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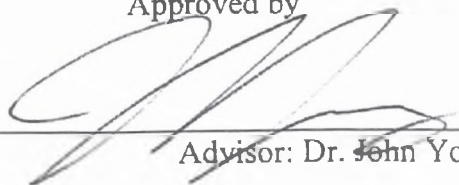
PHYSICAL THERAPY AND DEPRESSION: A PILOT STUDY ON SCREENING
FOR DEPRESSIVE SYMPTOMS

by
Allison Hatten

A thesis submitted to the faculty of The University of Mississippi in partial
fulfillment of the requirements of the Sally McDonnell Barksdale Honors College.

Oxford
May 2014

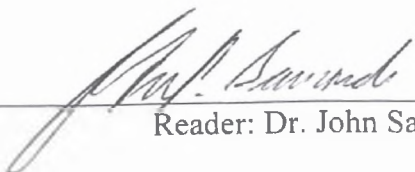
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ABSTRACT

The current paper presents a pilot study of mental health screening in a physical therapy clinic. It aimed to determine the feasibility of integrating simple, scientifically-sound methods of capturing symptoms of depression, anxiety, stress, sleep patterns, and physical pain. A total of 10 patients recruited from University of Mississippi Physical Therapy Clinic participated in the study. Participants were given the DASS-21 with additional questions on pain ratings, hours of sleep, and reason for physical therapy. The measure was administered twice with a three-week interval of time in between. Data were analyzed by conducting individual t tests for change in the variables of interest over the course of therapy. Significant changes were only noted in the category of stress, although limitations in interpreting this finding were notable due to a lack of reliability in the measure of stress and diminished power due to small sample size. Graphical analyses of patterns of symptoms change, however, indicated positive change in almost all constructs measured over time. The study demonstrated that it may be possible to implement depression screening in a physical therapy clinic. Conclusions, limitations, future directions, and the implications of this project on my career path are discussed.

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Introduction

Physical Therapy and Healthcare Reform

Physical therapists are healthcare professionals that provide a number of services to patients of all ages and work in settings ranging from hospitals, to schools, to outpatient clinics. Physical therapists diagnose and treat medical problems associated with movement dysfunction resulting from disease, disorder or injury. Sometimes this involves preventing the loss of mobility in the future, providing health promotion information or maintaining health and wellness. Physical therapists are very active in rehabilitation and are beginning to take a larger part in preventative care (American Physical Therapy Association, 2013).

Recent changes in American health care coverage have precipitated expansion of adjunctive services likely to be seen in physical therapy practice. The Affordable Care Act, for example, aims to provide healthcare to all people while reducing capitated expenses in healthcare itself. A necessary strategy for this to succeed is greater multidisciplinary integration of health services, both for accurate identification of health issues and fiscal efficiency. As a result of these impending changes and shifts in mindsets regarding allied health professions, physical therapy job descriptions are likely to broaden to encompass preventative care, education, and mental health screening. As of today many states allow patients direct access to physical therapists, which eliminates the need for referral from a physician. If this policy continues to expand throughout the country, then physical therapists will soon need to be well prepared to provide screening for a multitude of disorders and diseases, including psychological disorders (Kapasi, 2010). The following paper reviews the extant literature connecting depression, which may

constitute the highest base-rate psychiatric disorder, and physical therapy. The study built on this review provides a pilot test of a simple, freely available method of screening as implemented in a real physical therapy clinic with actual physical therapy patients.

Depression Symptoms

Major Depressive Disorder is a condition defined by either (or both) depressed mood and/or loss of pleasure in nearly all activities nearly every day. These conditions must also result in reduced function in some important area of life. Other specific concomitant symptoms that may occur in a person experiencing Major Depressive Disorder include sadness, decreased energy, feelings of worthlessness or guilt, having a difficult time making decisions or thinking clearly, or psychomotor changes.

Psychomotor changes include agitation (i.e., problems being still, hand wringing, pulling or rubbing the skin or other objects) or retardation (i.e., slow movement movements, slowed speech). Other symptoms include significant weight changes (in either direction), thoughts of death, or suicidal ideation. To be diagnosed with Major Depressive Disorder a person must display 5 or more of the above symptoms nearly every day during the same 2-week period. Symptoms cannot be attributed to substance use or a medical condition or be better defined by a psychotic disorder. A person must also not experience a manic or hypomanic episode (Diagnostic and Statistical Manual, 5th edition [DSM-V]; American Psychiatric Association [APA], 2013). Depression is often estimated to have the highest base rate among psychiatric disorders, both in terms of lifetime and recent incidence (e.g., Kessler et al., 1994), and has specific relevance to previous integrated mental health screening efforts in the context of physical therapy (see below).

Injury and Depression

Many studies report significant relationships between injury and depressive symptoms. For example, Udrey, Gould, Bridges and Beck (1997) conducted a study to investigate the psychological responses of athletes with season-ending injuries as well as possible positive outcomes from the injury. To conduct this research they interviewed 21 US ski team athletes that had experienced season ending injuries. Of these athletes 42.8% reported emotional depletion that included depressive symptoms such as feeling sad, disappointed, let down, as well as wanting to quit. The study used semi-structured interviews to gather data, which represented a significant methodological strength. It did not, however, interview the athletes at the time of their season ending injuries, and thus could have ultimately introduced bias in the results due to the length of time that elapsed between injury and interview. Therefore, it may be possible that an even higher rate of depressive symptoms would have been apparent in this group of athletes (Udrey et al., 1997).

