Abstract

Chronic pain affects approximately 16% to 36% of Canadian adults and is one of the most common reasons for physician visits in Canada. The effects of a self-referral community-based education/exercise program (Y-PEP) on physical function and well-being were initially evaluated in 20 individuals with chronic pain who had attended one of three Y-PEP sessions in 2007. The 10-week program incorporated chronic pain education/self-management and various exercise modalities to allow individuals with chronic pain to try different physical activities in a safe and supported environment. Questionnaires were administered pre-, post-program, and at 10-weeks follow-up and provided data on demographic information, physical activity levels, depression, pain perception, and pain catastrophizing. Maximal activity levels and adjusted activity levels increased 7% and 10% respectively at post-program, but only the adjusted activity levels remained elevated at the 10-week follow-up. No significant changes occurred in any of the other outcome measures, however, the extent to which maximal and daily activity increased was significantly correlated with greater improvements in the extent to which pain interfered with one’s life (r=0.45) and with pain catastrophizing (r=0.45). These latter two improvements were significantly associated with greater decreases in depression score (r=0.50). Overall, these findings suggest that a community-based program for individuals with chronic pain can improve physical function and psychosocial well-being. Further effort is required to establish such programs in communities for individuals with chronic pain.
Co-Authorship

Dr. C. King-VanVlack is the graduate supervisor and Dr. R. Dubin is the family physician who was instrumental in the development of the Y-PEP program. M. Thurgood collected the majority of the data and was responsible for the analysis and interpretation in this thesis. Chapter 3 was prepared with input from the co-authors and two MScPT students, Angela Lagerlof and Meghan Rashotte, who assisted with data collection through part of 2007.
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Chapter 1

Introduction

Chronic non-cancer pain (CNCP) is defined as pain that persists for more than 3 to 6 months which may or may not be associated with chronic pathology (Lubkin and Larson, 2006). Throughout this thesis the term chronic pain is synonymous with CNCP. Chronic pain is a prevalent and disabling condition that is poorly recognized, poorly treated and has a poor functional prognosis. Meana, Cho and DesMueles (2004) found that approximately 16% of Canadians 12 years of age and older suffer from chronic pain, with women more commonly affected. Another study reported that the incidence of chronic pain ranges from 16-36% across Canada, where 88% have moderate to severe pain (Boulanger, Clark, Squire, Cui & Horbay, 2007). In South-eastern Ontario, Tripp, Van Den Kerkhof and McAlister (2006) found a prevalence of 17% for chronic pain which was described as highly interfering and disabling pain, where health care visits and medications increased with the intensity of pain. Currently, only 40% of primary care physicians believe that chronic pain is well managed (Erikson, Sjogren, Bruera, Ekholm, and Rasmussen, 2006). One possible reason may be that both patients and physicians are hesitant to use opioid-based medications, due to possible side effects and the possibility of abuse or misuse of the medication (Erikson et al., 2006).

Chronic pain is one of the most common reasons for physician visits in Canada; individuals with chronic pain require more time per visit, spend more time in hospital and make greater use of other health care services (LeFort, Gray-Donald, Rowat, & Jeans, 1998). The causal nature of chronic pain is difficult to identify. In many instances the
pathology that initiated the pain has been resolved and yet the pain continues. This dichotomy between the presence of pain yet no measurable pathology has caused a shift in research from etiology to treatment (Meyer and Lemley, 2000). It is rare to achieve absolute and sustained relief of pain. Therefore, the goal of rehabilitation is to manage pain and to optimize physical function to enhance an individual’s participation in daily activities.

The Biomedical Model addresses the physical processes of a disease and views health as the absence of disease and pain. It does not take into account the role of social factors or individual subjectivity (Steen and Haugli, 2000). Therefore, the Biomedical Model alone does not provide adequate management of this multi-faceted condition. The psychosocial impact of chronic pain must also be addressed, since individuals with chronic pain report more feelings of deep distress, hopelessness, and despair (LeFort et al., 1998). Chronic pain affects all areas of life and results in disability, psychological distress, muscular deconditioning and weakness that affect functional ability and quality of life (van Kouil et al., 2007). Daily activities become difficult to accomplish and productivity diminishes. For some individuals, continued employment may not be possible (Sullivan, Stanish, Waite, Sullivan, & Tripp, 1998). Social support may disappear over time as family and friends become frustrated and lose patience with a problem that appears to be invisible and endless (Meana et al., 2004). As pain is a subjective experience, it can only be assessed indirectly, through the individual’s verbal and behavioural communication (Geertzen, Van Wilgen, Schrier & Dijkstra, 2006). Many people have experienced negative encounters with both society and the medical system, leading to feelings of self-doubt, disempowerment and shame which prohibit constructive
and open communication regarding their pain experience (Holloway, Sofaer-Bennett & Walker, 2007).

Self-management and/or exercise interventions have been commonly used to lower pain and increase physical function in individuals with CNCP. Self-management programs have resulted in improvements in physical ability (Goeppinger, Armstrong, Schwartz, Ensley, & Brady, 2007; Mead, Theadom, Byron, & Dupont, 2007), psychological distress (Mead et al., 2007; Wigers, Stiles, & Vogel, 1996), and pain (Goeppinger et al., 2007; Wigers et al., 1996). Exercise interventions have resulted in improvements in pain (Chatzitheodorou, Kabitsis, Malliou, & Mougios, 2007; Wigers et al., 1996), psychological distress (Chatzitheodorou et al., 2007; De Jong et al., 2003), energy (Wigers et al., 1996), physical ability (Chatzitheodorou et al., 2007; De Jong et al., 2003; Gowans et al., 2001; Wigers 1996), and well-being (Gowans et al., 2001).

Despite the need for specialty pain clinics and/or programs, access can be limited by the referral process, location, and cost (Mead et al., 2007; Meana et al., 2004). Community-based programs, as defined as those programs available in the community that do not require a physician referred, use exercise, self-management or a combination of both, may be an alternative strategy to improve access for individuals for the management of chronic pain. These programs are often offered in a group format which encourages peer interactions and socialization that help to counter-act feelings of depression and isolation (Boutaugh et al., 2003). Community-based programs have been found to lower pain and dependency on others and improve self-efficacy, resourcefulness, and life satisfaction (LeFort et al., 1998).
In 2006, a community-based program for individuals with chronic pain (Y-PEP) was developed by a team of local health care professionals and individuals from the Kingston Family YMCA. This 12-week education and exercise program incorporated the components of a 6-week Chronic Pain Self-Management program (LeFort, 2000) and a variety of exercise modalities. The intent of the program was to promote pain self-management and to allow individuals with chronic pain to experience a variety of activities in a safe and supportive environment. The initial pilot program consisted of individuals who were selected by the health care professionals on the program team and their colleagues. These individuals, most often severely disabled by their pain, were felt to be in greatest need and therefore most likely to benefit from the intervention. However, the long-term goal was to provide a program where chronic pain sufferers could register for this program without the need of a physician referral. The outcomes of the pilot program were encouraging, as individuals reported a decrease in their rating of worst pain level and an improvement in physical activity level (King-VanVlack et al., 2007). Improvements in participants’ activity levels were associated with greater improvements in depression and a reduction in the perception of the extent to which pain interfered with their lives (King-VanVlack et al., 2007).

The program was slightly modified and reduced to 10-weeks in duration after feedback from the participants and the instructor. It was then offered to the public as a YMCA program (Y-PEP) in 2007 and advertised by placing posters at the YMCA, physiotherapy clinics, pain specialists’ offices, and advertising on television, thus meeting the program team’s goal of a self-referral program. In 2008, the program was offered with the addition of a 1-hour weekly drop-in session for 10-weeks after completion of the
program. The intent of the drop-in sessions was to continue to provide a supportive environment which encouraged individuals to continue exercises that they found beneficial through the program.

The purpose of the current study was to determine the effects of this self-referral community-based program on physical function, depression, pain level and pain catastrophizing in individuals with chronic pain. It was hypothesized that following completion of the program, individuals would have an improved level of physical function and sense of well-being as evidenced by a reduced level of depression, a decrease in the perception of pain and the extent to which pain interfered with their daily life, and less pain catastrophizing. In the current study, sense of well-being is used as a general term that encompasses sensory, emotional and cognitive domains of chronic pain. Since most improvements at post-program in the 2006 pilot program were not maintained in the 12-week follow-up period, we also hypothesized that the benefits of the program on physical function, depression, and perceived sense of well-being that were observed at completion of the program would be sustained at 10-weeks after the completion of the program by the introduction of a weekly drop-in session during this time.
Chapter 2
Literature Review

2.1 Physical Function/Physical Activity in Chronic Pain

Chronic pain is the most common reason for disability in Canada (Bizier et al., 2006); 74% of the people with disabilities in the labour force suffer from chronic pain (Williams, 2006). According to the 2006 Participation and Activity Limitation Report Survey 11.7% of the Canadian population, 15 years and older, reported disabilities due to pain. There is also a sex difference in the population where women with disabilities related to mobility, pain or agility represented approximately 13% of the Canadian population, whereas men only represented 9%. These rates not only increase with age, but the sex difference also continues to increase with age. Pain and discomfort is the most common reason for activity limitation for the working-age population, with disabilities affecting three out of four persons (Bizier et al., 2006). Therefore, approximately 1.8 million working-age Canadians experience pain and discomfort-related disabilities (Bizier et al., 2006).

