.0
	Total	45	
Status 28	Heavy work	0	0.0
	Other	21	100.0
	Total	21	
COUNSELOR CODE			
Status 26	Counselor A	25	55.6
	B	1	2.2
	C	17	37.8
	D	2	4.4
	Total	45	
Status 28	Counselor A	4	19.0
	B	3	14.3
	C	14	66.7
	D	0	0.0
	Total	21	
REFERRAL SOURCE			
Status 26	Employer	2	4.4
	Public assistance	21	46.7
	Employment office	1	2.2
	Self	1	2.2
	Other	15	33.3
	Physician	5	11.2
	Total	45	
Status 28	Employer	0	0.0
	Public assistance	7	33.3
	Employment office	0	0.0
	Self	2	9.5
	Other	5	23.8
	Physician	7	33.3
	Total	21	
SOCIAL SECURITY STATUS			
Status 26	Never applied	35	77.8
	Applied--not accepted	9	20.0
	Applied--accepted	1	2.2
	Total	45	
Status 28	Never applied	12	57.1
	Applied--not accepted	6	28.6
	Applied--accepted	3	14.3
	Total	21	

TABLE VIII (continued)

Name		Frequency	Percent
WELFARE STATUS			
Status 26	Never applied	24	53.3
	Applied--not accepted	0	0.0
	Applied--accepted	21	46.7
	Total	45	
Status 28	Never applied	15	71.4
	Applied--not accepted	3	14.3
	Applied-accepted	3	14.3
	Total	21	
PREVIOUS OCCUPATION			
Status 26	Sales	4	8.9
	Service	15	33.3
	Farming	0	0.0
	Processing	10	22.2
	Machine trades	3	6.7
	Structural work	1	2.2
	Miscellaneous	12	26.7
	Total	45	
Status 28	Sales	1	4.8
	Service	6	28.5
	Farming	1	4.8
	Processing	4	19.0
	Machine trades	0	0.0
	Structural work	1	4.8
	Miscellaneous	8	38.1
	Total	21	
PAIN WITHOUT ETIOLOGICAL CAUSE			
Status 26	Yes	0	0.0
	No	45	100.0
Status 28	Yes	1	4.8
	No	21	95.2
	Total	21	

VITA

David Robert Vial was born in Huntsville, Alabama, on January 13, 1950. He attended elementary schools in that city and was graduated from Huntsville High School in 1968. In June, 1968, he entered Maryville College, and in May, 1972, he received a Bachelor of Arts degree in Sociology. In September, 1972, he entered the Graduate School at the University of Tennessee and received a Master of Science degree with a major in Vocational Rehabilitation Counseling in March, 1974. He is a member of the National Rehabilitation Counselors Association.