Other research has demonstrated that a large number of patients starting physical therapy with work related injuries exhibit symptoms of depression. Wideman, Scott, Martell and Sullivan (2012), for example, used a widely known measure of depression (the Beck Depression Inventory, 2nd Edition, or BDI-II) to screen incoming physical therapy patients for symptoms. At their initial appointments 50% of patients reported clinically significant levels of depressive symptoms (Wideman et al., 2012). George, Coronado, Benecuik, Valencia, Werneke & Hart (2011) also conducted a study in the area of injury and depression. The researchers found that injuries in specific regions of the body were associated with statistically different levels of depression. Patients with injuries to lumbar and cervical regions reported more severe levels of depression than

those with injuries to their upper and lower extremities (George et al., 2011). Similarly, Arango-Lasprilla, Ketchum, Starkweather, Nicholis, and Wilk (2011) determined that 11.9% of participants receiving physical therapy for spinal cord injuries were found to have diagnosable Major Depressive Disorder at a one-year follow up. By five years this figure had measurably dropped to 9.7%, but was still high enough to support the idea that depressive symptoms are a nearly ubiquitous part of physical therapy treatment. Although the synopsis of these articles focuses on the nature of depression as it relates to injuries, the studies by Wideman, Scott, Martel, and Sullivan (2012) and George, Coronado, Beneciuk, Valencia, Werneke & Hart (2011) will be reviewed in greater detail in a relevant section (below).

Pain and Depression

Quite a few studies have shown a correlation between pain and depressive symptoms. Cho, Hwang, & Lee (2013) conducted a study in Korea wherein 248 patients with chronic pain were surveyed to investigate the relationship between pain intensity, depression and suicidal ideation. To evaluate pain researchers used an 11-point numeric rating scale. The BDI-II was used to measure depressive symptoms and the Beck Scale of Suicidal Ideation was used to measure suicidal ideation. The authors determined a strong association between these variables, and demonstrated that depression was a mediator between pain intensity and suicidal ideation (Cho et al., 2013). Thus the variables were not only determined to be strongly correlated, but support was found for a causal relationship between pain, depression and suicidal symptoms. Given the severity of the potential for suicide and the high degree of likelihood of physical therapy patients

experiencing chronic pain, the results of this study support the relevance of including measures of depression in physical therapy practice.

Other populations also experience pain and demonstrate high levels of related depression. For example, 50% of pregnant women experience lower back pain (Bennet, Einarson, Taddido et al. (2004), as read in Gjestland, Bo, Owe, and Eberhard-Gran (2012)), whereas 12 percent of pregnant women report experiencing depression in the third trimester of pregnancy (Carlson, Carlson, Pastemark et al. (2003), as read in Gjestland et al., (2012)). One study in this domain examined a population of over 4,000 pregnant women to observe the correlation between exercise in mid pregnancy and pain and depression in late pregnancy. This study used a series of surveys and journal entries to collect data and found that women who engaged in moderate exercise during early pregnancy were less likely to experience lower back pain and pelvic girdle pain in late pregnancy. The women who exercised appropriately were also found to experience depression less often at week 32 of pregnancy. Women who did not exercise two or more times per week in early pregnancy were more likely to experience pain and depression in late pregnancy. (Gjestland et al., 2012). Although not specific to injury and/or chronic pain, the parallels between this study and the trajectory of depressive symptoms throughout a course of physical therapy treatment are potentially strong (given that they encompass similar domains; i.e., exercise as a way to promote healthy function and allay pain).

Lin et al. (2003) studied the possible effects that treating depression may have on arthritis pain in older adults. One group of patients (n = 506) diagnosed with both depression and arthritis received antidepressant medication and/or psychotherapy. A

control group of patients (n=495) received usual care for their arthritis. The group of patients receiving psychiatric and/or psychological treatment for their emotional symptoms showed less reports of pain intensity and interference with daily activities due to arthritis or pain, as well as enhanced quality of life in comparison to the control group. The findings indicate that improving depression care may not only have benefit for one's emotional state, but also contribute to reduction in chronic pain associated (Lin et al, 2003). Thus this study supported the strong relationship between these two constructs and further points to a need to integrate screening for depression into physical therapy treatment.

Although there is evidence that pain and depression are related, it is difficult to extricate the causal nature (if any) of this relationship. A recent review (Woo, 2010) addresses this topic and concludes that the most prevalent theory to explain this association is the diathesis stress model. Following the guidelines of this model, it is posited that a person's predisposition to depression interacts negatively and reciprocally with his/her stresses of chronic pain, and the resultant elevated stress levels lead the individual to develop chronic depression. The review also provided clinical implications for physical therapy practice, indicating that treating pain without considering the patient's emotional state is unlikely to ameliorate difficulties in either area. The ultimate conclusion of the article was that pain and depression are innately, inexorably linked, and as such should not be approached as separate problems to solve. Additionally, the author provided explicit recommendations for the integration of attention to emotional symptoms in the course of physical therapy treatment, many of which were central to the determination of methods for the current study (Woo, 2010).

Sleep and Depression

Sleep problems are one component of the diagnostic criteria for Major Depressive Disorder (DSM-V; APA, 2013), and many people have studied that relationship over time. In one study conducted by Sivertsen, Harvey, Lundervold, and Hysing (2013) sleep problems and depression were studied in adolescents. Researchers collected data on depression using the Mood and Feeling Questionnaire and had multiple self-report questions regarding the difficulty initiating and maintaining sleep. From the data they collected, 33.5% of depressed females and 38.7% of depressed males reportedly also experienced insomnia. In non-depressed females and males that number dropped to 8.8% and 13.5% (respectively). It was also found that both less sleep and longer sleep latency time were associated with depression (Silvertsen et al., 2013).

An experiment by Combs et al. (2014) found another connection between depression and sleep by examining what effects exercise intervention and antidepressant medication have on the sleep schedule of depressed individuals. Patients were assigned to one of the following conditions randomly: supervised exercise, home exercise, antidepressant medication, or placebo. All of the groups' sleep did significantly improve, but no differences were noted between the groups. Residual insomnia symptoms after the treatment period were good predictors of recurrence of depressive symptoms at the four-month follow up and diagnostic status of MDD at the one year follow up (Combs et al., 2014). Thus, although the main, post-treatment analyses in this study did not indicate significant differences between strategies to treat sleep difficulties, the long-term data collection pointed to a connection between sleep and the experience of depressive symptoms.

