Patient Compliance in Physical Therapy Home Exercise Regimens

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Patient Compliance in Physical Therapy Home Exercise Regimens

Honors Thesis
by
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April 7, 1995
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This thesis for honors recognition has been approved for the Department of Sociology.

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Date
Introduction

Compliance and noncompliance with medical regimens have been the topic of medical concern and scientific investigations since the beginning of humankind. Medical compliance can be broadly defined as, "The extent to which a person's behavior coincides with medical or health advice" (Haynes, Taylor & Sackett, 1979, p.1). Medical noncompliance is the failure to comply to medical and health care advice.

Compliance in physical therapy is of considerable importance because it is critical to the rehabilitation of an injury. If patients do not comply with the treatment regimen that physical therapists recommend, they are less likely to improve their condition (Ice, 1985). Most physical therapy patients are given a home exercise program to supplement their rehabilitation at the physical therapy clinic. Some studies have shown that only 64% of physical therapy patients comply with these short term home exercises (Sluijs, van der Zee & Kok 1993a).

The purpose of this study is to investigate the basis for compliance and the causes of noncompliance with physical therapy home exercise programs and to investigate different ways to alleviate noncompliance.

This study will concentrate on curative, short term compliance in home exercises. Short term compliance is defined as, "compliance with the exercise regimen within the period of treatment", as opposed to long term compliance, which is "compliance after the treatment period" (Sluijs, 1991, p.194). Curative treatment is
aimed toward a specific goal, usually recovery from an injury. Preventive treatment, on the other hand, has no specific goal - it is more of a process than a product (Sluijs, 1990). Preventive treatments involve exercises that are performed to prevent the recurrence of a previous injury or the incidence of a new injury. Curative treatments are often associated with short term compliance while preventive treatments are associated with long term compliance.
Physical therapists, by the nature of their profession, are primarily concerned with treating and preventing physical injuries (Saunders & Maxwell, 1988). Since the inception of the profession in 1900, physical therapists have been educating and advising their patients on the treatment of their particular injury (Hayne, 1988). The injuries treated by physical therapists often show a high rate of unavoidable recurrence (Leathley, 1988). Recurrence can be diminished, however, by educating patients and enhancing home exercise compliance.

Previous studies show different rates of noncompliance in physical therapy. Most agree, however, that anywhere from 30%-70% of all physical therapy patients are noncompliant with their home exercise regimens (Lorber, 1975; Spelman, 1980; Sluijs et al., 1993a). Some studies cite physical therapy patients' inability to understand instructions as frequently associated with noncompliance (Davis, 1966). Other studies point to noncompliance as the result of difficulties in the doctor-patient relationship (Francis, Korsch & Morris, 1969). Still others attribute noncompliance to the patient's beliefs about their particular injury (Lorber, 1975). Sluijs et al. (1993) notes that there are over 200 separate factors related to compliance, all of which can be consolidated into four broad categories.

1) Patient's beliefs and attitudes. Heiby and Carlson (1986) found that patients who believe they are responsible for their
own health are more compliant than patients who believe that their health does not depend on their lifestyle.

2) **Characteristics of the patient's injury.** Patients who have a serious injury that could cause further disabilities tend to be the most compliant patients in physical therapy. However, patients who have a chronic injury exhibit the highest rate of noncompliance (Spelman, 1980).

3) **Characteristics of the prescribed physical therapy regimen.** Simple exercise routines are associated with a higher rate of compliance than more complex ones. Regimens that easily fit into the patient's daily schedule are associated with a greater rate of compliance (Dolan-Mullen, Green & Persinger, 1985). Dishman (1988) has further demonstrated that educated patients will respond better to goal setting and self-monitoring while less educated patients will respond the best to simple, individual prompts concerning the prescribed exercise.