The most common outcome measures used to determine physical function/ability are either self-report questionnaires or specific physical function tests. There are a number of physical function tests that can assess physical capacity. Walk tests are commonly used to assess endurance capacity, since they indicate an individual’s ability to undertake daily activities or their functional limitations (Enright et al., 2003). Normative values of the maximum distance walked in the 6-minute walk test (6MWT) range from
494 m to 689 m in healthy individuals (Teramoto et al., 2006) and approximately 344 m in older adults (Enright et al., 2003). In chronic pain populations, these values vary substantively. In the fibromyalgia population, values may be low as 331 m and as high as 495 m (Gowans et al., 2001; Gowans, DeHueck, Voss, & Richardson, 1999; Mannerkorpi, Nyberg, Ahlmen, & Ekdahl, 2000; King et al., 2002). Values reported for the 6MWT in the arthritis population ranged from 351 m to 374 m (Callahan et al., 2008). Others have used the 5-minute walk test (5MWT), where an average normative value for healthy individuals is 518 m (Simmonds et al., 1998). In the chronic low back pain (CLBP) population, 5MWT values vary from 200 m to 413 m (Walsh et al., 2003; Ryan, Gray, Newton, & Granat, 2008; Cunha et al., 2002). Other walk tests include the 50-foot walk test, where individuals are asked to walk as fast as possible for 25 feet, turn, and walk quickly back to the starting point (Cunha et al., 2002). In healthy populations, it has been completed in 8.1 to 8.4 seconds (Simmonds et al., 1998). In the arthritis population, a value of 9.5 s has been reported (Bilek, Venema, Camp, Lyden, & Meza, 2005), and values from 10.54 s to 10.64 s have been found in the CLBP population (Cunha et al., 2002; Ryan et al., 2008).

Other performance tests to evaluate physical ability include those such as the timed sit-to-stand tests and load reach tests. In healthy individuals, sit-to-stand tests (5 repetitions) can be completed in 7.0 s to 7.4 s (Simmonds et al., 1998), but takes much longer (13.3 s) in the CLBP population (Cunha et al., 2002). During loaded-reach tests, individuals hold an object while reaching forward without taking a step, and the distance reached forward is measured in centimeters. Individuals with CLBP can reach 60.54 cm while holding 4.5 kg (Cunha et al., 2002) compared to 67.27 cm to 67.80 cm reached by
healthy individuals while holding 5% of their body weight or 4.5 kg (Simmonds et al., 1998).

Self-report measures have been commonly used to assess physical ability/activity or level of disability and can be generic or condition-specific in nature. The Physical Function (PF) and Role Physical (RP) sub-scales from the general SF-36 Quality of Life questionnaire have been used as indicators of one’s physical function. The PF sub-scale, comprised of 10-items, assesses limitations in physical activities, such as walking and climbing stairs. The RP sub-scale, comprised of 4 items, assesses problems with work or other daily activities as a result of physical health (Hopman et al., 2000). Both scales have a maximum score of 100, where higher scores indicate better health. Normative values in the Canadian population are 85.8 and 82.1 for the PF and RP sub-scales, respectively (Hopman et al., 2000). In the fibromyalgia population, the PF sub-scale score ranges from 41.9 to 47.5 and the RP sub-scale from 14.9 to 18.4 (Mannerkorpi et al., 2000; Redondo et al., 2004). Similar scores have been found in the general chronic pain population, where the sub-scales PF and RP were 38.4 to 41.7 and 8.6 to 12.0, respectively (LeFort et al., 1998; Nicholas, Asghari, & Blyth, 2008). In the arthritis population, scores of 64.8 and 49.1 have been reported for the PF and RP sub-scales (Bilek et al., 2005). These scores indicate that there are substantive reductions in physical function in the chronic pain population.

The Canadian Occupational Performance Measure (COPM) is a measure designed to assess an individual's self-perception of difficulties in occupational performance and satisfaction with their performance (Walsh, Kelly, Johnson, & Rajkumar, 2003). In a semi-structured interview, individuals identify up to 5 activities which are important to
them and are difficult to perform. Individuals then score each activity on a scale from 0 to 10, where higher scores indicate greater performance and satisfaction with the activity (Ripat, Etcheverry, Cooper, & Tate, 2001). Two scores are derived from this measure; occupation performance and satisfaction with that performance. In the general chronic pain population, normative values for the Performance dimension range from 2.6 to 4.0 and range from 1.9 to 3.0 for the Satisfaction dimension (Carpenter et al., 2001; Mead et al., 2007). In the CLBP population, the Performance dimension was rated as 3.2, and the Satisfaction subscale was rated 1.6 (Walsh et al., 2003). Again, these findings indicate substantive decline in physical performance.

The Human Activity Profile (HAP) was designed to assess general physical activity level (Daughton & Fix, 1986). The questionnaire consists of 94 activities ranked in ascending order of energy expenditure. For each activity, an individual indicates if he/she is, a) still doing the activity unassisted, b) has engaged in this activity before, but would not perform it now due to his/her condition even if the opportunity arose, or c) if he/she never performed this activity. Two scores are derived from this questionnaire. The Maximal Activity Score (MAS) is the highest number of the activity which the individual is still doing. It can be interpreted as one’s maximal activity level. The Adjusted Activity Score (AAS) is the difference between the MAS and the number of activities below the MAS that the participant no longer performs due to his/her condition. The AAS may be viewed as an indication of a person’s function on a daily basis within his/her maximal limitation. In healthy individuals ranging from 20-79 years of age, the MAS has been reported as 85.3±7.0 and AAS score as 83.2±7.8 (Daughton & Fix, 1986). In populations with chronic conditions, the MAS and AAS values are lower, but more importantly there
is a greater difference between these two values. MAS and AAS values for individuals with chronic pain range from 61.6 to 65.4 and 44.0 to 54.7, respectively (Daughton & Fix, 1986; King-VanVlack et al., 2007; Kung, Gibson, & Helme, 2000). In the arthritis population (n=28), the MAS ranged from 74.6 to 75.6 and the AAS ranged from 67.5 to 67.5 (Bilek et al., 2005).

The Roland-Morris Disability Questionnaire (RMDQ) is a self-report measure that has been used to measure disability, where a maximum score of 24 indicates greater disability. In the chronic pain population, the range in disability score has been reported as 12.2 to 13.0 (n=256, n=4897) (Ersek, Turner, Cain, & Kemp, 2008; Nicholas et al., 2008). In individuals with CLBP, the disability scores have ranged from 10.0 to 14.4 (Chatzitheodorou et al., 2007; Johnson et al., 2007; Ryan et al., 2008) or was reported as 76 out of a maximal score of 100 where the Likert modification version of the RMDQ was used (Walsh et al., 2003). The Disability sub-scale of the Health Assessment Questionnaire (HAQ) has also been used to measure the restrictions on daily activities caused by the individual’s illness. The Disability sub-scale has a maximum score of 3, which indicates a high level of disability and is calculated by adding the 8 component scores and dividing by the number of components (Ripat et al., 2001). In the elderly with arthritis the disability score has been reported as 1.03 (Callahan et al., 2008) and ranged from 0.63 to 0.70 in individuals with osteoarthritis of the knee (Yip et al., 2007).

The Fibromyalgia Impact Questionnaire (FIQ) is a self-report measure composed of 10 sub-scales, which evaluate the impact of fibromyalgia on all aspects of an individual’s life (Mannerkorpi et al., 2000). The FIQ was designed specifically for individuals with fibromyalgia, but the questionnaire has been used in other chronic pain
populations. The Physical Function sub-scale ranges from 0 to 10, where higher scores indicate greater levels of disability (Burckhardt, Clark, & Bennett, 1991). In the fibromyalgia population, the Physical Function sub-scale scores range from 3.2 to 5.9 (Burckhardt et al., 1991; Gowans et al., 1999; Mannerkorpi et al., 2000). Surprisingly, lower values (1.3 to 1.6) have been reported in the chronic pain population (Redondo et al., 2004).

The Western Ontario and McMaster Universities (WOMAC) Index of Osteoarthritis (OA) is a disease-specific questionnaire which contains a physical function sub-scale that assesses the degree of difficulty in performing daily activities such as walking, rising from chairs and household chores (Martire et al., 2006). Items may be rated on a 10-point scale or with respect to the total score of the 17 items on a 0 to 4 rating scale (maximum of 68) where greater scores indicate greater difficulty (Angst, Aeschlimann, & Stucki, 2001). Individuals with OA of the hip and knee scored 4.81 on a 10-point scale (Angst et al., 2001), while those with generalized OA scored 25.1 out of a score of 68 (Martire et al., 2006).

The Oswestry Disability Index is a 10-item self-report measure specifically designed to assess the impact of back pain on an individual’s activities of daily living. Individuals must indicate their level of functioning or disability for each statement regarding personal care, lifting, walking, sitting, standing, sleeping, sexual activity, social life and pain intensity. The maximum score of 100 indicates a high level of disability and a score of 0 indicates no disability (Turk, Okifuji, Sinclair, & Starz, 1998). In the healthy population, a normative score of 10.2 has been reported (Fairbank & Pynsent, 2000), but in the CLBP population scores have ranged from 23.1 to 24.6 (Frost, Lamb, Klaber
Moffett, Fairbank, & Moser, 1998). The Oswestry Disability Index has been used in other chronic illness populations. Scores of 41.33 and 21.3 to 26.5 have been observed in individuals with fibromyalgia (Turk et al., 1998) and chronic pain, respectively (Gatchel et al., 2002).

2.2 Psycho-social Issues with Chronic Pain

Psycho-social issues associated with chronic pain span a vast range of topics in the literature. However, the most common measures include pain catastrophizing and fear avoidance beliefs, depression and anxiety, and self-efficacy. Pain catastrophizing is the exaggerated and negative orientation toward pain, characterized by magnification, helplessness, pessimism, and rumination (Buenaver, Edwards, & Haythornthwaite, 2007; Buer & Linton, 2002). Self-efficacy is defined as an individual’s belief or level of confidence in his/her ability to perform specific behaviors under specific circumstances (Bandura, 1977).

2.2.1 Pain Catastrophizing and Fear Avoidance Beliefs

Pain catastrophizing affects several dimensions of the chronic pain experience, including an individual’s pain perception, emotional distress, perceived disability, and employment status. Sullivan and D’Eon (1990) found that individuals with CLBP (n=101) and neck pain (n=24) who reported frequent catastrophizing also demonstrated higher levels of depression and perception of pain severity.