Physical Therapy and Depression

As mentioned previously, symptoms of depression in people with injury and chronic pain can be substantial, impairing and often reflective of psychiatric diagnoses on this basis. Because of the fact that many patients with injuries and pain are referred to a physical therapy setting, depressive symptoms may also be part of the patients' presenting symptoms at onset of therapy. The complex, reciprocal relationship between these mood symptoms, pain, and sleep is not fully understood, but as the literature reviewed above suggests these constructs are all seemingly related.

Despite the relevance of mental health, and depression in particular, to the physical therapy setting, a relative paucity of research exists in this domain. At least three specific studies, however, have been conducted examining depression in this context. Akkaya, Atalay, Konukcu, and Sahin (2012) studied the effect number of physical therapy sessions had on pain, global evaluation, depression and anxiety scores. The researcher's purpose was to examine the relationship between the amount of physical therapy received (as quantified through number of sessions) and changes in depressive symptoms. Data were collected at treatment baseline, ten weeks into treatment, and again 15 weeks into treatment. Pain scores demonstrated statistically significant improvements between each time interval. Depressions scores, however, were significantly different between the first and tenth visit and the first and 15th visit, but did not evidence significantly differences between the tenth and 15th visit (Akkaya et al., 2012). These findings suggest that the benefit of physical therapy for ameliorating depressive symptoms is likely greatest in the early phases of treatment, and further bolsters the need to identify individuals with clinical levels of depressive symptoms as early as possible.

Wideman, Scott, Martel, and Sullivan (2012) also investigated depression over the course of physical therapy in patients with work related musculoskeletal injuries. These researchers tracked a number of predictors hypothesized to be related to problematic outcomes and/or limited recovery as a result of treatment. Data were collected at onset of physical therapy, the midpoint of treatment, and 7 weeks into therapy on parameters including pain, depression, pain catastrophizing, fear of movement and pain self efficacy. At mid treatment depression exhibited at baseline was resolved in 32% of the patients, and at seven weeks this percentage rose to 40.6% of the patients. At the one-year phone follow up individuals who had previously resolved their depressive issues (i.e., treatment responders) were more likely to have returned to work and reported less pain on average in comparison to those individuals who did not reduce their depressive symptoms. Among other conclusions, but most germane to the current study, the authors suggested that these results provide evidence that it may be a realistic goal in physical therapy to reduce depression in some patients (Wideman Scott, Martel, & Sullivan, 2012). Further, and consistent with previous literature reviewed, it appeared that depressive symptoms were closely related to pain and physical functioning differences among physical therapy recipients. Thus, the literature again points to the need to conduct depression screening in these environments.

Finally, George et al. (2011) sought to examine the association between the region of injury, outcomes of physical therapy, and possible moderating factors. The researchers collected information concerning injury type, depressive symptoms, and treatment length (as a proxy for determining treatment effectiveness). As outlined above, higher depressive symptom rates were associated with lumbar and cervical region conditions

and lower rates of depressive symptoms were found in patients with upper extremity and lower extremity conditions. Additionally, higher depression scores were associated with higher pain ratings and lower functional status scores at treatment discharge. Longer treatment time was also predicted by higher depressive scores at treatment baseline (George et al., 2011).

These cumulative interpretation of the research reviewed is to highlight the importance of screening patients for depressive symptoms at the onset of physical therapy, especially in the environment of a rapidly changing health service field. Although the nature and directionality of the relationship between pain, sleep, depression, and physical functioning is not yet clarified, there is enough indication of important associations between these constructs to suggest scrutiny and further study. Several studies examining these ideas in the context of physical therapy in particular have given tangential evidence that association between these constructs may be related to treatment outcome.

Further, if direct access to physical therapists without a physician referral becomes globally available, physical therapists may be the first medical professional that patients encounter. To that end, it is even more critical that professionals working in this area be attuned to mental health symptoms, particularly depression, and gain familiarity with techniques adequate to identify individuals with clinical levels of depressive symptoms. To the degree a simple, freely available, scientifically-supported screening measure could be feasibly integrated into physical therapy, this would advance research and clinical application in the field.

The following study approaches this problem in the context of a physical therapy clinic. It represents a pilot effort to determine 1) the feasibility of implementing a brief screening tool for depression, anxiety, and stress; and 2) a study of the effect of engagement in physical therapy on symptoms of depression, pain, and sleep. The study was conducted in a real-world physical therapy clinic and recruited actual physical therapy patients.

Methods

Participants

Participants were recruited through the physical therapy clinic on the campus of the University of Mississippi. A total of 16 patients were initially included in the study. Six of the participants were not included in the final data analyses because a second survey was not complete. A total of 10 (7 females and 3 males) patients' data were actually used for data analysis. The participants' ages ranged from 19 to 65 years of age ($M = 34.45$, $SD = 18.55$). Of the 10 patients, 6 had lower extremity injuries, 3 had upper extremity injuries, and 1 patient received therapy for injury to her lower back.

Materials

Depression, Anxiety, and Stress Scale, 21-item Version (DASS-21; Lovibond & Lovibond, 1995). Depression, anxiety and stress levels were measured with the Depression Anxiety and Stress Scale-21 (Lovibond & Lovibond, 1995), which is a self-report survey for these constructs. Participants are asked to respond to items in terms of how often a given symptom has been apparent to them in the past week on a 0 – 4-point scale. Higher scores signify larger levels of distress. The DASS has significant research to support its usage, with established subscale reliabilities being shown to be adequate (e.g., Depression: $\alpha = .91$; Anxiety: $\alpha = .81$; and Stress: $\alpha = .89$). Although sample size did not allow for a particularly robust examination of reliability in the current study, the estimation of alpha for the depression scale in the observed data was similarly high ($\alpha = .86$). This was not the case for the other subscales, however, which demonstrated reliability estimates below typically accepted levels for research (Anxiety: $\alpha = .61$; and Stress: $\alpha = .53$). For pedagogical purposes these scales remained a part of the overall

analytic strategy, although results were formulated with the recognition that this lack of reliability in the latter two scales is problematic. Given that the purpose of the research was more focused on depression, however, it was not seen as fully detrimental to understanding the outcome of the study.