4) **Therapist-patient relationship.** Patients who are being closely monitored are often more compliant than those who are not supervised (Sluijs et al., 1993a). Positive feedback from the therapist is associated with an increase in the compliance rate. Unclear and imprecise instructions from the therapist regarding the exercises to be performed can result in unintended noncompliance. Finally, a positive interpersonal relationship
between a patient and his or her therapist is associated with a greater rate of compliance (Haynes, Wang, Da Motat, 1987).
Theories

Many different biological, psychological, and sociological theories can be applied to the issue of noncompliance in physical therapy home exercises. Most compliance studies have been guided by one of five different theories: biomedical theory; operant and social learning theory; rational belief theory; communications theory; self regulative systems theory (Leventhal & Cameron, 1987).

The **biomedical theory** views the patient as the recipient and performer of regimens that are to be accepted and with which the patient must comply. Noncompliance is viewed as the result of personality problems with the patient. The potential for a lack of understanding by the patient is not considered a cause of noncompliance (Engel, 1977). Studies based on this model usually try to identify groups of patients at risk for noncompliance and then correct the personality problems that are common in these patients (Stone, Cohen & Adler, 1979).

**Operant and social learning theories** are derived from the learning theories of Pavlov and Skinner (Stone, et al., 1979). Studies based on these theories concentrate on the behaviors needed for patient compliance. Sluijs, author of numerous studies involving patient compliance in physical therapy, argues that the best way to achieve short term compliance is through behavior modification (Sluijs, 1990).

Behavior modification is based on the assumption that behavior is influenced by stimuli and positive feedback. The stimulus elicits the behavior while the positive feedback reinforces
the behavior. Both the stimulus and the feedback are necessary for the behavior to be repeated (Skinner, 1953).

Application of the behavior modification theory to home exercise compliance involves three steps (Sluijs, 1990, p.195):

1) **Physical therapists must instruct the patient in what exercises to do and how to do them.** Sometimes this involves the physical therapist actually demonstrating the exercise or guiding the patient through the exercise.

2) **The therapist must then find an appropriate cue to serve as a stimulus for the desired exercise.** For example, a sticky note on the bathroom mirror reminding the patient to do their home exercises can be an effective cue.

3) **Finally, the therapist must find an appropriate way to reinforce the correct performance of an exercise.** This can be done through positive verbal feedback, smiley stickers, cookies, or whatever the therapist thinks will work, depending on the personal characteristics of each individual patient.

For example, if a patient puts a note on his or her bathroom mirror to remind him/herself to do their home exercises, this note will serve as the stimulus or cue. A number of reinforcements may serve as feedback. It may be the positive reinforcement the patient gets from their therapist, it could be the good feeling the patient experiences just after the exercises, or it may even be the bowl of ice cream he/she promised him/herself if they exercised. Sluijs (1990) and Skinner (1953) concur that both the stimulus (sticky note), and the positive feedback (praise, good feeling, ice cream) as
an anticipated consequence of the desired behavior, must be present in physical therapy practice in order to achieve maximum compliance. According to this theory, if the patient does his/her recommended home exercises, but does not receive the positive feedback, he or she will soon discontinue the exercises and move into the realm of noncompliance.

The communications model of patient compliance views the patients as a novice who seeks the advice of the expert therapist. Compliance is a result of six major steps (Leventhal, Zimmerman, & Gutmann, 1984):

1) Effective generation of message - this includes setting specific goals and developing the means of reaching these goals.

2) Reception of the message by the patient.

3) Comprehension of the message by the patient.

4) Retention of the message by the patient.

5) Acceptance and belief in the message by the patient.

6) Compliant action by the patient.

The rational belief model assumes that human behavior is guided by a logical, objective thought process. Under this assumption, if the patient is given appropriate information on the benefits and consequences of different behaviors, the patient will make a logical decision and choose behaviors that are in compliance with their prescribed therapy. Noncompliance is the direct result of
a lack of knowledge of the benefits and consequences of a particular behavior or exercise (Fishbein & Ajzen, 1975).