In a later study, Sullivan et al., (1998) examined the effects of pain catastrophizing on pain intensity and disability in individuals with soft-tissue injuries (n=86) which
resulted in back and neck pain. The Pain Catastrophizing Scale (PCS) consists of 13 items describing different thoughts and feelings about pain and the individual must indicate the degree the statement applies to them on a 5-point scale (0-4). The questionnaire includes a total score (maximum= 52) and 3 sub-scales; rumination, magnification and helplessness (Sullivan et al., 1998). Higher scores of catastrophizing were moderately correlated with greater pain intensity, higher levels of perceived disability and greater likelihood of unemployment. Regression analysis revealed that catastrophizing contributed to the prediction of disability ($r^2= 0.38$) more than that by pain intensity ($r^2= 0.32$); catastrophizing was significantly associated with disability ($r= 0.55$) independent of depression and anxiety levels. These data suggest that individuals who have a tendency to catastrophize about their pain experience face more challenges returning to work after injury. The three subscales of the PCS contributed significantly to the prediction of disability ($r^2=0.24$). Of these sub-scales, the rumination scale was most strongly associated with disability ($r^2= 0.38$); suggesting that interventions which assist an individual in avoiding excessive focus on their pain may reduce catastrophizing and promote rehabilitation.

Severeijns, Vlaeyen, van den Hout, and Weber (2001) found similar results in individuals with chronic pain (n=211). Catastrophizing was a strong predictor for pain intensity ($r^2= 0.30$), disability (pain interference: $r^2= 0.43$, life control: $r^2= 0.48$), psychological stress ($r^2= 0.54$) even after controlling for physical impairment. No correlation was found between physical impairment and pain catastrophizing.

Sex differences have also been found between catastrophizing, pain and pain behaviors. Women (n=96) who reported higher levels of osteoarthritis (OA) pain and
disability, exhibited more pain behavior than men (n=72). Catastrophizing also mediated the relationship between sex and pain-related outcomes, such as pain intensity, disability and pain behavior (Keefe et al., 2000). These data suggest that women may experience higher levels of OA pain than men since they are more likely to respond to their pain by catastrophizing. Catastrophizing mediated sex-pain relationships after controlling for depression which suggests that catastrophizing might have unique effects on pain behavior that are not explained by depression.

The term ‘fear-avoidance’ has been used to describe the fear-avoidance model of exaggerated pain perception (Buer & Linton, 2002). Specifically, there are two extreme responses to pain; the adaptive response, where the individual is more likely to confront the pain and not to catastrophize leading to recovery and the non-adaptive response, which includes catastrophizing and avoidance which can lead to a vicious cycle of disuse, disability, and depression (Buer & Linton, 2002). Catastrophizing was examined in the pain-free or non-chronic spinal pain population (n=917). Catastrophizing was present at low levels and a dose-response pattern was found, where higher levels of catastrophizing were associated with higher levels of pain reported. Fear-avoidance beliefs and activities of daily living (ADLs) were related, where fear-avoidance beliefs were a risk factor for influencing ADLs (stronger fear-avoidance beliefs, lower activity levels), which was more pronounced than catastrophizing. These results indicate a stronger relationship between fear-avoidance beliefs and level of activity than fear-avoidance beliefs and pain. Therefore, it is possible that fear-avoidance beliefs may encourage an individual into a downward cycle of disuse and decreased activity which can lead to physical deconditioning, resulting in more pain (Nachemson and Jonsson, 2000).
2.2.2 Depression and Anxiety

The experience of pain is often associated with emotional distress, and in many cases the emotional distress associated with the pain is as central to the individual as the physical condition. Depression is one of the most prevalent mental health outcomes associated with chronic pain (Wittink & Carr, 2008); the prevalence of depression ranges from 31% to 100% (Munce & Stewart, 2007). The factors which contribute to the high incidence of depression in individuals with chronic pain are not well understood. Past studies have supported the concept that pain precedes the development of depression, rather than chronic pain being a manifestation of depression (Arnstein, Caudill, Mandle, Norris, & Beasley, 1999). The intensity of pain, frequency of severe pain, and number of painful areas of the body are strong predictors of depression. Functional disability may affect depression, such that people with chronic pain become depressed because they are not able to participate in meaningful or enjoyable activities (Arnstein et al., 1999).

Sex differences in depression also have been noted. In a cross sectional study of individuals (n=131,535) with fibromyalgia, arthritis, back pain, and migraine headaches, the prevalence of major depression in women was twice the prevalence of depression in men. Also, the prevalence of depression in individuals with low pain severity was 8.3% in men and 13.8% in women. The prevalence of depression was greater in those with severe pain and was reported as 19.6% in men and 23.2% for women. Similarly, the rate of depression in those that reported no limitation of participation in activities was 8.0% in men and 11.2% in women. As with pain severity, the prevalence of depression in those in
which most activities were limited was 20.8% in men and 26.7% in women (Munce & Stewart, 2007).

A wide variety of tools have been developed to assess depression in chronic pain conditions. More commonly reported measures include the Fibromyalgia Impact Questionnaire (FIQ) and the Beck Depression Inventory (BDI). The FIQ contains 10-point Visual Analogue Scales (VAS) for depression and anxiety. In the fibromyalgia population, depression and anxiety ratings range from 5.2 to 7.1 and 6.3 to 7.5 respectively, where higher scores indicate a negative impact (Gowans et al., 1999; Redondo et al., 2004). The BDI (version 1) consists of 21-items that assess the cognitive, affective, and somatic factors associated with depression, with a max total score of 63: A score >13 indicates depression and a score >21 indicates major depression. Depression ratings in the fibromyalgia population range from 16.8 to 20.1 (Gowans et al., 2001; Redondo et al., 2004). A similar depression score (16.7) has been reported in the chronic pain population (n=1810) (Nicholas et al., 2008)

Less commonly used measures include the Centre for Epidemiologic Studies Depression Scale, which is an 11-item measure of the symptoms that are associated with depression. Each item is scored from 0 to 3, which indicates how frequent the symptom has occurred in the past week, where higher scores indicate a greater frequency of depressive symptoms (0 to 33). In the arthritis population, the score has ranged from 6.7 to 7.3 (Callahan et al., 2008).

The Geriatric Depression Scale (GDS) is a 30-item self-report measure which assesses depressive symptoms in older persons. A yes or no response is required for each question, with a maximum score of 30; a score ≥11 indicates depression (Ersek et al.,
In the chronic pain population, scores ranged from 8.2 to 11.1 (Ersek et al., 2008), whereas in CLBP a score of 4.8 has been reported (Rudy, Weiner, Lieber, Slaboda, & Boston, 2007).

The Hospital Anxiety and Depression Scale (HADS) is designed to detect the presence of and severity of a mild mood disorder usually found in non-psychiatric patients. The scale consists of 14-items, 7 regarding depression and 7 regarding anxiety. Each item is given a score from 0 to 3 and the scores for each sub-scale are summed and a score of 7 or less indicates non-cases, 8 to 11 indicates doubtful cases, and 11 or more indicates definite cases. Therefore, the maximum score is 21 for depression and 21 for anxiety. In the healthy population (n=1792), the anxiety score, depression score and total score have been reported as 6.1, 3.7 and 9.8 respectively (Crawford et al., 2001). In the fibromyalgia population, anxiety has been reported as 9.96 and depression as 7.65 (Mead et al., 2007).

### 2.2.3 Self-Efficacy

Many studies indicate that while pain intensity has an important impact on an individual’s disability level, there are certain thought patterns, specifically self-efficacy beliefs that affect an individual’s disability level (Arnstein et al., 1999). In the chronic musculoskeletal pain population, low pain self-efficacy is significantly associated with the presence of depressive symptoms (Rahman, Ambler, Underwood, & Shipley, 2004). Pain self-efficacy is also lower in individuals who reported extensive or widespread rather than limited pain (Rhodes, McPhillips-Tangum, Markham, & Klenk, 1999). A possible explanation for this finding may be due to the view of widespread pain as less legitimate
than specific pain with a known cause. This perception may affect an individual’s beliefs regarding their own abilities resulting in lower self-efficacy (Rhodes et al., 1999).

Arnstein et al., (1999) found that in individuals with chronic pain (n=126), those that experienced intense pain had lower self-efficacy and higher levels of depression. Self-efficacy was also found to mediate the relation between pain intensity and disability, which indicates that individuals may become disabled partially due to doubting their own physical ability. Self-efficacy and pain intensity, but not disability level accounted for 32% of the variance in depression levels, suggesting that an individual’s beliefs regarding their abilities, instead of their level of disability, may contribute to their level of depression. Similar studies of self-efficacy have also found that low self-efficacy has been linked to depression (r=-0.25) and self-efficacy scores were lower in housewives and unemployed (Rahman, Reed, Underwood, Shipley, & Omar, 2008). Improvements in self-efficacy after rehabilitation programs have been associated with improved physical function (r=0.24) and lower self-reported pain levels (r=-0.41) (Altmaier, Russell, Feng Kao, Lehmann, & Weinstein, 1993).

Various questionnaires have been used to measure self-efficacy. The Self-Efficacy Scale (SES) contains 11 items which measures an individual’s perceived self-efficacy to manage their pain and other symptoms (LeFort et al., 1998). Each statement is rated using a 10-point scale ranging from 10 (very uncertain) to 100 (very certain). In individuals with chronic pain (n=110), baseline values for self-efficacy were 49.0 and 49.5 in two separate groups (LeFort et al., 1998).

The Arthritis Self-Efficacy Scale is composed of three sub-scales regarding pain, function and other symptoms. Each sub-scale is given a range of 0 to 100, where a higher
score indicates greater self-efficacy (Gowans et al., 2001). In the fibromyalgia population, the sub-scales for pain, function and other symptoms have ranged from 40.1 to 51.6, 54.3 to 67.6, and 41 to 57.9 respectively (Gowans et al., 1999; Gowans et al., 2001).

The Chronic Pain Self-Efficacy Scale is a 22-item questionnaire which consists of a total score and three sub-scales for pain management (5 items), coping (8 items), and physical function (9 items) (Arnstein et al., 1999). Individuals indicate their perceived ability to carry out the specific activity on a 10-point scale from 10 (very uncertain) to 100 (very certain). The score of each sub-scale is the mean response for that scale and the total score is the sum of the 3 sub-scales for a maximum score of 300. In individuals with chronic pain (n=126), the total score has been reported as 143 (Arnstein et al., 1999).

