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**The Relationship Between
Functional Disability of
Chronic Low Back Pain to
Depression**

by Janice E. Looman

March 1987

**A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Science in Nursing
Grand Valley State College
Kirkhof School of Nursing**

**Grand Valley State College
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ABSTRACT

This study is proposed for the purpose of determining if a relationship exists between the functional disability of chronic low back pain (LBP) to depression. In the investigation a random sample of 40-50 clients from area back clinics, at Blodgett Memorial Medical Center and Butterworth Hospital will be selected. The clients who have had LBP over six months and are willing to participate will be asked to take two self-administered questionnaires, a modified Dartmouth Pain Questionnaire (DPQ) and the Beck Depression Inventory (BDI). The modified DPQ includes two parts relating to the client's self perception and activity level prior to the LBP event. Also, the client will take the entire DPQ that will assess the present disability. The self-administered BDI which measures the degree of depressive symptoms will be given. The results will be divided into two categories; those clients with great discrepancy in functional disability before and after the LBP event and those with a small discrepancy in functional disability. The BDI scores will be compared to each of these categories to determine if a relationship exists.

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Chapter 1

INTRODUCTION

Low back pain (LBP) is a chronic illness which affects eight million people in the United States. In addition, fourteen billion dollars a year are spent in search of relief from this pain (Flor 1984). A major topic in recent psychological research has been the study of the positive or negative aspects of a client's beliefs about how much control he can exert over life events. It has been noted that LBP clients who experience physical dysfunction as well as pain are often exposed to perceived uncontrollable events which may produce depression as well. However, there is little understanding of their interaction at the biologic or psychophysiologic level. Most of the available data suggest that the level of depressive symptoms rather than pain itself is the critical variable determining the client's perception of and reaction to his disease or pain.

For health professionals involved in the treatment of LBP, a fuller knowledge of the relationship between the clients self concept, depression and the experience of chronic pain is important. Chronic LBP pain frequently results in a dramatic decrease in physical functioning. If a relationship exists between the decrease of physical functioning and increased depressive symptoms, nurses can utilize this information to help develop an awareness of this chronic illness.

STATEMENT OF PURPOSE

The study is designed to determine the relationship between LBP and depression as evidenced by perceived loss of functional disability. If a relationship exists, nurses can predict clients "at risk" for development of depression. Using the nursing process, they can intervene with these clients to decrease depressive symptoms.

RESEARCH QUESTION

Do LBP clients who report greater loss of functional ability as a consequence of their LBP also experience more depressive symptoms?

Chapter 2

REVIEW OF LITERATURE

Illness behavior has been described as the way in which an individual perceives, evaluates and reacts to his physical symptoms (Mechanic 1962). Stein and Fruchter's (1983) study of 37 clients with non-malignant pain supported previous studies which correlated pain and depression. The average depression score was similar to that reported in investigations which employed the Minnesota Multiphasic Index-Depression (MMPI-D) scale to index chronic pain clients (Steinbach 1974). Stein and Fruchter's (1983) results indicated that depth of depression correlated with disturbances in a broad range of illness behavior categories. The more depressed the client with chronic pain was, the more he displayed an anxious concern about his health. In addition, he was more likely to have a stronger awareness of the disease process. Consistent with the clinical symptoms of depression were his difficulties in expressing negative feelings and a sensitivity to life's problems not directly related to disease, which correlated with his depression level.

Armentrout (1979), Elton, Stanley and Burrows (1978) supported the finding that an association existed between chronic pain of undefinable organic origin and the low self-esteem which may lead to depression. However, the

Armentrout and Elton et. al. studies failed to differentiate whether the disturbances in illness behavior resulted from depression or whether the illness behaviors alone left the client more vulnerable to it.

Blumer and Heilbronn (1984) evaluated two thousand chronic pain clients in the past six years. The authors recognized that a pain-prone disorder was a variant of depressive disease. Listlessness and inability to enjoy life were almost always associated with chronic pain. Insomnia and depression were common, even though denial made them difficult to detect. The presence of depression among chronic pain sufferers varied according to research criteria. However, because of the pervasiveness of depressive traits in chronic pain clients, depression was generally recognized in the study. Additionally, with a persistence of pain and functional disability, the entire depressive state gradually worsened. Blumer and Heilbronn's study combined antidepressant drug therapy with the behavioral approach of encouraging activity while de-emphasizing the pain. They postulated that a limbic hypothalamic disorder akin to depression may be one of the possible mechanisms involved in the chronic pain process. This theory could be central to the interrelationship between depression and chronic pain.

Kramlinger, Swanson and Maruta's (1983) descriptive study of 122 chronic pain clients in a weekly inpatient rehabilitation program is also pertinent. They found that 25 of the clients

were definitely depressed, 39 were probably depressed and 36 were not depressed as defined by the Research Diagnostic Criteria for depression. The researchers postulated that the similarity between the groups may have resulted from the relatively minor effect of depression compared to the relatively powerful nature of the pain experience. Alternatively, the similarity might have occurred as a result of premorbid personalities, life situations, coping mechanisms, or a continuum of depression among all clients with chronic pain. In their study, it was hypothesized that improvement of the depression might have been due to acceptance of pain, improved understanding of chronic pain stimuli and/or expectations of a changed milieu at home resulting from family participation in the pain management program to remove noxious stimuli. An important aspect of this study was that the client could actually manipulate his environment and develop coping mechanisms to decrease his depression.

Romano and Turner (1985) reviewed the literature on chronic pain and depression. They concluded that depression among chronic pain clients was no more common than in other medical populations or healthy controls. It appeared that coexisting pain and depression may be a final common finding reached by a number of pathways. Some chronic pain clients developed a secondary depression which was noted to follow other acute and chronic medical diseases (Hall 1980, Rush and Beck 1978). The

presentation of depression ranged from mild depressive symptoms (more common) to a full blown major depression (less common). A variety of etiological processes and clinical presentations appeared to be associated with chronic pain and depression.

In reviewing the literature on depression and chronic pain, much research has been found in these areas. Some studies supported chronic pain and depression; others were not as conclusive. However, there has been little written on the effect of these interrelationships in the clinical area, especially in the area of functional disability and LBP. Most of the studies of depression and chronic illness were done on a variety of chronic illness clients without considering LBP clients as an entity within itself. What most researchers recommended in future studies was a more definite clinical application of the relationship between these variables.

Little research has been done in the clinical area with chronic LBP clients. Findings have been inconsistent, thus suggesting the need for more studies in the clinical area.