The **self-regulative systems model** views the patient as an active problem solver whose behavior is a result of an attempt to close the gap between his/her current status and the final goal. Compliance depends on the patient's ideas of such status and goals as well as the methods for appraising progress (Engel, 1977).
Methods

Operationalization: Noncompliance is a difficult subject to measure quantitatively. The most convenient method to measure noncompliance might seem to be to ask the patient if he/she is complying with the exercise regimens. However, there are three problems with this approach (Dishman, 1988). The first problem is that patients may have a faulty memory, especially when recall involves long periods of time. For example, a patient may not remember whether he/she did the exercises prescribed for the previous week. Secondly, a patient may define compliance in a different manner than the therapist. What a patient views as compliance might not necessarily be compliance in the eyes of a physical therapist. Finally, a patient may lie and say that he/she is doing the exercises when, in fact, he/she is not. A more valid way to quantitatively study noncompliance in home exercises is to observe the patients at their household and record the incidents of noncompliance (Dishman, 1988). This approach has inherent practicality problems.

This study consisted of interviews with physical therapists as well as a short survey of physical therapy patients to supplement the interviews. This combination of qualitative and quantitative analysis increases one's understanding of the subject matter.

Qualitative sample: The qualitative portion of this study involved a case study of five certified physical therapists (three females and two males). These therapists were selected from two
different physical therapy clinics: one was a large, public hospital and the other was a private, athletic-based rehabilitation center.

"Sally" graduated from the physical therapy school at the University of Minnesota in 1990. She has been employed as a physical therapist since graduation. "Jane" also graduated from the physical therapy school at the University of Minnesota, but in 1985. She has also been practicing as a physical therapist since graduation. "Myrtle" has been in the physical therapy field for 18 years. She graduated from the physical therapy school at the University of Montana. "Jim" has a Master's degree in physical therapy from Hahnemann University. He has been a physical therapist for three and one-half years. "Ben" graduated from the University of Minnesota in 1985, and has been practicing as a physical therapist for ten years.

**Quantitative sample:** Surveys were administered to a non-random sample of 40 current physical therapy patients for the quantitative portion of this study. Thirty-five of the 40 returned the completed questionnaire for an 88% response rate. The sample included 21 males and 14 females. Their ages ranged from 14 to 54 years, with a mean age of 27.9 years and a standard deviation of 10.4 years.

By occupation, blue-collar workers accounted for 18 of the 35 subjects (51.4%). Unemployed patients, including students, accounted for 10 of the 35 subjects (38.6%), while white collar workers accounted for 6 (17.1%). One of the subjects did not complete the occupation portion of the questionnaire and was not
included in any statistical association tests with patient occupation as the independent variable.

The sample was also coded by type of injury. Patients with lower extremity injuries accounted for 18 of the 35 subjects (51.4%). Neck and back injury patients, accounted for 9 of the 35 subjects (25.7%). Finally, patients with upper extremity injuries accounted for 8 of the 35 subjects (22.9%).

**Instruments:** Two separate instruments were used in this study: a set of 15 qualitative case study interview questions administered to five physical therapists (See Appendix A); and a ten-item quantitative survey administered to physical therapy patients (See Appendix B).

The interview schedule was developed independently using background research as a reference. The case study interviews were conducted during the month of December, 1994.

The quantitative questionnaire (Appendix B) administered to physical therapy patients followed a Likert scale format very similar to the questionnaire found in "Correlates of Exercise Compliance in Physical Therapy" (Sluijs, 1993, p.774). The questionnaire was composed of ten statements concerning the patient's home exercise program. These questionnaires were distributed by physical therapists among their current physical therapy patients.

Grounded Theory (Glaser, 1967) was the basis for analyzing the interview data. Grounded theory involves creating a theory based on observations. A theory is constructed inductively by observing
aspects of social life and seeking to discover patterns that may point to universal principles. Grounded theory is an inductive process that involves coding statements and observations in order to develop themes in a manner that makes theoretical sense.