The Pain Self-Efficacy Questionnaire consists of 10 items which measures the strength of the individual’s belief regarding their ability to accomplish various normal activities despite the pain (Asghari & Nicholas, 2001). Each statement is graded on a 7-point scale, where higher scores (i.e. maximum score of 60) indicate greater confidence. Self-efficacy scores in individuals with chronic musculoskeletal pain (n=196, n=354, n=4645) have ranged from 25.5 to 28.0 (Rahman et al., 2004; Rahman et al., 2008; Nicholas et al., 2008).

2.3 Intervention Programs

For many conditions that result in chronic pain, a causal mechanism has not been identified. It is rare to achieve absolute and sustained relief of pain. Therefore, the rehabilitation goal is the management of pain to enhance function in order to optimize participation in daily activities. A combination of pharmacological and non-
pharmacological treatments is the most common treatment plan for pain. Non-pharmacological treatments include self-management and exercise interventions, which have proved to provide benefits by lowering pain perception and increasing the sense of well-being (Mannerkorpi & Henriksson, 2007). Most studies reviewed were randomized controlled trails except for those by Mead et al., (2007) and Kitahara et al., (2006).

Exercise interventions are beneficial in a number of clinical conditions, including that of chronic pain. Chatzitheodorou et al. (2007) compared the effects of high-intensity aerobic exercise (30–50 minutes, 3 times / week) in individuals (n=10) with chronic lower back pain. Pain, disability, anxiety and depression were assessed through the McGill Pain Questionnaire (MPQ), Roland-Morris Disability Questionnaire (RMDQ) and the Hospital Anxiety and Depression Scale (HADS) respectively. At the end of the 12-week study, pain, disability and anxiety/depression decreased by 40%, 30% and 30% respectively (p<0.001), no changes were observed in the control group (n=10). A significant interaction of time and intervention was found indicating that the improvement in the intervention group was greater than in the control group.

The benefits of a 2-year, high-intensity exercise program as compared to usual care (physiotherapy) were examined in patients with rheumatoid arthritis (RA) (n=309) (De Jong et al., 2003). At 24 months, functional ability, as determined by the McMaster Toronto Arthritis (MACTAR) Patient Preference Disability Questionnaire, significantly improved by 6% from baseline in the exercise group, which was significantly greater than that in the control group. Work capacity significantly improved by 8.2±37.1 W in the intervention group but decreased by -6.7±35.2 W in the control group; this difference between the groups was significant. Muscular strength of the knee extensors increased in
both groups but the improvement in the intervention group (26.1±60.9 W) was significantly greater than that in the control group (9.6±52.0 W). The exercise group also demonstrated significantly greater improvements in anxiety and depression (p=0.007), as measured by the HADS, than those in the control group.

A chronic pain community-based psycho-education program for 2 hours/week for 6 weeks found that the treatment group (n=52) had significant improvement (p<0.003) in six of the ten antecedent, mediating and outcome variables as compared to the control group (n=50) (LeFort et al., 1998). Specifically, the treatment group had less dependency on others, decreased severity of the pain problem on their lives, had greater levels of self-efficacy and resourcefulness, more involvement in valued adult role activities and had greater life satisfaction as compared to the control group. Further, the treatment group had significantly greater improvements in the sub-scales Role Physical (153%), Bodily Pain (28%) and Vitality (36%) of the SF-36 as compared to the control group.

After a 4-week pain coping strategy program for chronic pain patients (n=60), depression and anxiety scores significantly decreased by 18% and 15% respectively at the 6-week follow-up compared to baseline (Mead et al., 2007). There was also a 13% decrease in the percentage of participants that met the criteria to be clinically diagnosed with anxiety and depression at reassessment. Improvements in physical ability were also found as indicated by significant increases of 18.5%, 24%, and 33% increases in the 3-minute walk test, sit-to-stand test, and forward-flexion test respectively. Self-perceived occupational performance improved by 30% and satisfaction with occupational performance increased by 64%. While these results are very promising, it is difficult to assign causality to the intervention without a comparable control group.
Gowans et al., (1999) combined exercise and education for 41 subjects with fibromyalgia; 20 who underwent the program and 21 who served as controls. After the 6-week program, the intervention group had significantly greater improvements in the 6-MWT (22%), FIQ fatigue (9%), well-being (18%), and knowledge (15%) as compared to the control group. The control group was later offered the intervention program, and demonstrated similar improvements as above upon completion of the program. The improvements in the 6-MWT and well-being were maintained at the 3-month follow-up in all individuals (initial intervention group and subsequent control group undergoing intervention) who participated in the exercise and education program.

Kitahara, Kojima and Ohmura (2006) reported that of 74 individuals with chronic pain, 72 individuals initially reported that activities of daily living (ADLs) were usually impaired by pain and 39 individuals reported that walk distance was impaired by pain. After a 300-hour inter-disciplinary program, 36 and 40 individuals reported that their walk distance and ADLs, respectively, were no longer impaired. It is difficult to determine if the improvements were a result of the program since a control group was not employed.

A 6-week self-management program with gentle exercises was compared to conventional treatment in patients with osteoarthritis of the knee (n=120) (Yip et al., 2007). At 16-weeks after the program, the intervention group had significantly greater decreases in current pain ratings (-12 mm on a 100 mm Visual Analogue Scale (VAS)) and increases in pain self-efficacy (+7 units) compared to the control group (-2 mm, +1.5 units respectively). The duration of light exercise also increased by 41% from baseline and self-management skills were more frequently used in the intervention group.
Gowans et al., (2001) found that 23 weeks of supervised exercise improved mood and physical function in 51 individuals with fibromyalgia. After the intervention, the cognitive/affective sub-scale and total score for the Beck Depression Inventory increased by 40% and 57% respectively in the exercise group; no change was observed in the control group. The exercise group also had significantly greater improvements in the depression (21%) and positive affect (17%) sub-scale scores from the Mental Health Inventory, and 6-MWT (+75 m) as compared to the control group (-10 m). Pain in the exercise group did not improve after the intervention; however, this could be due to the way it was measured. Tender points were only evaluated based on the presence or absence of pain, a measure which is not sensitive to an increase or decrease of pain.

Another prospective study evaluated the efficacy of an 8-week exercise program, consisting of 45 minutes of land and water-based exercises five times per week, compared to cognitive-behavioral therapy (CBT) in women with fibromyalgia (Redondo et al., 2004). Between group analysis demonstrated an improvement in the FIQ score; the magnitude of which was not different between groups. Anxiety, depression, and self-efficacy did not change in either group and were not different between the groups. At the 1-year follow-up, the amount of physical activity remained elevated from baseline in the exercise group but was not different from that in the CBT group. In contrast, relaxation strategies were still being used by the CBT group at the 1-year follow-up and this was significantly different than in the exercise group. Although participants in the exercise group were instructed to maintain daily exercises at home at the end of the program, not all subjects exercised to the same level of the program which may have affected the results in the exercise group at follow-up.
In a pilot study, individuals (n=17) with chronic low back pain that attended two 40-minute aerobic and strengthening sessions each week for 9 weeks had significantly lower disability scores (p=0.02) than individuals in the psychotherapy group (n=16) (Machado, Azevedo, Capanema, Neto, & Cerceau, 2007). The psychotherapy group received treatment for 80 minutes, twice a week with a group therapist. At the 6-month follow-up, disability, pain and depression scores did not differ significantly between the two groups. This study had a low sample size and the loss of subject data at follow-up may have been a factor in not finding significant differences in the pain, disability and depression scores between these two groups. Since each intervention addressed a different domain of pain, then it may not be surprising to see an improvement with each intervention. Greater improvements may have been observed in a combined intervention group.

A 4.5-year prospective study randomized 60 individuals with fibromyalgia to a stress-management, exercise or control group (Wigers et al., 1996). After the 14-week intervention, pain, tenderness, and depression were reduced by 24%, 25% and 55% respectively in the stress-management group and these changes were greater than those in the control group. At follow-up, 4 years post-program, only reduced tenderness remained, even though subjects had reported that learning relaxation skills were of great benefit. The stress management group had the highest compliance rate, as 69% of subjects continued to use relaxation strategies despite no obvious benefits. Subjects in the aerobic exercise program reported a reduction of 56%, 16%, and 32% in pain distribution, pain score on the Visual Analogue Scale (VAS), and tenderness of tender points respectively which were greater than in the control group. Also, there was an improvement in lack of
energy score and work capacity by 33% and 14% respectively. At follow-up, these improvements returned to baseline, possibly because only 20% of the exercise group continued to exercise at follow-up.

Goeppinger et al., (2007) evaluated the effectiveness of the 6-week Arthritis Self-Help Course (ASHC) and the Chronic Disease Self-Management Program (CDSMP) in patients with arthritis (n=416). At the 4-month follow-up, self-efficacy, general health, self-management behaviours (stretching and strengthening exercises), and minutes of aerobic exercise improved compared to baseline in both the ASHC group (13%, 6%, 39%, 38% respectively) and in the CDSMP group (14%, 18%, 7%, and 14% respectively); no differences were observed between groups. However, the CDSMP produced greater improvements in pain and disability reduction (p=0.002) as compared to the control group.

Overall, past studies have found exercise, education, and self-management programs to be beneficial for individuals with musculoskeletal pain, neck and back pain, fibromyalgia, and arthritis. Specifically, pain perception decreased between 24% to 40%, disability scores improved between 6% to 30%, physical function improved anywhere from 15% to 33%, and emotional well-being was enhanced between 11% to 30%. Improvements in these areas vary between the past studies, which can be attributed to the variety of measurement tools, chronic pain conditions, duration and types of intervention programs.