IMPLICATIONS FOR NURSING

The implications for nursing stem from the possibility that LBP is much more than a physiological process, involving a psychological process as well. This psychological process may be manifested by depressive symptoms. If such relationships exist, nurses' awareness of the symptoms can help the client with this LBP event. Predicting which clients are "at risk"

will allow nurses to intervene to make the client more aware of this process. Nursing interventions will be directed toward helping the client decrease the depressive symptoms.

Chapter 3

CONCEPTUAL FRAMEWORK

Several major theories were used in developing this research thesis: Systems Theory, Gate Theory of Pain, and Depression Theories. In chronic LBP, the triggering event can be any disease or injury which affects the spinal cord. The triggering event causes both a physiological and a psychological response, which is often depression. A model of the responses to LBP are in Appendix A. These theories will help explain the LBP process.

SYSTEMS THEORY

According to the Systems Theory, man as a system acts as a whole. Any dysfunction, such as chronic low back pain, causes a system disturbance rather than the loss of only a single function (Putt 1978). Into all systems, regardless of components and interacting forces, activity can be identified into feedback circuits such as input, throughput and output. Feedback circuits function to control variables, modify reaction by facilitation, inhibition, or dissemination, and direct the overall system toward a goal. According to Systems Theory, maintenance is the primary goal of an intact system.

Man is also an open system who reacts with his environment. As an open system, there are multiple variables that permit a continuous exchange in an orderly process. The outcome is not predictable because of the great number of variables. In the

chronic LBP process, Systems Theory explains that if the pain affects the physiological process, it may also affect the psychological process. The client may use his psychological coping skills to help his physiological pain, thus, maintaining an intact system.

GATE THEORY OF PAIN

The Gate Theory of Pain is significant to this study because it was the first theory to relate how the psychological being affects the physiological pain process (Figure 1).

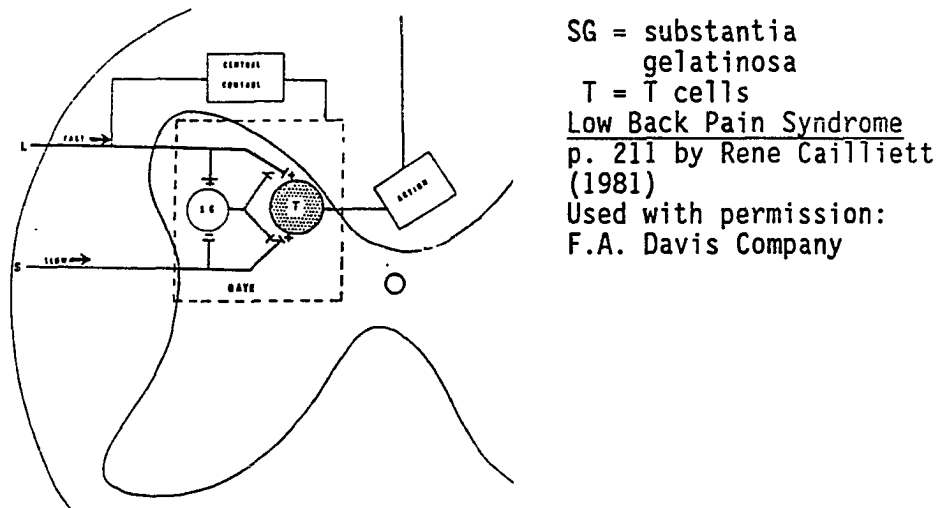
The physiological process of the LBP event results in pain and functional disability from injury or disease process. There are two major neurophysiologic transmission systems (Figure 1). The spinothalamocortical transmission system, which involves few neurons, has a short latency period and precisely discriminates intensity and duration. The spinoreticulothalamic transmission system has complex multisynaptic connections, does not precisely discriminate location, and has a long latency period. It projects to the limbic system and is involved in the emotional system. The limbic system has nervous fibers which are classified many ways:

1. Fiber A's are myelinated afferent, efferent, and somatic nerve fibers.
2. Fiber B's are myelinated preganglionic and thus sympathetic nerve fibers.

3. Fiber C's are unmyelinated somatic, afferent, and/or sympathetic nerve fibers.

Fibers A and C transmit pain sensation. A Fibers are further divided into alpha, beta, gamma which transmit impulses rapidly and delta fibers which localize sensation. Because C fibers transmit to the fasciculus proprius on both sides and are considered to carry pain sensations, it is possible that pain is transmitted up both sides of the spinal cord. There are no specific nerve fibers or nerve endings that transmit pain, other than touch or temperature receptors. Free nerve endings that can transmit pain sensation are found everywhere in the body. Spatial and temporal mechanisms must operate in the decoding of pain perception (Cailliet 1981).

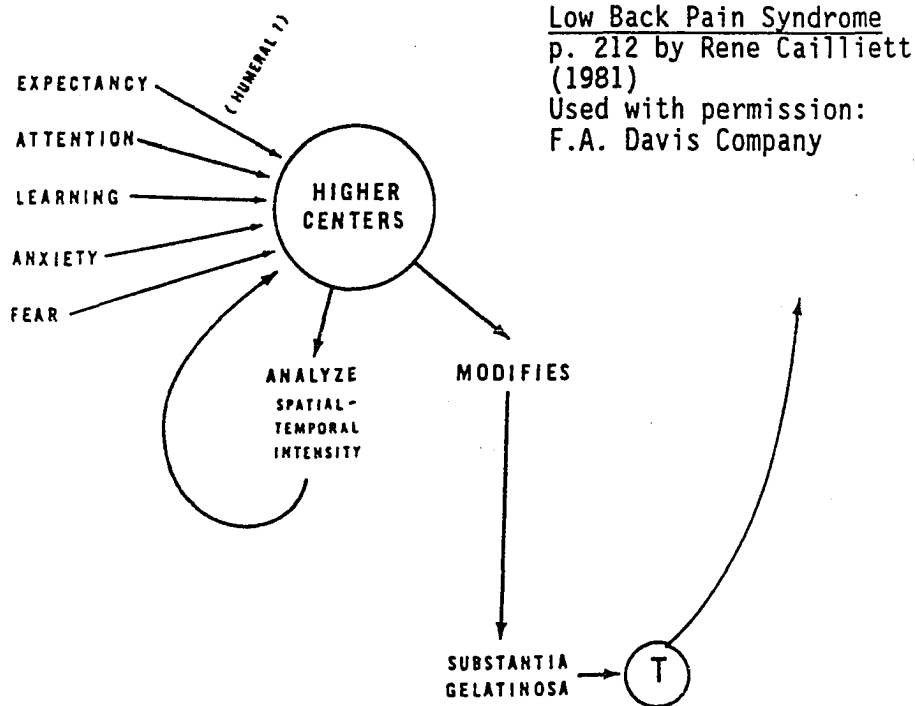
Figure 2. Wahl-Melzack gate theory of pain transmission