Independently Generated Items to assess sleep, pain, and injury type. Along with the DASS 21, questions regarding sleep, pain, and injury type were also included (see Appendix). Patients were asked to rate their pain on the day of their appointment on a scale from 0 – 10 (with 0 meaning no pain and 10 meaning the most pain possible). Additionally, patients were also asked to report the approximate amount of time spent sleeping per night over the preceding week. Finally, participants were also asked to indicate the reason for therapy; that is, the type of injury they incurred or area of dysfunction that led to their presence in the clinic.

Procedure

The University's Institutional Review Board approved all procedures for this applied study. Informed consent was obtained from each participant upon recruitment for the study, which occurred face-to-face in the context of their routine physical therapy appointments at the University of Mississippi Physical Therapy Center on campus. To qualify to participate patients must have been 18 years of age or older and attending physical therapy at the time of the first data collection date. Additionally, given a desire to assess change over time, patients had to have a course of recommended care that entailed at least 4 weeks of additional treatment from the date of baseline assessment. A total of 16 patients were initially approached for participation in the study. All 16 initially agreed to participate, but 6 did not return to the clinic during the post-treatment data

collection. This ultimately yielded a final sample of 10 people who were included in the study. Individuals who agreed to participate and completed baseline questionnaires were then screened for the same variables again 3 weeks later.

Results

As outlined above, only a limited number of cases could be collected in this health service delivery setting. This necessitated a dual form of analysis that included 1) paired *t*-tests comparing the average change over time in depression scores, pain, and sleep, as well as 2) graphical trend analysis of overall averages and individual trajectories from the beginning of treatment to the end. Overall, the results of quantitative analyses were largely non-significant. Depression scores did not significantly change over the measurement period ($t(9) = 1.0$; $p = .34$). Neither did Anxiety ($t(9) = 1.0$; $p = .34$), pain ($t(9) = .48$; $p = .64$), or sleep ($t(9) = -.75$; $p = .47$), although as mentioned above there were issues in the reliability of anxiety measurement that tempered the utility of these data. The sole point of significant change via quantitative analyses was the DASS-21 Stress score ($t(9) = 2.68$; $p = .03$), which indicated a significantly lower value at post than at baseline assessment. In addition to difficulties related to a lack of measurement reliability (noted above), the lack of significant results is potentially related to low power, given that few participants could be recruited. A power analysis indicated that at least 34 participants would have been required to achieve a power of .80 at a moderate effect size ($d = .5$), which is customary to ensure internal validity in scientific research. In the sample gathered observed power was calculated a posteriori to be .47 for Depression and Anxiety and .99 for Stress.

Graphical analysis is presented below, and includes attention to the overall trend for the entire group (Figures 1-4) as well as for individuals (Figure 5). Additionally, several participants in the study endorsed no symptoms of depression at baseline or at post treatment. This represented a fairly significant proportion of the overall sample, thus

creating a floor effect for potential changes in the data over time. As such, another graphical analysis (Figure 4) of depression scores was conducted that included only the individuals endorsing at least 1 symptom of depression at baseline. These graphs demonstrate that although significant results were not found for most parameters in this study (perhaps due to methodological and sample-size issues noted above), there may be a relationship between these constructs that warrants closer study in the future.

Additionally, it should be noted that 100% of patients solicited for participation in the study were receptive, thus yielding at least preliminary evidence that this is a feasible method of screening for numerous variables potentially related to treatment outcome.