In summary, chronic pain affects a large percentage of the Canadian population and can result in disability, psychological distress, muscular deconditioning and weakness (van Kouil et al., 2007). Physical ability, assessed through physical tests or self-report
measures, in the chronic pain population has been found to be substantially lower compared to healthy individuals. There are many psycho-social issues associated with chronic pain. The most common issues include pain catastrophizing and fear-avoidance beliefs, depression and anxiety, and self-efficacy. Pain catastrophizing has been found to affect pain perception, emotional distress, perceived disability, and employment status. Fear-avoidance beliefs have been related to lower activity levels and may encourage an individual into a downward cycle of disuse and physical deconditioning. Depression is the most prevalent emotional issue in the chronic pain population. Currently, the factors that contribute to depression are not well understood, although depression has been found to be related to pain intensity, pain frequency, and the number of painful sites. Self-efficacy has been associated with depression, disability and pain intensity. Chronic pain is most commonly managed through a combination of pharmaceutical agents, CBT and exercise. Previous studies have reported intervention programs that employ exercise or CBT alone or in combination are beneficial in the chronic pain population.
Chapter 3

The Effects of a Community-Based Education/Exercise Program on Physical Function and Well-Being in Individuals with Chronic Pain

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3.1 Abstract:

The effects of a self-referral community-based education/exercise program (Y-PEP) on physical function and well-being were determined in 20 individuals with chronic pain who had attended one of the Y-PEP sessions in 2007. The 10-week program incorporated components of chronic pain self-management and a variety of exercise modalities which would allow individuals with chronic pain to try different physical activities in a safe and supported environment. Questionnaires that provided data on demographic information, physical activity levels (Human Activity Profile), depression, pain perception, and pain catastrophizing were completed at pre-, post-program and at 10-weeks after the program (follow-up). Maximal activity levels and daily activity levels increased 7% and 10% respectively at post-program, but only the daily activity levels remained elevated at the 10-week follow-up. No significant changes occurred in any of the other outcome measures, however, the extent to which daily activity increased was significantly correlated with greater improvements in the extent to which pain interfered with one’s life (r=0.45) and with pain catastrophizing (r=0.45). These latter two improvements were significantly associated with greater decreases in depression (r=0.50). These findings suggest that a community-based program for individuals with chronic pain can substantively improve physical function and psycho-social well-being.

3.2 Perspective:

These findings indicate that participation in a community-based program which incorporates both exercise and principles of self-management can significantly enhance
the daily activity levels in individuals with chronic pain which in turn may influence mood, pain perception, and the extent to which they catastrophize about their pain.

3.3 Introduction

Chronic Non-Cancer Pain (CNCP) is a prevalent and disabling condition that is poorly recognized, poorly treated and has a poor functional prognosis. Approximately 16% of the Canadian population, 12 years of age and older, suffer from chronic pain, where women are more commonly afflicted (Meana et al., 2004). Tripp et al., (2006) found a prevalence of 17% for highly interfering disabling pain in South-eastern Ontario, where health care visits and medications increased with the intensity of pain. CNCP is one of the most common reasons for physician visits in Canada (LeFort et al., 1998). Patients require more time per physician visit, report more feelings of deep distress, hopelessness and despair, and use more time in hospital and other health services (LeFort et al., 1998). Long-term consequences include disability, psychological distress, muscular deconditioning and weakness which affect functional ability and quality of life (van Kouil et al., 2007). Social support may disappear over time as family and friends become frustrated and lose patience with a problem that appears to be invisible and endless (Meana et al., 2004).

The Biomedical Model alone does not provide adequate management of this multi-faceted condition. The goal of rehabilitation is to manage pain and to improve function to perform daily activities. Self-management and/or exercise interventions have been commonly used to lower pain and increase physical function for individuals with CNCP. Self-management programs have found improvements in physical ability (Goeppinger et al., 2007; Mead et al., 2007), and pain (Goeppinger et al., 2007; Wigers et
al., 1996). Exercise interventions have resulted in improvements in pain (Chatzitheodorou et al., 2007; Wigers et al., 1996), psychological distress (Chatzitheodorou et al., 2007; De Jong et al., 2003; Gowans et al., 2001), energy (Wigers et al., 1996), physical ability (Chatzitheodorou et al., 2007; De Jong et al., 2003; Gowans et al., 2001; Wigers et al., 1996), and well-being (Gowans et al., 2001).

Access to specialty pain clinics can be limited by the referral process, location, and cost (Mead et al., 2007; Meana et al., 2004). Community-based programs may be an alternative strategy to improve access for individuals for the management of chronic pain. Usually these programs are offered in a group format which encourages peer interactions and socialization that help to counter-act the feelings of depression and isolation (Boutaugh, 2003). Community-based programs have been found to lower pain and dependency on others and improve self-efficacy, resourcefulness, and life satisfaction (LeFort et al., 1998).

In 2006, a team of local health care professionals and individuals from the Kingston Family YMCA developed a community-based program for individuals with chronic pain (Y-PEP). This was a 12-week education and exercise program which incorporated components of a 6-week Chronic Pain Self-Management program (LeFort, 2000) and a variety of exercise modalities which would allow individuals with chronic pain to try different physical activities in a safe and supportive environment. The intent of the program was to provide information with peer-support in order to help individuals cope with chronic pain. Further, the introduction to a variety of exercise modalities would enable individuals to identify and safely try those activities which do not exacerbate their pain. In this way, it was hoped that individuals would continue with activities of their
choice upon completion of the program. Finally, the team wished to provide a program for any chronic pain sufferers, where individuals could register without the need of a physician referral. However, the offering of the initial pilot program consisted of individuals who were selected by the health care professionals on the program team and their colleagues. These individuals were most often severely disabled by their pain and thus felt to be in greatest need of this intervention and therefore, most likely to benefit from it. The outcomes of the pilot program were encouraging as individuals reported a decrease in their rating of worst pain and an improvement in physical activity level. Improvements in participants’ activity level were associated with greater improvements in depression and a reduction in the perception of the extent to which pain interfered with their lives (King-VanVlack et al., 2007).

Following feedback from the participants and the instructor, the program was slightly modified and reduced in duration to 10 weeks because participants in the pilot sessions felt that it started to get ‘stale’ in the last 2 weeks. It was then offered to the public as a YMCA program in 2007 through standard YMCA program advertisement and by placing posters at physiotherapy clinics, pain specialists’ offices, and family physicians’ offices. The program team’s goal of self-referral was met by removal of the necessity of a physician referral for registration in the program. The purpose of the current study was to determine the effects of this self-referral community-based program on physical function, depression, and perceived sense of well-being in individuals with chronic pain. It was hypothesized that following completion of the program, individuals would have an improved level of physical function and sense of well-being as evidenced
by a reduced depression level, a decrease in the perception of pain and the extent to which it interfered with their daily life, and a decrease in pain catastrophizing.

3.4 Methods

3.4.1 Participants
In 2007, participants were recruited from individuals enrolled in the Y-PEP program. To register for the program, participants had to be 18 years of age or older, have had chronic pain for at least 6 months, be under physician management, have the capacity to tolerate sitting for short periods of time, and be able to provide informed consent. Each potential registrant was provided with a screening package which required the individual to have medical clearance to participate (Physical Activity Readiness Medical Examination (PARmed-X) completed by a physician). The PARmed-X is a standard screening requirement for any individual registering for a YMCA program associated with a clinical population. Individuals who were frail elderly, had pure neuropathic pain or spinal cord injury, had an active substance abuse disorder, presented with severe depression or active psychosis, or had a physical disability sufficient to limit mobility were not accepted for registration in Y-PEP. These criteria were established by the program team but were also reviewed by the family physician.

During the first session, one of the investigators explained the outcome measures for the study and Y-PEP participants were invited to take part in this research project. It was emphasized that this study which was determining the physical and psycho-social
outcomes of the program was entirely separate from the actual Y-PEP program and participation was entirely voluntary. Once an individual indicated interest in participation, he/she was provided with the Informed Consent Form, which he/she then reviewed and signed. All measures and the informed consent form were approved by the Queen’s University Health Sciences Research Ethics Board.

3.4.2 Outcome Measures

a) Demographic Information

All participants completed a demographic questionnaire to provide information regarding their age, height, weight, level of education, marital status, and employment status. The condition responsible for the participants’ pain, other existing medical conditions, previous pain treatments, current medications and any side effects of these medications were also reported. The information was provided by self-report and no information was collected from participant medical records.

b) Human Activity Profile (HAP)

The HAP was designed to assess general physical activity level (Daughton & Fix, 1986). The questionnaire consists of 94 activities ranked in ascending order of energy expenditure. The participants were required to indicate for each activity, a) if they are still doing the activity unassisted, b) if they have engaged in this activity before, but would not perform it now due to their condition even if they had the opportunity, or c) if they never performed this activity. Two scores were derived from this questionnaire. The Maximal Activity Score (MAS) is the highest number of the activity which the individual is still
doing while Adjusted Activity Score (AAS) is the difference between the MAS and the number of activities below the MAS that the participant no longer performs due to his/her condition. The MAS can be envisioned as the maximal activity energy limitation (functional limitation) imposed by the chronic pain. The AAS provides a better indication of one’s ability to function on a daily basis within this maximal limitation. In healthy individuals ranging from 20-79 years of age, there is minimal difference between the MAS (85.3±7.0) and AAS score (83.2±7.8) (Daughton & Fix, 1986). In individuals with chronic conditions, both the MAS and AAS values are lower, but more importantly there is a greater divergence between these two values. MAS and AAS values for chronic pain patients (n=83) have been reported to be 63.3±13.1 and 51.6±16.2 respectively (Daughton & Fix, 1986). The test re-test reliability for the MAS ranges from r=0.76-0.97 and for the AAS ranges from r=0.76-0.97 (Davidson & de Morton, 2007). Validity has been assessed against a variety of physical function outcome measures and has high ratings with other self-report measures (r=0.78-0.80) and moderate ratings with actual physical tests (r=0.51-0.78) (Davidson & de Morton, 2007; Johansen et al., 2001; Tran, Schwarz, German, & Helme, 1997).