Wahl and Melzack (1973) postulated a neurophysiologic concept of a "gate" in the region of the dorsal horn in the spinal cord gray matter (Figure 2). The gate theory postulates that the faster conducting large fibers, which mainly carry touch and proprioception, project to the substantia gelatinosa and then to the T cells. The substantia gelatinosa exerts an inhibitory influence upon the affected fibers. The faster fibers will increase the substantia gelatinosa activity, while the slower C fibers, thought to be related to pain transmission, exert inhibitory influence. Since the slower impulses reach the

gate later than the larger fiber impulses, they find the gate closed. However, how the receptor endings and the slower fibers carry the sensation of pain is not clarified. It is believed that various thresholds for basic stimuli exist (Figure 3).

Figure 3. Higher center modifications influencing gate in dorsal horns



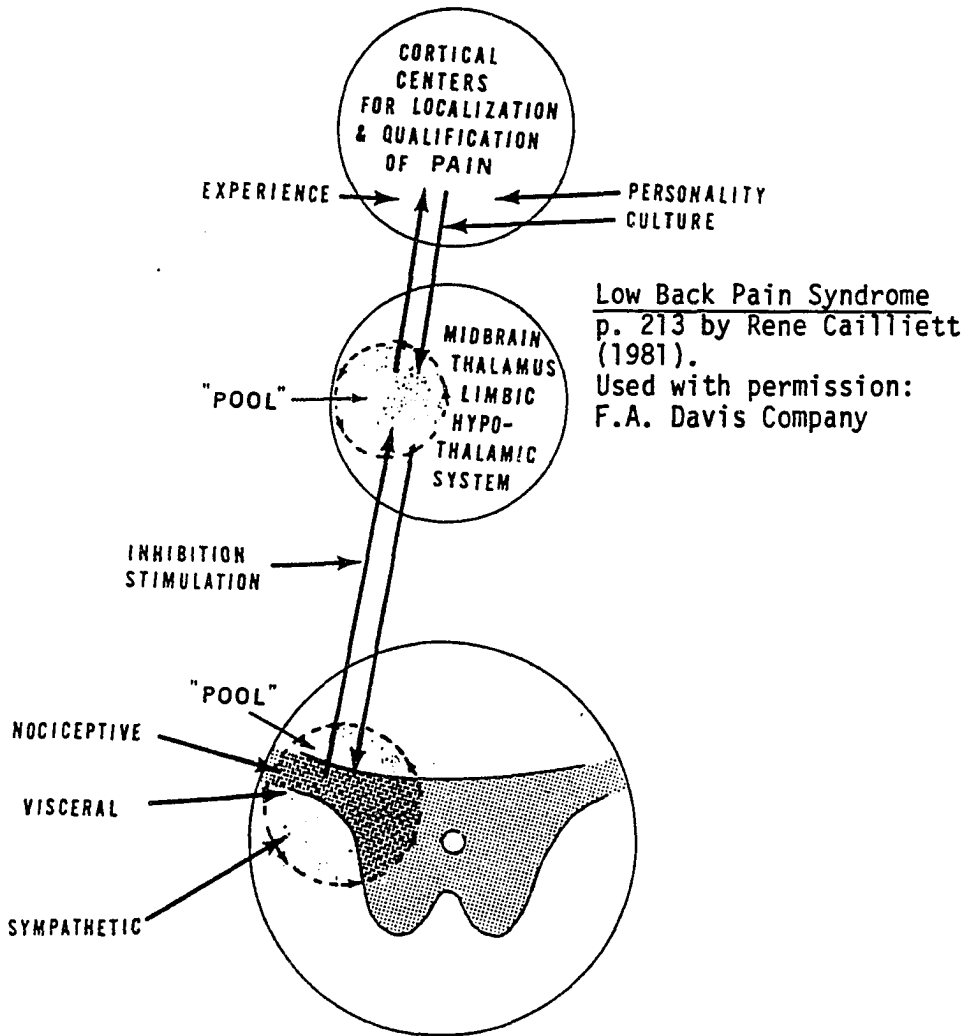
Crue (1973) revealed that T cells are capable of independent firing. This independent firing can be enhanced when the T cells are sensitized by depolarization. The T cells are postsynaptic and may be potentiated from the periphery or

central sources. In acute pain, the firing of T cells is orderly and limited, while in chronic pain, T cell impulses can be progressive, uncontrolled, and even epileptiform.

Current concepts of pain (Cailliet 1981) suggest there may be neuronal pools of various levels of the central nervous system that act as a pain pattern generating mechanism. These mechanisms are programmed and act as sources of pain that can be influenced by external stimuli (Figure 4).

These pools comprise a pattern generating center which contains the dorsal horns and all its internuclear connections. They are directly influenced by peripheral impulses as well as central stimuli descending from as high as the cortical centers. Cells in this pool can be suppressed, activated or released. The influences upon the pool can be somatic, visceral or autonomic. In this pool there is such a fine, delicate balance that a loss of input as well as an excess of input can result in overaction of the pool. Loss of input can result from nerve damage, while excess output can occur from distant tissue irritation.