Figures

Figure 1

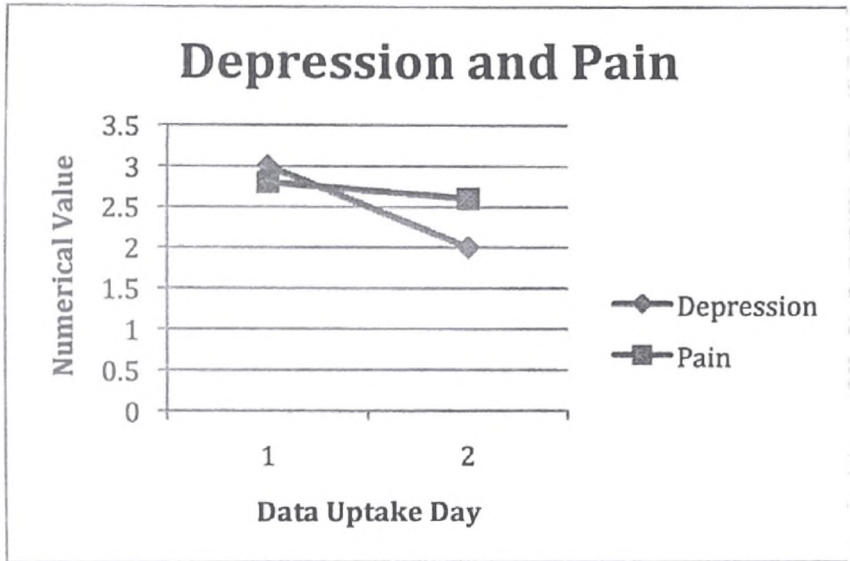


Figure 2

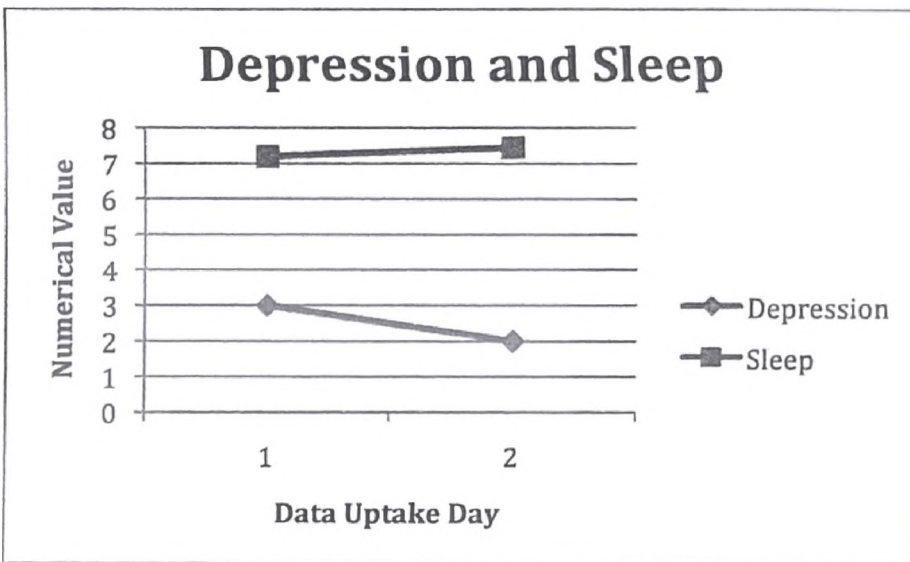


Figure 3

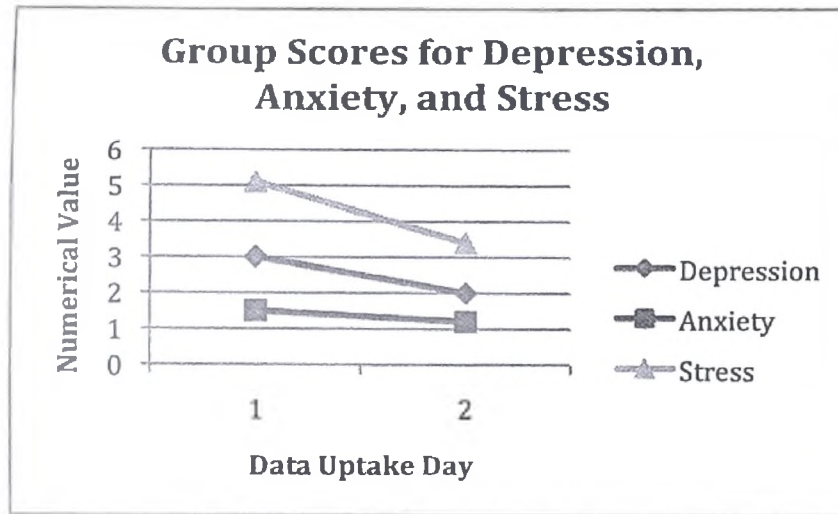


Figure 4

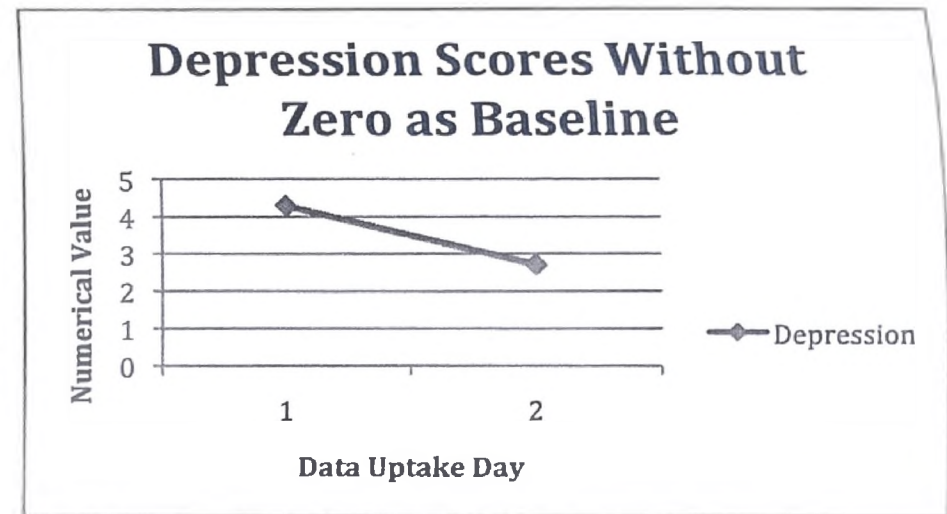
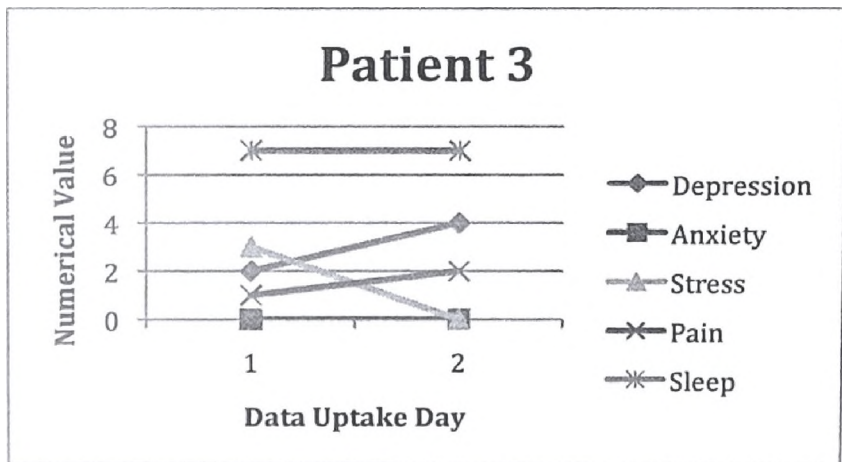
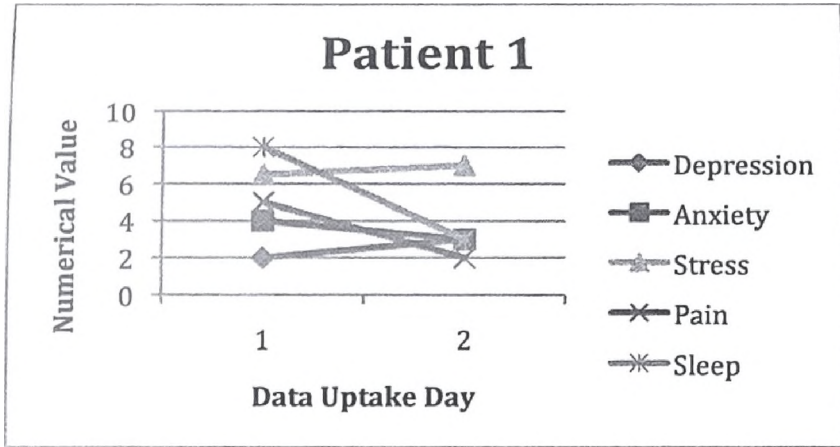
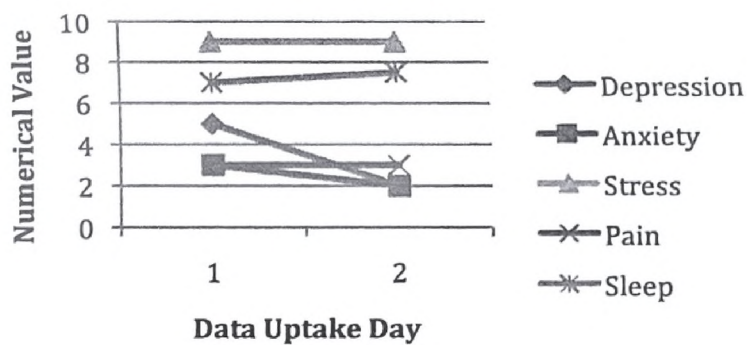