c) Brief Patient Health Questionnaire (PHQ) - Depression

The Primary Care Evaluation of Mental Disorder Brief Patient Health Questionnaire (PHQ) was used to determine the level of depression in the participants (Spitzer, Kroenke, & Williams, 1999). The questionnaire provides information on the perceived symptoms of depression, anxiety, somatic complaints, and psychological distress. Due to incomplete responses to other questions by a large number of the participants, only the subset of 9 questions with respect to depression was used for the
purpose of this study. Specifically, participants indicated on a scale of 0 to 3 for each statement regarding depression that in the previous 2 weeks they experience it, “not at all, several days, more than half the days, or nearly every day.” Scores were then categorized on a scale of 0-27 where 0 to 4 indicated no depression, 5 to 9 indicated mild depression, 10 to 14 indicated moderate depression, 15 to 19 indicated moderately severe depression and 20 to 27 indicated severe depression (Spitzer et al., 1999). The PHQ has good agreement with diagnoses by independent mental health professionals.

d) Pain Catastrophizing Scale (PCS)

The Pain Catastrophizing Scale is a self-report questionnaire that measures the extent to which individuals with chronic pain catastrophize about their pain (M. J. Sullivan, Bishop, & Pivik, 1995). Catastrophizing is defined as an exaggerated negative cognitive and affective orientation to pain (D'Eon, Harris, & Ellis, 2004). The questionnaire contains 13 statements that describe different thoughts and feelings that may be associated with pain. Participants were asked to provide a score ranging from 0 to 4 for each statement, where ‘0’ indicates the statement does not apply to them at all, and a score of ‘4’ indicates that the statement occurs all the time. This outcome measure is composed of a total score (maximum=52) and three sub-scales of rumination (maximum=16), magnification (maximum=12), and helplessness (maximum=24) which have been shown to be robust across various clinical populations (D'Eon et al., 2004; Sullivan et al., 2001).

e) Brief Pain Inventory (BPI)

The Brief Pain Inventory is a self-report of the intensity of a participant’s pain experience (sensory dimension) and level of interference of pain in the individual’s life
(reactive dimension) (Cleeland & Ryan, 1994). This tool is a 21-item questionnaire in which participants rate their worst, least, average, and current pain on a scale from 0 to 10, where ‘0’ is no pain and ‘10’ is the worst pain imaginable. In the subsequent 7 items, participants rank the degree to which the pain has interfered with their general activity, mood, walking ability, normal work, relations with others, sleep, and enjoyment of life on a scale from 0 to 10, where ‘0’ indicates that the pain does not interfere and ‘10’ indicates the pain completely interferes with a total maximum score of 70. The BPI also contained questions regarding pain relief, pain quality, and patient perception of the cause of pain but these items were not used as part of the outcomes measures in this study (Cleeland & Ryan, 1994).

### 3.4.3 Protocol

Outcome measures were determined at baseline (pre-program), upon completion of the program (post-program) and at 10 weeks after completion of the program (follow-up). In the earlier pilot study in 2006, the participants indicated that it was uncomfortable for them to complete all of the questionnaires at one time (King-VanVlack et al., 2007). Therefore, the questionnaire packages were distributed to the participants at the first Y-PEP session and they were asked to complete the questionnaires at their leisure and then return them to the investigator at a Y-PEP session the following week. The participants were provided with the contact information for the investigators should they have any questions while completing the forms at home. Similarly, at the end of the program, questionnaire packages were distributed to the participants during the second last week of the program, and completed forms were collected by the investigators at the last session.
of the program. At 10 weeks following the program, questionnaire packages were mailed to the participants. A self-addressed stamped envelope was enclosed in order that the participants could submit their completed forms. If a package had not been received from a participant by 2 weeks after the initially mailing, a follow-up letter was sent.

Program:

Y-PEP is a 10-week self-referral, community-based education and exercise intervention program consisting of two 1.5 hour sessions per week. The education component included information regarding pain, nutrition, and pain management skills. Early in the program, the exercise component consisted of general stretching and relaxation exercises using the Range of Motion (ROM) Dance (LeFort, 2000) and progressed to include a potpourri of aerobic activities (i.e. aquafit, tai chi, yoga, core strengthening, therabands) in latter stages. The exercise component was not an exercise training program but was used to introduce participants to a variety of physical activities in a safe and supportive environment. It was hoped that individuals would be able to identify an activity which did not exacerbate their pain and continue to pursue that activity upon completion of the program. For specific topics and types of exercises performed, please refer to Appendix A.

3.4.4 Data Analysis

Data are reported as means ± standard deviation (SD). Significant changes between pre and post-program for which there were 20 complete data sets were determined using dependent t-test analysis. Significant changes between pre-program, post-program and follow-up measures, for which there were 16 complete data sets, were
determined using a repeated measures of ANOVA and subsequent Bonferroni multiple means analysis. If the test for normality was failed, then the appropriate non-parametric measures were used. A Spearman correlational analysis was performed to determine the presence of significant relationships between changes in the various outcome measures at pre and post-program. Significance was accepted at p<0.05.

3.5 Results

Approximately 30 individuals registered for one of the three Y-PEP sessions offered by the Kingston Family YMCA during 2007. Of those, 27 individuals volunteered to participate in the study. Complete data sets at pre- and post-study were obtained from 20 participants while complete data sets for pre-, post-study, and follow-up were obtained from 16 participants. General demographic descriptors of the 20 participants are listed in Table 3-1. The participants on average were middle-aged with the women being slightly older than the men. The majority of individuals were married. The women reported having either secondary or post-secondary education, while the men only reported having secondary education. Half of the participants were on long-term disability (LTD), 3 were retired, 3 reported self-employment, 1 was unemployed, and 3 were employed full-time (one with short-term disability). All male participants listed lower back pain (usually associated with Degenerative Disk Disease [DDD]) as the primary cause of their pain, 6 individuals reported osteoarthritis, 4 individuals indicated an accident or surgery caused their pain. Others indicated neck and back pain (usually associated with DDD), spinal stenosis and myofascial pain syndrome as the main cause of their pain. Ten other reported primary causes of pain included polymyalgia rheumatica,
polio, tendonitis, fibromyalgia, chronic fatigue, multiple sclerosis, etc. Participants listed several co-morbidities which were sectioned into cardiovascular (n=9), gastrointestinal (n=6), respiratory (n=4) and psychological (n=3) categories. The majority of the female participants listed other co-morbidities that did not fit in the above categories such as insomnia, migraine headaches, plantar fasciitis, hypothyroidism, glaucoma, etc.

The medication data are listed in Table 3-2. Most participants (80%) were taking non-narcotic pain medication, and 65% also reported receiving narcotic pain medication. Narcotic medications included acetaminophen combined with codeine, oxycodone or tramadol, codeine, oxycodone, and morphine in both short and long-acting formulations. Of those individuals taking pain medication, the average number per person was 1.4 for narcotic and 1.7 non-narcotic medications. Few changes in pain medication were observed pre- versus post-study. However, one individual reduced the dosage of acetaminophen with codeine and stopped taking acetaminophen with oxycodone. Another’s codeine dosage was decreased by 36%, while a third maintained the acetaminophen with codeine dosage but stopped taking acetaminophen with oxycodone. One individual increased narcotic pain medication (both dosage and number). Participants also reported numerous other medications including psychotropic, cardiovascular, gastrointestinal (mostly laxatives and antacids) and other medications taken by 40%, 30%, 50% and 60% of the participants respectively.

The mean values ± standard deviations for Maximal Activity Score (MAS) and Adjusted Activity Score (AAS) from the Human Activity Profile are shown in panels A and B respectively in Figure 3-1. In the group of 20 participants (pre/post only) the MAS increased 7.3% (p<0.05) from a starting value of 60.2±15.1. In the group of 16
participants (pre/post/fup) the MAS increased 6.7% (p<0.05) at post-program from a starting value of 57.9±14.1 and remained elevated at follow-up ($x^2=7.13$, DF=2). The AAS score increased 10% and 12% (p<0.05) respectively in the group of 20 and 16 participants respectively (F=4.57, DF=2). Unlike the MAS, the AAS score did not remain significantly elevated at follow-up.

The mean values ± standard deviations for Worst Pain, Least Pain, and Pain Interference from the Brief Pain Inventory are shown in Panels A, B, and C respectively in Figure 3.2. The pre-study values for Worst, Least, and Pain Interference were 7.0±1.9, 4.0±2.4, and 41.0±14.7 respectively in the group of 16 participants (Worst pain: F=1.74, DF=2; Least Pain: F=0.59, DF=2; Pain Interference: F=0.49, DF=2). Pre- and post-program values were not different in the group of 20 participants. These pain ratings did not change significantly over the course of the study.

The mean values ± standard deviations for the total and sub-scale scores for rumination, magnification, and helplessness from the Pain Catastrophizing Scale for all, female, and male participants at pre- and post-program are listed in Table 3-3. The pre-study scores for Total Pain Catastrophizing, Rumination, Magnification and Helplessness did not change significantly at post-program. An unexpected finding was the sex difference in PCS scores; male participants reported higher Total Scores at pre-study than did the female participants. At pre-program the female Total PCS score was only 36% of the maximum possible score, while that in males was 61% of the maximum possible score. No significant changes were observed in the female participants. The total PCS score decreased 9% (p<0.05) in the men but these values were still higher than those in the female participants. In the 16 participants, no significant changes were observed for
any of the PCS scores over the course of the study (Total: $F=0.97$, $DF=2$; Rumination: $F=0.24$, $DF=2$; Magnification: $F=0.54$, $DF=2$; Helplessness: $F=1.35$, $DF=2$).

The level of depression was assessed using the Brief Patient Health Questionnaire. The pre-study value was $9.5 \pm 5.6$ in the group of 20 participants which indicated a mild level of depression (range=5-9) (Spitzer, Williams, & Kroenke, 1999). The depression ratings did not change significantly over the course of the study. There was no difference between values pre-, post- and follow-up in the group of 16 participants ($x^2=0.25$, $DF=2$).