Figure 4. Neurone pool concept for generating pain patterns



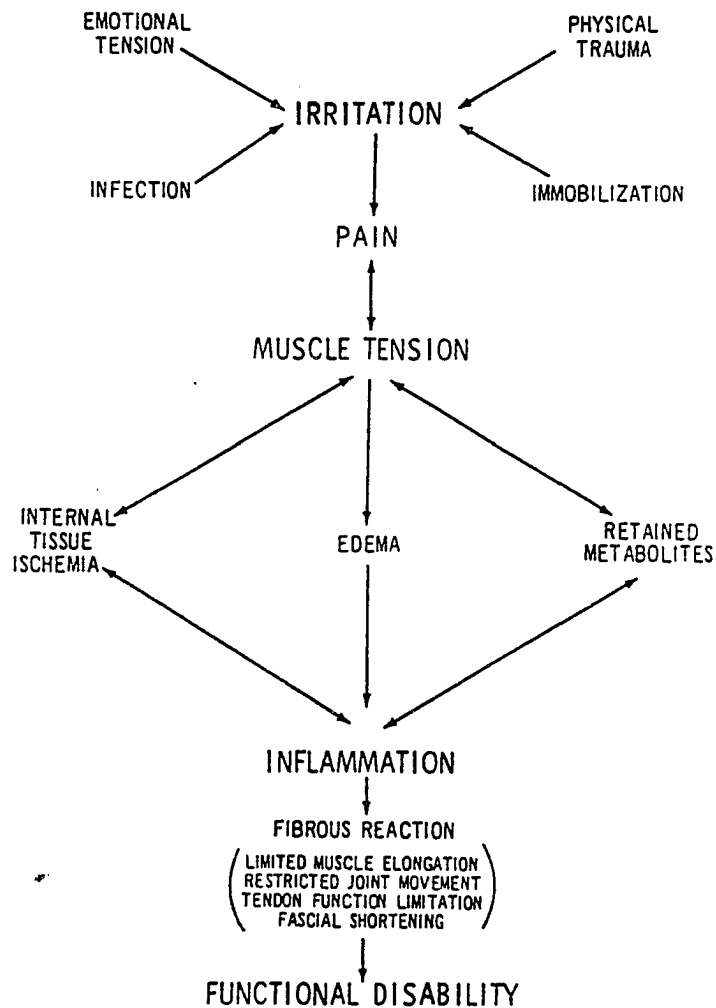
In low back pain syndromes the peripheral irritants can result from disc herniation, root compromise or any of the

numerous sites of peripheral irritation. Depression, anxiety, or fear can have a similar affect from descending pathways.

Pain can be mediated via the posterior primary division as well as the anterior primary division (Figure 5). The protective "muscle spasm" that results to prevent movement of the insulated position of the vertebral column may become the site of the stimulus. The ventral root, considered principally "motor" is now known to contain many sensory fibers. Stimulation of this ventral root produces pain, muscular tension and tenderness at the myoneural junction of that dermatome. Release of muscle tension in low back pain has been accepted for many years as a means of relieving backache. Tension in the low back has been the accepted cause of pain.

Since the development of the Gate Theory of Pain the psychiatric aspects of pain have gained credit in recent years and are important in the client's care. Pain must be viewed from the perspectives of disease process, client response, personality, life style and existing circumstances.

Figure 5 Schematic functional disability related to soft tissue involvement.



Low Back Pain Syndrome p. 214 by Rene Cailliet (1981).
Used with permission: F.A. Davis Company

DEPRESSION

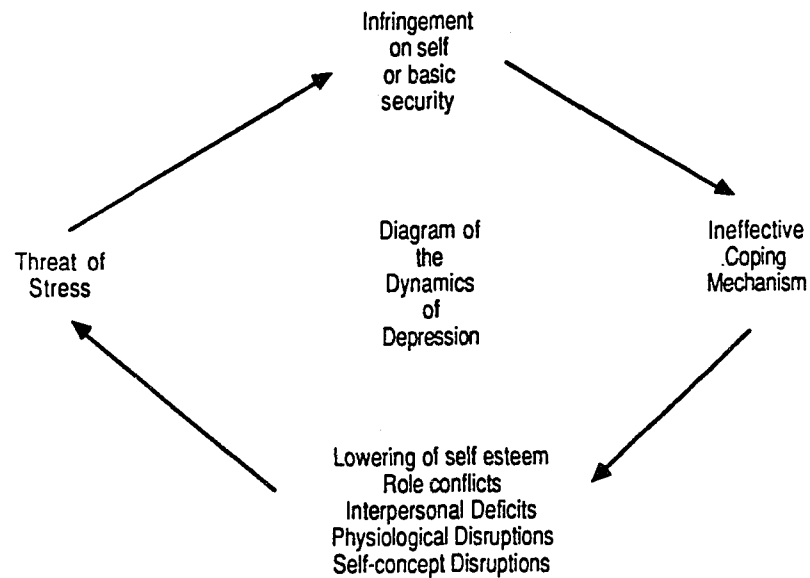
There are many theories of depression. Fordyce (1976) states that depression may have several possible roles in regard

to chronic pain. He postulates that the uncomfortable or functionally impaired client is saddened by his plight and becomes depressed. Prior associations between depression and pain result in the cues or stimuli for one producing the other as well. Alternatively, cues or stimuli to depression may also elicit pain responses or behaviors. Depression may be seen as a state of deprivation of reinforcement.

Roy (1984) describes depression as a reaction to some real or perceived threat or stress. Often the stress is a loss (real, perceived or threatened) which may activate a biochemical or a learned response -- a coping mechanism (Figure 6).

According to Roy (1984) and psychoanalytic theorists, the client gets psychological relief from immobilization and/or distraction. Depression gives the client a breathing spell from the conflict situation but also warns that something is wrong and needs attention. The type of coping mechanisms used in depression are those related to the flight response rather than the fight response. It is also possible that there is a learned use of a particular coping mechanism which fosters depression. If so, and if the client were faced with the same stimuli, he could activate other coping mechanisms so the depressive cycle would not be initiated.

Figure 6. Dynamics of depression



Source: Roy (1984) p.464

HYPOTHESIS #1

LBP clients with greater perceived loss of functional ability will experience more depression than LBP clients with less perceived loss of functional ability.

NULL HYPOTHESIS

LBP client's perception of function loss will not be related to the level of depression.

DEFINITIONS

For the purpose of this study, the following operational definitions will be used:

LBP Clients: Clients with chronic LBP consist of both sexes with ages ranging from 18 to 78 years old. The back pain could have occurred as part of a disease process or an injury in the spinal cord. LBP pain has been present for over six months.

Depression: Depression will be measured using the Beck Depression Scales (Appendix B). This inventory contains 21 items each corresponding to a specific manifestation of depression.

Functional Disability of LBP: This will be measured subjectively using the Dartmouth Pain Questionnaire (Appendix C).

Functional Disability before the LBP injury will be measured using modified DPQ (Appendix D). This measures the clients self perception before the LBP event, and what the perceived activity level was. Functional disability of LBP which is the client's current disability will be measured using the entire DPQ.

ASSUMPTIONS

1. Some level of functional disability occurs with LBP.
2. All clients are able to read and write as evidenced by reading consent form.
3. During the testing procedure external stimuli was kept to a minimum as evidenced by private quiet room.
4. All subjects have a chronic LBP process that they go through regardless of the etiology of the LBP.