One caution must be noted. The sample sizes were relatively small. The quantitative sample of 35 patients was non-random and not large enough to prove significance - especially in the Chi-Square test. The qualitative sample of five therapists was also non-random. With these cautions in mind, let us continue.
Qualitative Analysis

After analyzing the transcripts of the five physical therapist interviews, a number of relevant themes emerged.

**Compliance Rates:** All five therapists agreed that at least some of their patients do not comply with their home exercise programs. Their estimated rates of compliance ranged from 40% to 80%. Jim and Sally estimated that their compliance rates (60% and 80% respectively) were average while Myrtle and Jane thought that their compliance rates (75% and 70% respectively) were above average. Jane distinguished between two different groups when asked about her compliance rates.

"I think with the sports individuals, I'd say 70%. I'd say with your back patients it's probably 40% to 50%.

**Compliance Training:** None of the subjects had any training in physical therapy school directly relating to compliance. However, three out of the five said that their education briefly addressed the topic from an ethical viewpoint. Jane explained,

"I think we addressed it (compliance) more in ethically whether you could continue to follow somebody if they are not going to follow you."

**Compliance and Changes in the Medical Field:** Four out the five therapists believed that recent changes in the medical field have contributed to changes in noncompliance rates over time.
Jane stated,

"Five years ago, I could schedule somebody 12-24 times, no problem. Now, I'm seeing them four to six times. So, I think people are realizing that this (in-clinic physical therapy) is not something they can do long term and that they need to become a little more active in what they do".

Sally agreed,

"We are seeing less visits with people so we have to accomplish our goals in a certain time period or they are discharged from physical therapy. So, maybe the pressure is on them a little bit more to accomplish things in the time frame that they are given.

**Compliance and Personality Traits:** "Lazy," "passive," "poorly motivated," and "cocky" were some of the words used by the physical therapists to describe common personality traits of noncompliant patients. These labels relate to Freidson's description of the labeling theory in accepting the sick role. Freidson holds that the key to distinguishing among sick roles is the idea of legitimacy. Freidson believes that there are different consequences for each individual and that other people treat the individual differently based on the label applied to him or her (Freidson, 1970). Four out of the five therapists also felt that workmen's compensation patients were also likely to be noncompliant. Myrtle commented,

"I think because of insurance payments and workmen's comp, people are not as compliant. They feel like they want to get better, but they are not really motivated to perform or go out and do something to get better."

Jane added,
"... the noncompliant patient is kind of like the patient that goes in to the doctor's office and says, 'Give me a pill to get better', because they are not going to work at it."

**Compliance and Demographics:** Only one out of the five therapists interviewed thought that the patient's age and sex related to noncompliance. Ben stated,

"I've found that teenagers are often noncompliant. After the age of twenty, however, the older the patient is, the greater their rate of noncompliance as a whole. Older women with lower back problems are the most noncompliant of all patients."

The other therapists did not believe there was any correlation between compliance and the patient's age or sex.

**Compliance and Type of Injury:** The most frequent theme that arose during the analysis of the interviews was that low back patients are the least compliant of all patients. All five therapists agreed with this idea. Jim stated,

"I would say the majority of noncompliance, in my experience, is back patients. If I had to pinpoint one injury it would be a lower back injury."

Sally added,

"I think the low back is probably the biggest injury affected by noncompliance because society has kind of labeled it as one of those things that people have to live with."

**Compliance and Patient-Therapist Interactions:** The therapists agreed that there was a difference in the relationship
between them and a compliant patient as opposed to the relationship with a noncompliant patient. Jane explained,

"You wish you could say there is no difference, but, I think that is untrue because I think with the compliant people, you are actively involved with them and you continue to progress with them. Whereas with the other ones, you get more frustrated and you spend more time trying to get them to do what you want them to do so you don't make as much progress with them."