The relationships between the changes in outcome measures (post minus pre) were assessed using a multiple correlation analysis and are depicted in Figure 3-3. Improvements in the MAS were significantly associated with decreases in the Average Pain rating ($r=-0.45$) and Pain Catastrophizing Helplessness scores ($r=-0.50$). Similarly, improvements in the AAS were significantly associated with greater reductions in Pain Interference ($r=-0.45$) and decreases in Pain Castastrophizing Helplessness scores ($r=-0.45$). In turn, the greater the reductions in these two latter scores were associated with greater decreases in depression scores. In general, improvements in functional activity as a result of the Y-PEP program were associated with perceptions that pain interfered less with daily activities and individuals felt less helpless with respect to pain, which in turn were associated with greater improvements in the level of depression.

### 3.6 Discussion

The primary findings of the current study were that participation in a 10-week education/exercise program for chronic pain (Y-PEP) resulted in significant increases in physical activity levels. These improvements were associated with lesser ratings of pain perception and pain catastrophizing, which in turn were significantly associated with
improvements in depression. Further, we identified that a sex difference in pain catastrophizing may exist with men exhibiting greater levels. These data indicate that an exercise/education program can result in significant improvements in physical activity which appears to be inter-related with pain cognition and coping skills. A causal relation has yet to be identified with respect to the complex relationship of physical function, mood and cognition.

The current study found that there was an improvement in the intensity levels of physical activities after completion of the Y-PEP program. The MAS and AAS scores increased by 7% and 10% pre- to post-study, respectively, and at follow-up the MAS remained elevated. For example, if an individual indicated that activity #59 (climb 24 steps) was the highest numbered activity he/she was still doing, then that was the MAS score. A 7% increase would mean this value would increase to activity #63, which is walking 1 mile. This study is the first to use the HAP as an outcome measure to determine changes in the intensity levels of physical activity in patients with chronic pain following an intervention. Our values for the MAS and AAS at the beginning of the study were similar to previously reported values of 63.3±13.1 and 51.6±16.2 respectively for individuals with chronic pain treated at a pain centre (Daughton & Fix, 1986). Other studies which have incorporated education and/or exercise programs for individuals in the general chronic pain population have also found improvements in physical function/activity. Kitahara et al., (2006) reported that of 74 individuals with chronic pain, 72 individuals initially reported that activities of daily living (ADLs) were usually impaired by pain and 39 individuals reported that walk distance was impaired by pain. After participating in 300 hours of a multi-disciplinary education and exercise program
over the course of 8 to 36 weeks, these numbers decreased to 34 and 3 individuals respectively. Substantive improvements in Role Physical (60%-183%) of the SF-36 were observed in individuals with chronic pain who participated in self-management programs ranging in length from 6 to 8-weeks (Ersek, Turner, McCurry, Gibbons, & Miller Kraybill, 2003; LeFort et al., 1998). Finally, a 4–week coping pain strategies program for 31 individuals with chronic pain resulted in 18% and 24% improvements in the 3-minute walk distance and number of sit-to-stands in one minute respectively (Mead et al., 2007).

Other education and/or exercise programs for specific chronic pain populations have shown more variable results in physical function or activity. Gowans et al., (1999) found no change in the physical component of the Fibromyalgia Impact Questionnaire (FIQ) in individuals (n=35) with fibromyalgia who underwent a 6-week education and exercise program. In contrast, 19 individuals with fibromyalgia who underwent an 8-week exercise program demonstrated improvements in upper limb, lower limb and vertebral column physical activity (range of motion, muscle endurance and pain with movement) ranging from 17-29%; no such improvements were observed in a cognitive behavioral therapy (CBT) group (n=21) (Redondo et al., 2004). Reductions in disability of 30% and 20% were found in individuals with lower back pain (LBP) who underwent a 12-week high intensity exercise program (Chatzitheodorou et al., 2007) and a 9-week exercise program (Machado et al., 2007). Improvements of 70% and 15% were reported in the Role Limitation Physical sub-scale and the Physical Component Scale respectively of the SF-36 in 51 individuals with LBP who participated in a 7-week multi-disciplinary education and exercise program. In comparison, there was no change in the 151 participants who received usual care (Lang, Liebig, Kastner, Neundorfer, & Heuschmann,
2003). It would appear that in most cases, exercise programs, exercise and education programs, and self-management programs can significantly impact function or disability in a variety of chronic pain conditions. However, the wide variety of outcome measures used (self-report, physical activity function tests) make it difficult to compare the relative magnitude of change between programs. We prefer using the HAP due to the dual scale properties of this outcome measure. The MAS may be viewed as indicating the extent to which one’s maximal activity level is limited by one’s chronic condition, whereas the AAS may be used as an indication of how a person functions on a daily basis within the maximal limitation. Accordingly, while we would like to improve the participants’ MAS, it may be more important to focus on optimizing function within their maximal limitation (i.e. AAS). We know of no other self-report tool that can provide this type of discernment. Our results indicate a similar magnitude of improvement in both the MAS and AAS with no narrowing of the difference between scores, indicating both were impacted to the same degree.

The pain ratings from the Brief Pain Inventory (BPI) did not change over the course of our study. Results from previous studies have been mixed. In the general chronic pain population, LeFort et al., (1998) reported a 16% and 28% improvement in pain perception and SF-36 Bodily Pain sub-scale respectively after a 6-week self-management program for people with chronic pain. Similarly, the pain intensity score from the Graded Chronic Pain Scale decreased 29% in 22 individuals with chronic pain following an 8-week self-management program compared to individuals that received an education booklet (Ersek et al., 2003). In a later study, Ersek et al., (2008) found no changes in the pain intensity or pain interference scores of the BPI in 114 elderly
participants after a 7-week self-management program. In 74 individuals with chronic pain, 14.9% and 54.1% reported complete relief or almost complete relief of pain, respectively, after a 300 hour interdisciplinary program (Kitahara et al., 2006). In specific pain populations such as LBP, the SF-36 bodily pain subscale improved by 67% (n=51) after a 7-week multidisciplinary program (Lang et al., 2003) and the McGill Pain Scale scores decreased by 40% (n=10) after a 12-week high-intensity aerobic exercise program (Chatzitheodorou et al., 2007). For individuals with Fibromyalgia, no change in the FIQ subscale for pain was observed after a 6-week exercise and education program (n=23) or an 8-week supervised exercise program (n=27) (Gowans et al., 1999; Gowans et al., 2001). In contrast, Redondo et al., (2004) reported that the SF-36 Bodily Pain sub-scale improved by 40% after an 8-week exercise program in individuals with fibromyalgia (n=19) compared to the CBT group. Overall, the majority of self-management programs, exercise programs or combinations of both have been found to improve pain intensity and pain perception in individuals with a range of chronic pain. Although all measures of pain intensity and pain perception are based-on self-report, the wide variety of questionnaires for specific chronic pain populations may contribute to the inconsistency of findings across studies.

While our current study did not find any changes in pain scores, some interesting contrasts were found when compared to the Y-PEP pilot program data (King-VanVlack et al., 2007). In the physician-referred pilot program in 2006, the worst and least pain scores (8.7 ± 0.8, 5.3 ± 1.8 respectively) at baseline were higher compared to those of 7.0±1.9 and 4.0±2.4 respectively in the current study. Following the Y-PEP program, the worst pain score in the pilot group decreased to levels not different than the worst pain scores in
the current study. The baseline MAS and AAS scores were similar in the pilot and current study and similar improvements in these scores were observed post program. The two interesting contrasts in these studies were that (a) higher worst and least pain scores did not translate into worse physical function/activity, and (b) improvements in physical function can occur without changes in pain scores.

There are many other factors that may affect physical function in people with chronic pain. It is possible the level of physical function may be affected by the level of confidence in one’s ability to perform various physical activities. Confidence may be affected by pain catastrophizing or depression level (Buer & Linton, 2002). We did not find any significant changes in either of the above factors post-program. However, significant relationships between changes in physical function, pain perception, pain catastrophizing and depression were found. Specifically, greater improvements in physical function were associated with greater improvements in pain catastrophizing and the extent to which one’s pain interfered with daily life; both of which were associated with greater improvements in depression. These findings are in agreement with those of others who found that pain catastrophizing contributes to heightened disability, greater pain intensity, higher ratings of occupational disability, and greater possibility of unemployment (Sullivan et al., 1998). Catastrophizing has also been found to be associated with high levels of disability, regardless of pain (Sullivan et al., 1998) which suggests that increased levels of physical activity may not be the result of lower pain perception, but rather due to a change in attitude towards managing one’s pain, resulting in an increased confidence in one’s ability to perform a given activity. A strong relationship between depression and pain catastrophizing has also been reported by others.
such that the relationship between coping, measured by the Coping Strategies Questionnaire (CSQ), and depression was primarily accounted for by the association between catastrophizing and depression (Sullivan & D'Eon, 1990). Our findings can only demonstrate that significant relationships are present between improvements in these above variables and cannot assess causality. Further studies are required to determine the nature of the intricate relationship between these cognitive and physical consequences of chronic pain.