Chapter 4

METHODOLOGY

Design

This descriptive, correlational study used the subjects in the study as their own control group.

The client was asked to complete the modified DPQ which includes an activities record and self perception form which relates to the condition prior to the LBP event. The client then took the entire DPQ which relates to the present LBP injury. The client next completed the BDI. Individual scores on the modified DPQ and the entire DPQ were compared. Clients were assigned to two groups depending on the DPQ scores. Those clients with a large difference between the modified and entire DPQ were placed in the group composed of individuals who perceived greater functional disability related to LBP. Clients with small differences in the modified DPQ and entire DPQ were placed in the group composed of individuals who perceived lesser functional disability related to LBP. The BDI scores were compared between these two groups for any significance. All clients also completed the demographic data sheet (Appendix E).

The Sample

A convenience sample of forty one subjects was obtained for this study from two hospital sponsored back clinics. All subjects in the sample were between the ages of 17 and 77 years

old. Subjects who had back pain for less than six months or were in an active litigation with a pending lawsuit because of their injury were excluded from the sample. Subjects were selected on the day of their clinic appointment and were asked to participate if they fit the criteria for the study. The data collector was the author of this study.

The Setting

After institution approval, the sample was obtained from Butterworth Hospital's Pain Management and Blodgett Memorial Medical Center's Back Clinic, both general hospitals in Grand Rapids, Michigan. Two units were selected because of the diversity of clients' background and contrast in settings. At Butterworth Hospital the clients came to the hospital for pain management which included an epidural steroid and Morphine Sulfate injection. After the injection was administered by the physician, the client laid on a stretcher for thirty minutes. During this time period the client completed the questionnaires in a private room with the door closed. At Blodgett's Back Clinic clients came to be evaluated by one of two orthopedic surgeons so an exercise program of physical therapy and back strengthening exercises could be individually determined. After these clients were assessed by one of the physicians, they were taken to an empty private room with the door closed where they answered the questionnaires.

Human Rights Protection

The investigator obtained institutional approval from each of the selected Hospital Review Boards and from the Human Research Review Committee at Grand Valley State College. Each subject, in addition, was given an explanation of the study and the nature of their participation in the study. The consent form was signed and witnessed by the data collector (Appendix F). Subjects were assigned a code number on the data collection instrument for the remainder of the study. The signed consent forms were kept in a location separate from the study data.

If at any time during the study the client was too tired after the treatment or there was a change in vital signs after the Butterworth prescribed treatment the session would be terminated and the physician notified. If the subject was visibly upset after the questionnaire was administered, this was also reported to the physician.

Validity

Potential threats to internal validity in this study included the client's cultural background, developmental level, life forces, educational background and previous experience with LBP. This was controlled in the study by having clients in two separate pain management clinics in two distinct areas of

Grand Rapids. Those clients involved in a legal litigation were not selected.

External threats to validity included questionnaires given in a pain clinic setting, interacting of existing pain treatment, experimenter effects (Hawthorne effects), and measurement effects. Also considered was the accessibility of the population in the pain clinic as representative of the target population. A variety of data were collected using the clients record and subjective data -- the client's perception. Rater bias was controlled by offering a brief explanation of the questionnaire and having the client self administer the questionnaire.

The Beck Depression Inventory (BDI) has reported internal consistency by using Kruskal-Wallis Non-Parametric Analysis of Variance by Ranks. Split-half reliability was computed (N=97) and the Spearman-Brown reliability coefficient of 0.93 was obtained (Beck 1976).

The stability of the BDI was found to parallel changes in clinical ratings. Concurrent validity was tested by correlating BDI scales with other measures of depression. The BDI was found to correlate 0.65 with clinical ratings, 0.75 with the MMPI-D scale and 0.75 with Hamilton's Ratings Scale for Depression

(Beck 1976). Construct validity was compared by the BDI and other scores which are considered indicators of depression. Significant relationships were found in literature with negative self concept, identification with the loser, pessimism and hostility-inward scale (Beck 1976).

The Dartmouth Pain Questionnaire (DPQ) has been tested for validity and reliability. Validity of the Dartmouth Pain Questionnaire was tested and found to be satisfactory. The Dartmouth Pain Questionnaire reports a test-retest reliability of high stability showing an overall correlation of 0.70. Some low correlations were found in the amount of physical activity in part 5 -- E,G and B which are the pain behaviors and passive behaviors on the activity record of the questionnaire. In a study by Corson and Schneider (1984), these findings were attributed to being a chronic pain client. Internal consistency was also evaluated on the DPQ. The number of hours above or below 24 can be evaluated for parts 5 -- A, B and C; medication reported to have been taken can be compared with medication prescribed. The sites of pain indicated on Part 1 can be evaluated in the context of anatomic and neurologic knowledge and compared to a dermatone chart.

Data Collection

All data were collected over a four week period from June 1986 to July 1986. A five page data collection tool was used in this study, using tools by Corson (1984) and Beck (1967) (See

Appendices C and D). Historical and demographic information was obtained from the patient and medical records. The investigator approached the client after the MD prescribed back treatment and provided a verbal explanation of the study. If the client was willing to participate in the study, the subject was asked to sign the consent form.

After the questionnaires were completed by the client, time was allotted to discuss feeling about the research and client concerns. If the client appeared visibly upset after the study, a referral was made to the physician for immediate appropriate follow up.

To maintain consistency of approach the same investigator was used to explain the study, obtain written consent, and follow-up after instruments were completed.

INSTRUMENTS

Beck Depression Inventory

The Beck Depression Inventory (BDI), consisting of 27 items, has been used in more than 100 published research studies. The questions have alternate responses that are scored on a four point (0-3) ordered scale. Each item corresponds to a specific manifestation of depression; the higher the total score, the more symptoms of depression the client exhibits (Appendix B).

Dartmouth Pain Questionnaire

The Dartmouth Pain Questionnaire is used as an adjunct to the McGill Pain Questionnaire (Melzack 1975). The Dartmouth

Pain Questionnaire was developed because most existing assessment procedures focused on pain and impairment and omitted the positive functional aspects of the disability. The Dartmouth Pain Questionnaire addresses these omissions. The questionnaire has four objective measurements (pain complaints, somatic interventions, impaired functioning and remaining positive aspects of function) and one subjective measure (changes in self-esteem since onset of pain). In addition to the sensory, affective and evaluative dimensions of the pain experience of Melzack (1975), this questionnaire adds a self-esteem dimension and positive aspects of function. Data are collected on Likert scales (Appendix C).