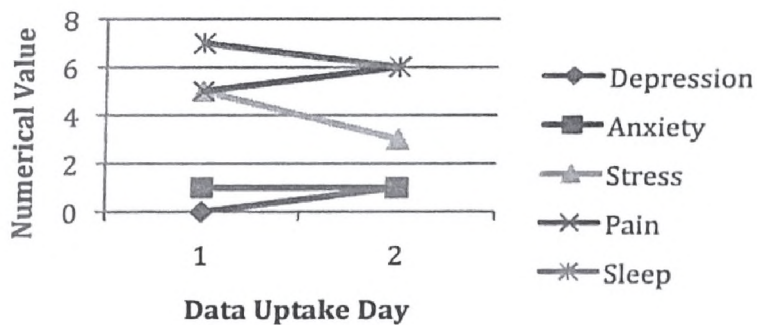
Figure 5



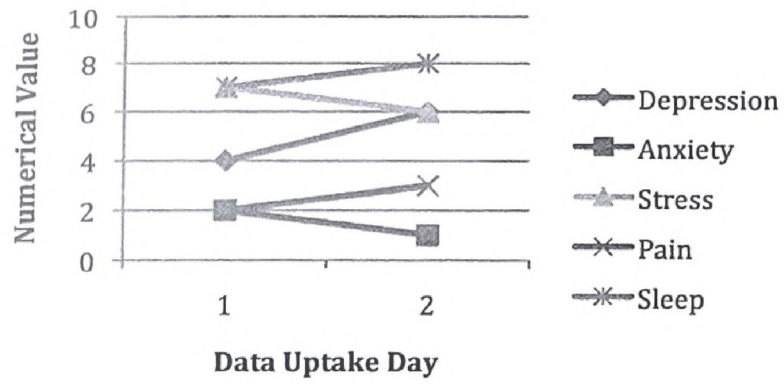
Patient 2



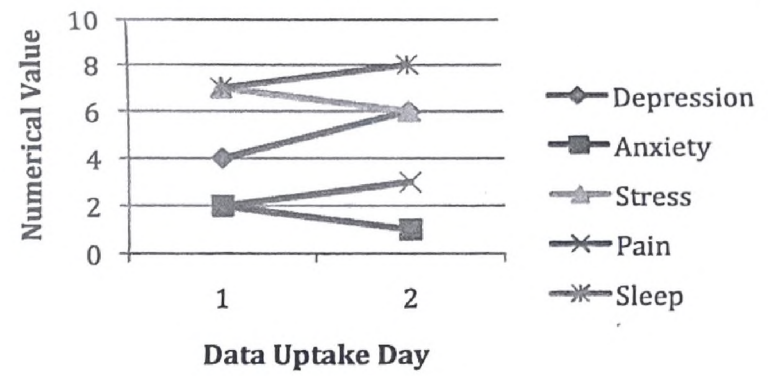
Patient 4



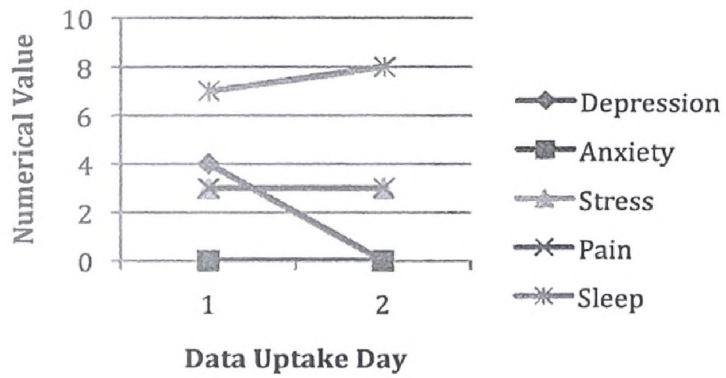
Patient 5



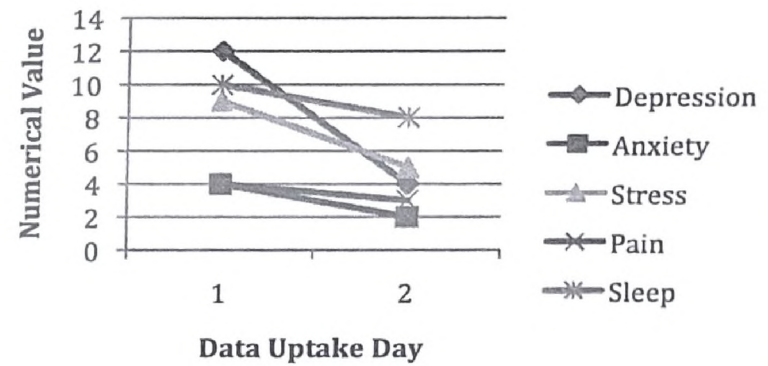
Patient 6



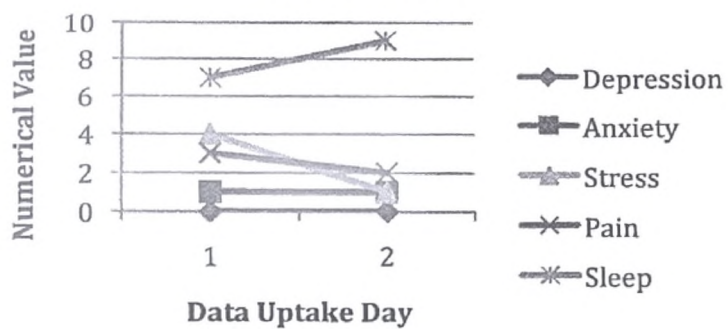
Patient 7



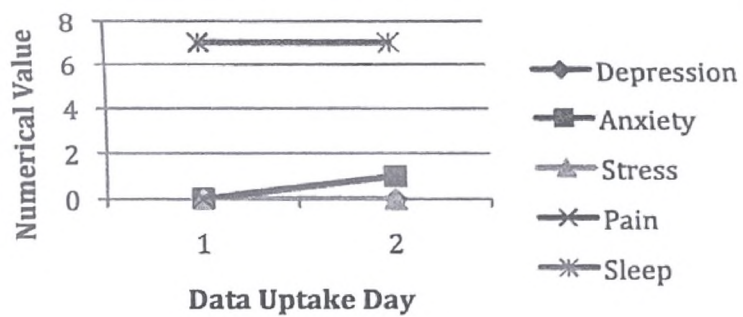
Patient 8



Patient 9



Patient 10



Discussion

Although there were difficulties with this study, the overall conclusion of the piloting effort was to indicate that it is feasible to establish brief mental health screening procedures in the context of physical therapy treatment sessions. As discussed in greater detail below, there was a considerable learning curve to achieving implementation of this procedure that resulted in limited data being collected, but the demonstration that it could work using a strongly scientifically supported instrument to capture symptoms was encouraging. This phase of study, including conceptualization, approaching an applied clinician for cooperation, implementation, and navigation of this environment also led to learning and development on the part of the researcher. In short, it was an eye opening experience that will inform my future career efforts (see below) in a way that is likely to strongly enhance my capability in both research and clinical practice in the future.

In terms of the overall results of the study, it appeared that only stress exhibited a significant change on the basis of statistical comparison. Given the issues related to limited sample size and low power noted above, however, this is not particularly surprising. More germane to understanding and developing future research studies were the results of the graphical analyses. At the group level, depression (the main outcome of interest) showed some change. This was noteworthy, particularly considering the numerous study limitations (see below). When individuals with no endorsement of depressive symptoms were removed from these trend analyses, the differences between pre- and post-treatment measurement became even more pronounced. These assessments via what can be termed an “intra-ocular inspection” (i.e., eyeballing) do not, of course,

substitute for more substantial statistical analyses. They do, however, point the way to interesting potential relationships and encourage building on the current pilot effort using more thorough, well-controlled methods in the future.

It was notable that pain did not appear to decrease appreciably over the course of physical therapy encountered. This was the case when the construct was analyzed via graphical and statistical analysis. Notwithstanding the brief nature of physical therapy intervention between measurement time points, this is a curious effect that may have bearing on future studies. In particular, previous studies showing a decrease in pain in the context of measured depression have often entailed populations of patients in more intense pain and/or with particular types of injury. Attention to these details in future work, including categorization of injury type and affected body area, would help to delineate differences along these dimensions.