Myrtle added,

"The compliant patient is much easier to deal with - they are a reward to us as therapists."

**Compliance and Exercise Routine**: Although each therapist had his/her own way of explaining home exercises to their patients, they all had similar routines. They began by explaining the exercises and the purpose of the exercise. Then, they usually demonstrated the exercises themselves with the patients watching. It was then the patient's turn to perform the exercise while the therapists watched and made corrections if needed. An illustration of the exercise was then given to the patient for reference. However, each therapist had minor variations in this routine. For example, Myrtle often used anatomical charts to assist her in her initial explanation of the exercises. They all made sure to stress the importance of the home exercise program as well as the reasons behind doing the exercises. Myrtle added,

"I think the better understanding of what the problem is and why they are doing the exercises, the better the compliancy. Most of the time, people want to understand what's wrong."
**Patient Counseling:** The final question of the interview inquired how often the therapist found themselves counseling their patients on subjects other than physical therapy. Jim said he did this 40% - 50% of the time and Jane found herself doing this 25% of the time. Myrtle said,

"We are not just muscles and people separate, we are people with muscles. So if you don't treat the person and just try to treat the muscle or joint, you miss out on a large part of physical therapy. I think that sometimes with people who have a lot going on in their lives - when it comes to physical therapy, it's not all that important."
Quantitative Analysis

The physical therapy patient surveys were analyzed using the computer software, Statistical Package for the Social Sciences (SPSS). The dependent variables measured the relative compliance of each individual patient using a Likert scale. The 10 items had response options ranging from 0 (least compliant) to 4 (most compliant). The 10 responses were then added together for each respondent for a total compliance score ranging from 0-40.

Statistical measures of association used in this study included Pearson's product-moment "r", and Chi-Square, as well as a test for significant differences between group means.

Pearson's product-moment "r" is a measurement of association between two interval level variables - in this case, patient age and total compliance score. Pearson's "r" revealed a significant, inverse correlation between the patient's age and relative compliance score (r= -.627, p<.001). Simply stated, the data indicated that the older the patient, the less compliant he/she was.

The Chi-Square is a frequently used statistical association to test the null hypothesis. In order for the Chi-Square test to be valid, p<.05 is mandatory and each subgroup must have at least five subjects in it (Babbie 1992). Because of the small sample size in this study, no Chi-Square tests were proven to be valid.

The t-test is a measure of significant differences between the group means of some categorical independent variable on a continuous dependent variable (Babbie, 1992). In this study, the patient's sex, injury, and occupation were individually tested on the
total relative compliance score. T-test results showed that males had higher relative compliance levels (mean score of 21.3, s.d.=4.8) than did females (mean score of 17.6, s.d.=6.2) (See Appendix C). The t-test showed that blue-collar workers were the least compliant (mean score of 17.9, s.d.=3.7) while white-collar workers were more compliant (mean score of 20.3, s.d.=5.2). Unemployed patients showed the highest compliance (mean score of 23.6, s.d.=6.9) (See Appendix D). The t-test results also showed that back and neck patients were the least compliant (mean score of 16.3, s.d.=2.8). Upper extremity patients (mean score of 18.0, s.d.=5.9) were more compliant, and lower extremity patients were the most compliant (mean score of 22.2, s.d.=5.6) (See Appendix E). The mean compliance score for the entire sample was 19.7, s.d.=5.1.
Conclusions

This study was conducted to investigate the basis for compliance and the reasons behind noncompliance with physical therapy home exercise regimens. Despite the study limitations discussed previously, this study did reveal some tendencies that, given larger samples in the future, may become significant.

The most obvious conclusion of this study is that noncompliance is indeed a problem that needs to be dealt with. The therapists' estimated rates of compliance ranged from 40%-80%, and this is clearly unacceptable. Both therapist reports and quantitative results showed that back and neck patients showed the poorest compliance rates of all injuries. Data also associated females with poor compliance rates in comparison to their male counterparts. Pearson's product moment "r" revealed that the older the patient, the less likely they are to be compliant.