Procedure

Informed consent was obtained prior to the study from the subject (Appendix F). The author introduced self and the study utilizing a consistent procedure (Appendix G).

This descriptive, correlational study is for the purpose of determining if a relationship exists between the functional disability of chronic low back pain (LBP) and depression. In the investigation, a convenience sample of 41 clients from area back clinics at Blodgett Memorial Medical Center and Butterworth Hospital were selected. The clients who have had LBP over six months and were willing to participate were asked to take two self-administered questionnaires, a modified Dartmouth Pain

Questionnaire (DPQ) and the Beck Depression Inventory (BDI). The modified DPQ included two parts relating to the clients affective dimension and activities, which questioned the client's self perception and activity level prior to the LBP event. Also the client took the entire DPQ that assessed the present disability. The results of the DPQ were divided into two categories; those clients with greater discrepancy in functional disability before and after the LBP event and those with a lesser discrepancy in functional disability. All clients also took the self-administered BDI which measured the degree of depressive symptoms. The BDI scores were compared to each of these categories to determine if a relationship existed.

Data Management

The null hypothesis was that LBP client's perception of loss will not be related to the level of depression. Ordinal data are produced by the BDI and DPQ. Frequency distributions were generated for BDI and DPQ including means, medians and standard deviations. Frequency distribution was also calculated for age, sex, years of treatment. Survey data were treated in the same manner. Data of the two groups of greater and lesser functional ability were analyzed using paired "t" tests. Spearman's RHO was also used to see if a relationship exists between the ranks of two independent groups for non-parametric statistics measurement. Ranges of scores of the two groups of greater and lesser functional disability were placed on a continuum of

scores. Those scores on the lower one-third were considered a lesser perceived functional disability and scores of the upper one-third were those clients with greater functional disability. The middle scores acted as the control of the group and were not evaluated statistically. Statistical significance was analyzed using the SPSS computer program Condescript tabulation.

The probability level desired for this study was .05. With 40-60 subjects at .05 the tabled level of significance would be 2.021-2.000. If the tabled value was smaller than the absolute value of the "t" test and non-parametric test, then the results were statistically significant. If the table value is larger, then the results were nonsignificant.

SUMMARY

The sample consisted of 41 subjects, all of which had chronic low back pain for over six months. Each subject took the questionnaire after their physician prescribed treatment in the back clinic. The subjects served as their own control as placed on a continuum of those with greater functional disability before and after the LBP event and those with lesser functional disability.

Chapter 5

RESULTSStatement of Purpose

The purpose of this study was to add to the knowledge on nursing care of the chronic low back pain client. This descriptive correlational study examines the relationship of the functional disability of low back pain to depression.

Description of Sample

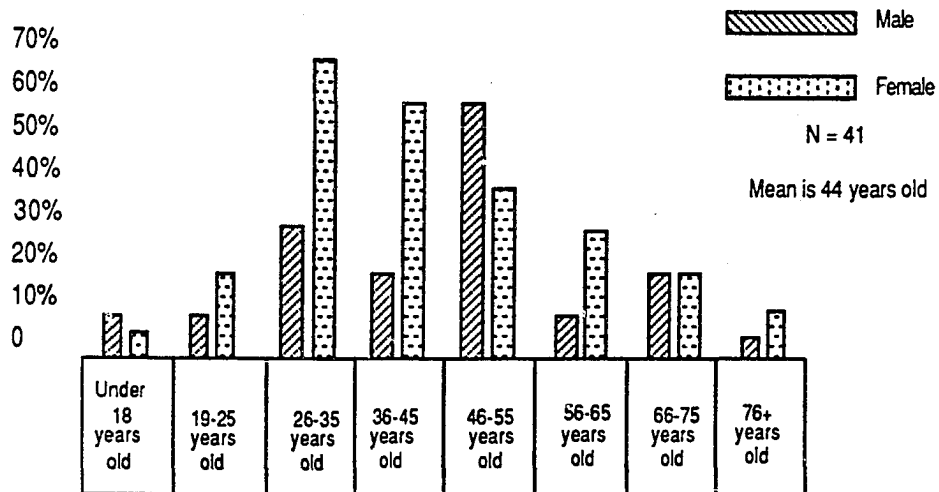
Of the 41 subjects involved in the study, 25 (61%) were females and 16 (39%) were males. In the distribution of subjects, 38 (93%) were caucasian, 1 (2%) was black, and 2 (5%) were of other ethnic backgrounds (Table 1).

Table 1

Characteristics of Sample

	Caucasian	Black	Other
Males	16	0	0
Females	22	1	2

Table 2

Age Distribution Male Versus Female

In the under age 18 group there was only 1 male (6% of the male subjects). In the 19-25 year old group there was 1 male (6% of the males) and 2 females (8% of the females). In the 26 to 35 year old group there were 3 males (19% of the males) and 7 females (28% of the females). In the 36-45 year old group there were 2 males (13% of the males) and 6 females (24% of the females). In the 46-55 year old group there were 6 males (38% of the males) and 4 females (16% of the females). In the 56-65 year old group there was 1 male (6% of the males) and 3 females (12% of the females). In the 66-75 year old group there were 2 males (13% of the males) and 2 females (8% of the females). In the 76+ year old group there was only 1 female (4% of the females).

The mean age for the entire group is 44 years old. The mode age for females was 26-35 years old while the mode for the males was 46-55 years old.

Table 3

Age of Occurrence of Lower Back Pain

	Under 18	19-25	26-35	36-45	46-55	56-65
Male	3	3	3	4	3	0
Female	4	7	13	7	7	3

The mode occurrence of LBP in the female population occurred at age 26-35 years old (40%). The mode occurrence for the male population with LBP occurred at ages 36-45 years old (25%). However, the male distribution was not as definitive as the female population.

Table 4

Cause of Lower Back Pain

Cause	Male	Female	Total
Work Related	8	6	14
Disease	0	2	2
Auto Accident	0	2	2
Other	2	6	8
Unknown	6	9	15

The cause of LBP varied between the males and females in the study. The mode for males was work related injury as the causative agent for LBP (50% of male subjects). In females the mode for the LBP event was an unknown cause (29% of the female subjects).

Table 5
Years of Treatment

Years	Male	Female	Total
0-5	10	20	30
6-10	3	2	5
11-16	0	0	0
17-20	0	0	0
21-25	2	2	4
25+	1	1	2

The mode for both males and females was zero to five years of treatment. Ten males (62.5%) have been in treatment for zero to five years while twenty females (80%) of those in the study have been in treatment five years or less.