Limitations

The first and most obvious limitation of this study was its sample size. The power of the study was minimal due to this limitation, and thus obfuscated the ability of the current examination to find potentially meaningful results comparing patients across time points (i.e., very high potential for Type II error). The reasons for this limited sample size were mainly related to the challenges of conducting data collection in an applied clinical setting, and the difficulties in coordinating controlled research in this environment. For example, patients themselves can be hard to monitor (i.e., missing appointments) and a typical physical therapist's schedule is extremely full. Appointments are usually 30 minutes to an hour, sometimes with overlap of more than one patient in the clinic at a time (as was often the case in this setting). The additional task of soliciting patients,

documenting consent, and administering a survey can be burdensome on a therapist's clinic, and not always a welcome intrusion to work in pursuit of their service delivery goals.

An additional difficulty encountered was related to inconsistencies between individuals in terms of their longevity of treatment at the time of data collection. In the course of physical therapy patients commence session at different times, attend on different schedules of frequency, and stay for a length of time that is not predetermined. One patient whose data were reflected in the current study, for example, had been in therapy for over a year at the time of the baseline measurement. It can be reasonably expected that differences between the pre- and post-treatment measurement for this individual were likely to be much less affected than those for, say, a patient who was assessed during his/her first physical therapy session. Indeed, there is some empirical evidence to support this supposition, in that Akkaya et al. (2013) evidenced change in depression symptoms following patients from session 1 to 10 in a physical therapy clinic, but saw no change in this same variable comparing scores collected during sessions 10 and 15. Given that the timing, variability, and persistence of treatment in the current study were largely unknown, it is likely that this represented a confound in attempting to ascertain change on the basis of physical therapy participation.

Other limitations included the lack of a control group, although this was not feasible given the demands of coordinating activity with a real-world clinic and soliciting patients as they presented for treatment. Likewise, as discussed briefly in the results section, the measure used in to assess anxiety and stress demonstrated reliability well below that typically required for inclusion of research data. Although the depression

subscale of this same instrument did not exhibit problematic responding, the interpretation of anxiety and stress results (and thus conclusions formed on that basis) must be attenuated by these difficulties in measurement. Put another way, data concerning anxiety and stress cannot be trusted, and any discussion of these constructs is tenuous at best.