The therapists' view of noncompliance was not based on just one of the five major theoretical models of noncompliance - each therapist viewed noncompliance as a combination of all five. This study concludes that noncompliance is a problem that needs to be studied and treated holistically. Biological, sociological and psychological theories do not explain noncompliance when viewed separately. A combination of all three are necessary to explain noncompliance and increase compliance with home exercise programs.

Suggestions for further research include a similar study with the exception of an increase in sample size, especially in the
quantitative aspect. Research on patient compliance is highly relevant to the physical therapy profession. Both patients and therapists will benefit immensely from more knowledge about the basis for patient compliance in home exercise programs as well as the reasons behind noncompliance in such programs.
Appendix A

Case Study Interview Questions

1) What do you estimate your compliance rate to be?

2) Do you think that rate is higher or lower than average?

3) Did you have any training in physical therapy school involving patient-therapist interactions or how to stop noncompliance?

4) What methods have you learned since you have become a physical therapist to stop noncompliance?

5) Have you noticed any trends in noncompliance rates?

6) Have you noticed a certain personality trait that tends to be noncompliant?

7) Have you noticed a link between a certain type of injury and noncompliance?

8) Is there a difference in the relationship between you and a compliant patient and the relationship between you and a noncompliant patient?

9) If so, did the noncompliance cause the difference in relationship, or did the difference in relationship cause the noncompliance?

10) Say a new patient comes in, what steps do you go through to instruct the patient in their home exercises?

11) Do you explain the reasons behind doing exercises or modalities?
12) Do you think most patients understand your explanations?

13) How often do you find yourself counseling patients in things other than exercises? For example, family problems, or stress relief.

14) Have you noticed a link between a patient's sex and noncompliance?

15) Have you noticed a link between a patient's age and noncompliance?
Appendix B

Home exercise questionnaire

Age: ______
Sex: ______
Injury: ________________________________
Occupation: __________________________

Please rate your opinions towards the following statements concerning your home exercise program.

SA = Strongly Agree
A = Agree
N = Neutral
D = Disagree
SD = Strongly Disagree

<table>
<thead>
<tr>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>N</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I get tired from exercising.</td>
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<tr>
<td>I try to do my home exercises as prescribed</td>
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<tr>
<td>My prescribed home exercises are easy to do</td>
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<tr>
<td>I have little time to do my prescribed exercises</td>
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<tr>
<td>Home exercises are helping my recovery</td>
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<td>Health clubs are too expensive to join</td>
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<tr>
<td>My prescribed home exercises are painful</td>
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<tr>
<td>My recovery depends mainly on my therapist</td>
<td></td>
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<td></td>
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<tr>
<td>My injury will disappear without exercising</td>
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<tr>
<td>I avoid public health clubs because of a lack of privacy</td>
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<td></td>
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</tr>
</tbody>
</table>
Total Compliance Score by Sex

Male Patients...... Mean = 21.3......... s.d.= 4.8
Female Patients..... Mean = 17.3......... s.d.= 6.2

F = 4.62
p < .04
Appendix D

Total Compliance Score by Injury

Back and Neck Patients................. Mean = 16.3.......... s.d. = 2.8
Upper Extremity Patients.............. Mean = 18.0.......... s.d. = 5.6
Lower Extremity Patients.............. Mean = 22.2.......... s.d. = 5.6

$F = 4.56$

$p < .02$
Appendix E

Total Compliance Score by Occupation

Unemployed Patients...... Mean = 23.6........... s.d. = 6.8
Blue Collar Patients....... Mean = 17.9........... s.d. = 3.6
White Collar Patients...... Mean = 20.3........... s.d. = 5.2

F = 4.56
p < .02


Gentry D. *Handbook of Behavioral Medicine*. New York, New York: Pergamon Press; 1984,