Table 6

Current Treatment

Treatment	Male	Female	Total
Pain pills	6	12	18
Rest	2	1	3
PT exercise	4	7	11
Steroid injection	8	11	19
None	2	4	6
Other	1	1	2

Many of the subjects involved in the study were using several types of treatment for their LBP. The most common treatment currently used by females in the study was pain pills (48%). Males currently used steroid injections as their current treatment (50%).

Table 7

Previous Treatment

Treatment	Male	Female	Total
Physical therapy	8	12	20
Chiropraction	8	12	20
Acupuncture	2	0	2
TENS	6	6	12
Hot pad	12	21	33
Traction	2	3	5
Steroid injection	3	5	8
Biofeedback	3	4	7
Cold Pack	1	2	3
None	1	1	2

Numerous treatments were utilized by both males and females in this study. A heating pad for pain relief was being used by 84% of females. Physical therapy and chiropractic therapy were being used by 48% of females. Males also used a heating pad as the most common previous treatment (75%). Males as well as females used physical therapy and chiropractic therapy (50%) as their second most frequent previous treatment.

Table 8

Referral to Back Clinic

Referred by	Male	Female	Total
Doctor	9	17	26
Nurse	2	2	4
Family	1	0	1
Friend	2	3	5
Other	2	3	5

Referrals to Butterworth Pain Management Clinic and Blodgett's Back Clinic are primarily by physician referral. Males were referred by physicians 56.25% of the time while females were referred by physicians 68% of the time.

Table 9

Employment

Status	Male	Female	Total
Employed	9	6	15
Unemployed	4	14	18
Retired	2	3	5
Homemaker	0	2	2

Currently 56.25% of the males in the study were employed while 25% were unemployed and 12.5% were retired. Of the

females in the study, 24% were employed, 56% were unemployed, 12% were retired and 8% were homemakers.

Table 10

Dermatone Mapping of Lower Back Pain

Location	Number*
Lumbar 1-2	3
Lumbar 2-3	2
Lumbar 3-4	11
Lumbar 4-5	11
Lumbar 5-Sacral 1	33

*Exceeds 41 subjects since many clients selected two main sites

Several subjects in this study identified two main sites of their lower back pain on the Dartmouth Pain Questionnaire. However the main sites identified for the pain were the Lumbar₅-S₁, the L₃₋₄ and the L₄₋₅.

ANALYSIS OF THE RESEARCH HYPOTHESIS

Hypothesis I

Lower back pain clients with greater perceived loss of functional ability will experience more depression than lower back pain clients with less perceived loss of functional ability.

Null Hypothesis

Lower back pain client's perception of loss will not be related to the level of depression.

Spearman's RHO measures the significance of differences from zero or to test if a relationship exists. The t test measures the significance of differences between means. The p score indicates the probability of statistical significance. A probability level of $p < .05$ was established for this study.

Significant changes occurred by using the Spearman's RHO statistical test. Comparing the entire DPQ which measures current functional disability, to the modified DPQ which measures previous functional disability (Table 11), a significant decrease in activity was noted after the LBP event as compared to before the injury.

Table 11

Dartmouth Pain Quotient Spearman Rho Rank Coefficient Correlations

	After Part 3 DPQ	After Part 5i DPQ	After Part 5ii DPQ	After Part 5iii DPQ	After Part 5iv DPQ	After Part 5v DPQ
Before Part 3 DPQ	.253257*					
Before Part 5i DPQ4780735**				
Before Part 5ii DPQ6391184**			
Before Part 5iii DPQ6051265**		
Before Part 5iv DPQ6442123**	
Before Part 5v DPQ534596**

* significant at the .05 level

** significant at the .01 level

Part 3 on the Dartmouth Pain Questionnaire refers to the subjects self perception before and after the LBP event (Table 11).

Part 5 of the Dartmouth Questionnaire refers to different aspects of the subjects functional disability before and after the LBP event. Part 5-I refers to the person's active behaviors, part II refers to the person's passive behaviors, part III refers to active behaviors and enjoyment, part IV refers to pain behaviors and part V refers to the number of medications taken by the subject. Using Spearman RHO Rank Coefficient Correlation these were all significant before and after the LBP event at the .05 and .01 level. t tests also were significant at the .05 level (Table 12).

In comparing DPQ scores before and after the LBP event to the Beck Depression Inventory, statistical significance was found at the .05 level. Using Spearman's RHO tests comparing the upper third of functional disability scores to Beck scores a significance was found (Table 13). These scores were also supported by t tests (Table 14). Therefore, it can be said that the higher functional disability scores that occurred after the LBP event correlate with higher Beck Depression Inventory scores.

Table 12

Dartmouth Pain Quotient t Tests

		After Part 3 DPQ	After Part 5i DPQ	After Part 5ii DPQ	After Part 5iii DPQ	After Part 5iv DPQ	After Part 5v DPQ
Before Part 3	DPQ	15.150**					
Before Part 5i	DPQ	.....	13.291**				
Before Part 5ii	DPQ	.....	.....	28.700**			
Before Part 5iii	DPQ	.....	.....	.....	17.750**		
Before Part 5iv	DPQ	.....	.....	.....	.....	8.918**	
Before Part 5v	DPQ	.....	.....	.....	.....	.....	14.125**

* significant at the .05 level

** significant at the .01 level

Table 13

Spearman Rho Rank Coefficient Correlations on Sample Scoring Above 13 on the Beck Scale

		Upper Third (N = 12)					
		After Part 3 DPQ	After Part 5i DPQ	After Part 5ii DPQ	After Part 5iii DPQ	After Part 5iv DPQ	After Part 5v DPQ
Before Part 3	DPQ	.8275918**					
Before Part 5i	DPQ	. . . . .	.6281959**				
Before Part 5ii	DPQ	. . . . .	. . . . .	.8481632**			
Before Part 5iii	DPQ	. . . . .	. . . . .	. . . . .	.8923919**		
Before Part 5iv	DPQ	. . . . .	. . . . .	. . . . .	. . . . .	.8445388**	
Before Part 5v	DPQ	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	.7663184**

* significant at the .05 level

** significant at the .01 level

Table 14

t Tests on Sample Scoring Above 13 on the Beck Scale

		Upper Third (N = 12)					
		After Part 3 DPQ	After Part 5i DPQ	After Part 5ii DPQ	After Part 5iii DPQ	After Part 5iv DPQ	After Part 5v DPQ
Before Part 3	DPQ	64.618**					
Before Part 5i	DPQ	. . . . .	22.491**				
Before Part 5ii	DPQ	. . . . .	. . . . .	56.759**			
Before Part 5iii	DPQ	. . . . .	. . . . .	. . . . .	34.719**		
Before Part 5iv	DPQ	. . . . .	. . . . .	. . . . .	. . . . .	8.524**	
Before Part 5v	DPQ	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	34.044**

* significant at the .05 level
 ** significant at the .01 level

In comparing the lower third of functional disability scores on the DPQ to the BDI a significance was also found. Spearman RHO statistical tests supported lower depression scores with lesser functional disability at the .05 level (Table 15). t tests supported the lower depression scores with less functional disability (Table 16). Therefore, it can be said that lower functional disability levels after the LBP event correlate with lower depression scores.