Future research would do well to address these limitations and incorporate knowledge gained through this pilot effort in an applied setting. In particular, planning for significantly more time than might be perceived as necessary to set up procedures and plan data collection on the front end would be very useful. The gap between research-focused activities and service delivery environments is high, and preparation to ensure that all parties are “on the same page” prior to implementing study procedures would enhance efficiency and promote data collection among a larger group of people. Additionally, the preferred method of data collection would be to follow patients from their initial physical therapy contact to the completion, taking measurements of key constructs at every point along the way. This would enable much more robust statistical analysis and could have facilitated less need to discard data on the basis of a single missing measurement point. As outlined above, however, this sort of data collection would be very difficult to manage in a crowded clinic, and could even be at odds with the first suggestion offered for future studies. Additionally, it would be interesting to track patients from multiple clinics to determine if the role of setting had any impact on their improvement (or lack thereof) over the course of treatment. Finally, introduction of a control group would significantly elevate the methodology employed in the current study. This could also be difficult, however, in that an appropriate comparison group would also

entail individuals with injuries or dysfunction that would place them into physical therapy being randomized to a wait list. Both the selection of said group and the ethical difficulties associated with randomization when this could result in deleterious effects for those receiving waitlist assignment are problematic.

Career Implications

I have plans to attend Texas Women's University in the fall to begin working toward my doctorate of physical therapy and possibly enter into a fast track program to earn my Ph.D. in physical therapy. This experience has allowed me be aware of more than a patient's presenting physical injuries. In thinking about the implications of what I read and what I learned over the course of study I was very surprised to find that I will not be required to take any health psychology electives to earn a DPT. This is the case even though research exists to indicate that psychological factors such as depression can affect overall outcome of the therapy, the rate of such symptoms is high, and major physical therapy professional organization's directives that the field should be adapting to integrate attention to these issues. Additionally, as a doctoral student I will be required to complete a study on our own the last two years of the program, and my learning during the course of this project will guide nearly complete changes to the way I approach study in an applied setting in the future. I will likely be interested in expanding on this pilot effort in the future, with attention to similar mental health screening methods. As the structure of healthcare changes medical professionals must compensate to fill the needs of their new roles. The current field lacks the necessary screening measures to assist those with potentially damaging levels of depression or to understand the impact of physical therapy services on emotional symptoms. After this experience I feel even

stronger about the importance of accurate screening tools to help patients achieve a higher overall level of health in a time effective manner, and will work to hold these considerations in mind throughout the course of my graduate education.

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APPENDIX

DASS21

Name:

Date:

Please read each statement and circle a number 0, 1, 2 or 3, which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

- 0 Did not apply to me at all
- 1 Applied to me to some degree, or some of the time
- 2 Applied to me to considerable degree, or a good part of time
- 3 Applied to me very much, or most of the time

1	I found it hard to wind down	0	1	2	3
2	I was aware of dryness of my mouth	0	1	2	3
3	I couldn't seem to experience any positive feeling at all	0	1	2	3
4	I experienced breathing difficulty (eg. excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5	I found it difficult to work up the initiative to do things	0	1	2	3
6	I tended to over-react to situations	0	1	2	3
7	I experienced trembling (eg. in the hands)	0	1	2	3
8	I felt that I was using a lot of nervous energy	0	1	2	3
9	I was worried about situation in which I might panic and make a fool of myself	0	1	2	3
10	I felt that I had nothing to look forward to	0	1	2	3
11	I found myself getting agitated	0	1	2	3
12	I found it difficult to relax	0	1	2	3
13	I felt down-hearted and blue	0	1	2	3
14	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15	I felt I was close to panic	0	1	2	3
16	I was unable to become enthusiastic about anything	0	1	2	3
17	I felt I wasn't worth much as a person	0	1	2	3
18	I felt that I was rather touchy	0	1	2	3
19	I was aware of the action of my heart in absence of physical exertion (eg. sense of heart rate increase, heart missing a beat)	0	1	2	3
20	I felt scared without any good reason	0	1	2	3
21	I felt that life was meaningless	0	1	2	3

On average how many hours did you sleep per night in the past two weeks?

On a scale of 0 to 10, how would you rate your pain today? (0 being no pain and 10 being the most pain)

Briefly describe the type of injury you have/the reason for therapy.

How many weeks have you been in therapy? _____

Methods

Participants

Participants were recruited through the physical therapy clinic on the campus of the University of Mississippi. A total of 16 patients were initially included in the study. Six of the participants were not included in the final data analyses because a second survey was not complete. A total of 10 (7 females and 3 males) patients' data were actually used for data analysis. The participants' ages ranged from 19 to 65 years of age ($M = 34.45$, $SD = 18.55$). Of the 10 patients, 6 had lower extremity injuries, 3 had upper extremity injuries, and 1 patient received therapy for injury to her lower back.

Materials

Depression, Anxiety, and Stress Scale, 21-item Version (DASS-21; Lovibond & Lovibond, 1995). Depression, anxiety and stress levels were measured with the Depression Anxiety and Stress Scale-21 (Lovibond & Lovibond, 1995), which is a self-report survey for these constructs. Participants are asked to respond to items in terms of how often a given symptom has been apparent to them in the past week on a 0 – 4-point scale. Higher scores signify larger levels of distress. The DASS has significant research to support its usage, with established subscale reliabilities being shown to be adequate (e.g., Depression: $\alpha = .91$; Anxiety: $\alpha = .81$; and Stress: $\alpha = .89$). Although sample size did not allow for a particularly robust examination of reliability in the current study, the estimation of alpha for the depression scale in the observed data was similarly high ($\alpha = .86$). This was not the case for the other subscales, however, which demonstrated reliability estimates below typically accepted levels for research (Anxiety: $\alpha = .61$; and Stress: $\alpha = .53$). For pedagogical purposes these scales remained a part of the overall