Table 15

Spearman Rho Rank Coefficient Correlations on Sample Scoring Below 6 on the Beck Scale

		Lower Third (N = 16)					
		After Part 3 DPQ	After Part 5i DPQ	After Part 5ii DPQ	After Part 5iii DPQ	After Part 5iv DPQ	After Part 5v DPQ
Before Part 3	DPQ	.9846204**					
Before Part 5i	DPQ	. . . . .	.9216332**				
Before Part 5ii	DPQ	. . . . .	. . . . .	.9519021**			
Before Part 5iii	DPQ	. . . . .	. . . . .	. . . . .	.9072164**		
Before Part 5iv	DPQ	. . . . .	. . . . .	. . . . .	. . . . .	.8041796**	
Before Part 5v	DPQ	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	.8036898**

* significant at the .05 level

** significant at the .01 level

Table 16

t Tests on Sample Scoring Below 6 on the Beck Scale

		Lower Third (N = 16)					
		After Part 3 DPQ	After Part 5i DPQ	After Part 5ii DPQ	After Part 5iii DPQ	After Part 5iv DPQ	After Part 5v DPQ
Before Part 3	DPQ	3.699**					
Before Part 5i	DPQ	.....	40.801**				
Before Part 5ii	DPQ	.....	.....	54.154**			
Before Part 5iii	DPQ	.....	.....	.....	30.457**		
Before Part 5iv	DPQ	.....	.....	.....	.....	27.995**	
Before Part 5v	DPQ	.....	.....	.....	.....	.....	23.652**

* significant at the .05 level

** significant at the .01 level

Chapter 6

DISCUSSION OF RESULTS

Statement of Purpose

This descriptive correlational study was designed to compare the relationship of functional disability after a low back pain event to a depression score. The goal was to see if a psychological component existed with the physiological process of low back pain.

Summary of Results

The research hypothesis, that LBP clients with greater perceived loss of functional ability will experience more depression than LBP clients with less perceived loss of functional ability, was supported by this study. The null hypothesis that LBP client's perception of loss will not be related to the level of depression, was rejected.

Discussion

The functional disability that occurs after a low back pain episode has shown positive correlation to depression as evidenced in this study. However, as described in Appendix A, in the chronic low back pain process, many variables can effect or interfere in this event. Nurses using this information can help the client understand the chronic pain process that occurs with low back pain. If the person has a high level of functional disability s/he may very likely have some depressive

symptoms. Nurses, using the nursing process, can assess the person's coping mechanisms of the low back pain event. Early identification and intervention into this process may activate other coping mechanisms to aid in diverting the depressive cycle. This will also be done by aiding the client to manipulate his environment (i.e. activities of daily living) to help him feel more in control of the situation and decrease feelings of helplessness.

Other pertinent findings in this study involve the demographic data. Many subjects with LBP when interviewed stated that their first intervention for LBP was conservative therapy at home: bedrest and heating pad. Outside the home the first intervention was with a physical therapist or chiropractor. Eventually the subjects went to their doctors for interventions but it was often not their first choice for advice. This can have some important implications for health teaching interventions and health professionals.

Lastly, the staff and subjects were very receptive to this study. Pending results of this study, the staff at both back clinics are interested in adding a psychological component to their assessment data. Staff were interested to know if a relationship exists between functional disability and depression. If such a relationship exists, staff felt that it would be helpful information for them to know. If the clients

are depressed as evidenced by their Beck Depression Inventory scores, appropriate interventions can be done and initiated. The subjects were also receptive to the study. This was evidenced by their willingness to participate in the study. When approached, they were very willing to be in the project and most spent almost an hour or longer discussing their LBP. Many verbalized that it was good to have someone listen to them about their LBP. This is important for future research, as there is certainly a need and interest from both staff and LBP clients.

Limitations of the Study

The numerous variables that can interfere with a chronic low back process limit generalization of the results of this study. The major factors that limit generalization are the small sample size of 41, the variable causative underlying disease process and the convenience sampling procedure. Further research using a much larger sample size is needed before inference can be made to the general population.

Implications for Nursing Practice

The chronically ill client with LBP experiences problems with pain, frequent hospitalizations, finances, jobs, and relationships. Nurses often describe these clients as "low back losers" (Burgess 1980). Since a correlation between the client's functional disability and depression exists, nurses can help the client by identifying and intervening in the

psychological process that may have an effect on the physiological process of LBP. Nurses using the nursing process can intervene and lessen the depressive symptoms. This can be done by allowing the client more control in the schedule of activities of daily living. The client may wish to space the activities, need rest periods between treatments or require pain medication before ambulating. Allowing the client more choices (external locus of control) in his care will allow more control in the LBP process, thus decreasing his depressive symptoms.

Recommendations for Future Research

Further studies are needed. Generalization of findings to a larger population can be determined. Suggestions for further research include:

1. Replication of this study with increased sample size.
2. Replication of this study using: a) more back clinics, b) random selection of subjects and c) acute versus chronic LBP clients as subjects.
3. Replication of this study looking at other variables that can influence depression.
 - a) Locus of control
 - b) Coping mechanisms
 - c) Workmans' compensation
 - d) Litigation

Conclusion

The amount of functional disability that occurs after a LBP event has shown a positive correlation to depression as evidenced by this study. Previous research has supported the relationship between chronic pain and depression. More research in these areas is needed. Since these relationships are known to exist, nurses can intervene to help clients know that depression may occur with LBP. Furthermore, nurses can intervene to help LBP clients avoid or cope with depression. Further studies will help validate these findings and expand knowledge in this area.

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Example Of Process Of Chronic Low Back Pain - Utilizing Roy's Theory Of Nursing