In conclusion, the Y-PEP program resulted in significant improvements in physical function in individuals with chronic pain. The improvements in physical function were associated with perceptions that pain interfered less with daily activities and they were less helpless with respect to pain, both of which were associated with greater improvements in the level of depression. The nature of these inter-relationships needs to be addressed in future studies.
3.7 Acknowledgements

We would like to acknowledge the contribution of Angela Lagerlof and Meghan Rashotte; MSc PT trainees who assisted with data collection. We would also like to acknowledge the Kingston Family YMCA personnel for their support and offering of the program. Appreciation is extended to the participants who gave of their time to complete all of the surveys. Finally we would like to acknowledge the instructor, Tarey Gillard, who captured the hearts of all participants. Her compassion and her training as an exercise instructor have been instrumental to the success of the program.
References


Figure 3-1: The Human Activity Profile
The mean values ± standard deviation for the Maximal Activity Score (Panel A) and Adjusted Activity Score (Panel B). PRE, pre-program; POST, immediately post-program; FUP, follow-up at 10 weeks post-program. Histograms on the left represent PRE and POST data from 20 participants. Histograms on the right represent PRE, POST, and FUP data from 16 participants. (*) represents significant difference from PRE value at p<0.05.
Figure 3-2: The Brief Pain Inventory
The mean values ± standard deviation for the Least Pain (Panel A) and Worst Pain (Panel B) and Pain Interference (Panel C). PRE, pre-program; POST, immediately post-program; FUP, follow-up at 10 weeks post-program. Histograms on the left represent PRE and POST data from 20 participants. Histograms on the right represent PRE, POST, and FUP data from 16 participants. (*) represents significant difference from PRE value at p<0.05.
**Figure 3-3: Inter-Relationships between Outcome Measures**

Schematic depiction of the significant relationships (p<0.05) between changes in outcome measures pre- versus post-program. $r$, Spearman Correlation Co-efficient (BPI, Brief Pain Inventory; PCS, Pain Catastrophizing Scale; AAS, Adjusted Activity Score; MAS, Maximal Activity Score).
Table 3-1: Participant Demographic Information

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**PRIMARY CAUSES OF PAIN**

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**CO-MORBIDITIES**

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Values for Age and Weight are reported mean ± standard deviation. Remaining values represent the number of participants in each category. DDD, degenerative disk disease; FTE, full-time employment; STD, short-term disability; PTE, part-time employment; LTD, long-term disability; R, retired; SE, self-employed; UE, unemployed.
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Values are number of individuals taking the medication. #/person: average # of medications for those who reported taking medications.
Table 3-3: Scores Pre- and Post-Program for the Pain Catastrophizing Scale

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<td>POST</td>
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<td>TOTAL</td>
<td>All</td>
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<td>Females</td>
<td>18.8±9.9</td>
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<td>19.9±10.4</td>
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<td>Males</td>
<td>31.8±7.5</td>
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<td>MAGNIFICATION</td>
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<td>12.4±4.6</td>
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Values are mean ± standard deviation. PRE, start of the program; POST, end of the program; FUP, 10 weeks post-program. (*) represents significant difference from PRE values for the specific outcome measure.
Chapter 4

Summary and Future Directions
The purpose of this study was to examine the effects of a self-referral community-based education/exercise program on physical function and well-being in individuals with chronic pain. It was hypothesized that following completion of the 10-week program, individuals would have an improved level of physical function and sense of well-being as evidenced by a reduced depression level, a decrease in the perception of pain and the extent to which it interfered with their daily life, and a decrease in pain catastrophizing. The program incorporated components of chronic pain self-management and a variety of exercise modalities which allowed individuals with chronic pain to try different physical activities in a safe and supported environment.

The main findings of this study were that following participation in the Y-PEP program, a) participants experienced significant increases in their physical activity without any changes in pain ratings, b) a sex difference in pain catastrophizing where men exhibited greater levels was noted, c) improvements in physical function (MAS and AAS) were associated with improvement in pain catastrophizing and the extent to which pain interfered with ones activities; both of which showed positive correlations with improvements in depression.

Comparison of the data from the 2006 pilot study, 2007 Y-PEP sessions revealed an interesting trend. In the physician-referred pilot program in 2006 and the Fall 2008 program, participants reported higher worst and least pain scores at baseline compared to the scores reported in the 2007 Y-PEP sessions. The worst pain scores in the 2006 and 2008 groups decreased to levels similar to the scores in the 2007 group. Interestingly, the baseline scores for the MAS and AAS were similar between all groups and similar levels
of improvements were observed post-program. These findings suggest that the extent of one’s pain perception does not necessarily result in lower physical function and improvements in physical function can occur without changes in pain perception. Each group experienced similar levels of limitations and improvements in physical function, despite reporting different levels of least and worst pain, and/or changes in pain level.

Past studies that have incorporated education and/or exercise have also found improvements in physical function as indicated by either self-report measures or physical function tests (Kitahara et al., 2006; Ersek et al., 2003, Lefort et al., 1998; Mead et al., 2007). Other studies have reported improvements in pain perception (LeFort et al., 1998; Ersek et al., 2003; Kitahara et al., 2006), while other studies have found no change in pain perception (Ersek et al., 2008; Gowans et al., 1999; Gowans et al., 2001). While our results are consistent with previous studies specific to each variable, the new knowledge generated in this investigation is that pain perception and limitations in physical function are not necessarily linked.

In the 2007 program, significant moderate inter-relationships were found. The improvements in physical function were associated with lower ratings of pain and pain catastrophizing, which were associated with improvements in depression. These results suggest that improvements in physical function with an exercise/education program can significantly impact psycho-social and cognitive aspects of pain.

Overall, we found the Y-PEP program to be successful in promoting improvements in physical function and well-being in individuals with chronic pain. This program is different from standard exercise and education pain programs or cognitive-behavioral therapy programs because it is a community-based program in which chronic
pain participants can voluntarily register and not a program created with the confines of the healthcare system with respect to physician referral fee, structure and healthcare facilitators. The program was lead by a fitness instructor who facilitated the discussion to promote participants interacting with each other regarding various aspects of chronic pain, such as the loss of former self, depression, and disability. The results of the study indicate substantive benefits without financial support being required from the healthcare system. It is also an opportunity for individuals to choose to participate in a program rather than being told/referred to a program. Promotion of community-based program such as Y-PEP may offer a valuable resource for individuals with chronic pain. This can be accomplished via the local YMCA or other community agencies that can provide infrastructure for the program (i.e. an instructor, facilities, resources).

The primary limitation of this study was the small number of participants. Typically, each Y-PEP session was limited to a maximum of 15 individuals to encourage peer interaction. Many participants choose not participate in the research component of the program due to issues related to chronic pain (i.e. legal issues with employment compensation too much to cope with, etc). Further, of those who volunteered to participate in the study, complete data sets were only available from approximately 50% of these individuals.

Future directions of the study include increasing the number of participants through offering the Y-PEP program at multiple community centers, which will also increase access to programs for individuals with chronic pain. Data collection should continue to determine the extent to which the program has increased physical function and well-being in individuals with chronic pain.
A second hypothesis was that benefits of the program on physical function, depression and perceived sense of well-being that were observed at completion of the program would be sustained at 10-weeks after the completion of the program by the introduction of a weekly drop-in session during this time. This hypothesis was driven by the findings of the 2006 pilot program in which improvements that occurred upon completion of the program were not maintained at 12-weeks post-program. Unfortunately, this hypothesis was unable to be tested due to situations beyond the control of the investigators. Initially, the drop-in sessions were scheduled to occur during the spring and the fall YPEP programs during 2008. Unfortunately, the format of the YPEP program in the spring was changed without prior consultation with the investigators making it impossible to collect any data from this session, nor to introduce a drop-in session in the weeks following the program. The original format of the YPEP program was resumed in the fall of 2008. However, complete data sets were only collected from 5 of the 8 individuals who volunteered to participate in the study; of these 5, only 3 attended the drop-in sessions on a sporadic basis. Accordingly, no concrete statistical analysis could be performed that had any meaningful significance and maintenance of improvement through the 10 weeks post-program could not be adequately assessed. It is recommended that drop-in sessions continue be held in the post-program period in order to adequately assess if such an intervention will maintain improvements that are observed immediately upon completion of the program.
References


Appendix A: Y-PEP 2007 Program Outline
<table>
<thead>
<tr>
<th>Week</th>
<th>Session 1</th>
<th>Session 2</th>
</tr>
</thead>
</table>
| I    | • Introduction of the program  
      • Explanation of the study | • Debunking myths  
      • Introduced Pelvic Floor exercises |
| II   | • Introduction to Chronic Pain  
      • Benefits of exercise  
      • Introduction to goal setting  
      Exercise: Introduced ROM Dance | • Discussed how everyone felt after the exercises from previous session  
      • Introduction to Contracts  
      Exercises: chair exercises, balance exercises and the ROM dance. |
| III  | • Discussed contracts  
      • Pain Management  
      Exercises: chair exercises, balance exercises and the ROM dance. | • Discussed pacing  
      Exercises: chair exercises, balance exercises and the ROM dance. |
| IV   | • Discussed self-talk  
      Exercises: chair exercises, balance exercises and the ROM dance. | • Informal discussion  
      Exercise: Attended Aqua-fit class |
| V    | • Discussed the pain-depression cycle  
      Exercise: Used exercise balls | • Informal discussion  
      • Instructor demonstrated proper use of gym equipment focusing on the treadmill.  
      Exercise: walking on treadmill |
| VI   | Class cancelled | • Causes of fatigue  
      Exercise: Tai Chi demonstrated by an instructor sitting and standing |
| VII  | • Dealing with Anger, Fear and Frustration | Exercise: Option of participating in an Aqua-fit class or using the treadmill/ exercise balls with the instructor. |
| VIII | • Discussed communication skills  
      Exercise: Used exercise balls | • Informal discussion with a chronic pain sufferer who had previously attended the program. |
| IX   | • Presentation given by a nutritionist, discussing the basics of the Canadian Food Guide.  
      Exercise: Instructor lead exercises on the exercise balls | • Reviewed Nutrition and Good Communication  
      Exercise: Instructor lead exercises on the exercise balls |
| X    | • Reviewed the problem solving approach and self-massage.  
      Exercise: using the treadmill with the supervision of the instructor. | • Majority of topics had been discussed.  
      • Informal discussion varying from problems with medications, food sensitivities, sharing information and discussing the benefits of the program.  
      Exercise: modified Yoga poses (i.e. sitting and standing) were |
<table>
<thead>
<tr>
<th>Week</th>
<th>Session 1</th>
<th>Session 2</th>
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<tbody>
<tr>
<td>Make-up session</td>
<td>• Reviewed different resources beyond the program.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Defined chronic pain and compared to definition made at the beginning of the program.</td>
<td>demonstrated by a Yoga instructor.</td>
</tr>
</tbody>
</table>

80
Appendix B: Questionnaires and Data Forms
PARTICIPANT DEMOGRAPHIC INFORMATION

Age: _______ (yrs)  
Gender  M  F  Circle one

Height_______ (ft) _______ (in)  
Weight_______ (lbs) _________ (Kg)

Highest completed level of education

☐ Elementary School
☐ Secondary School
☐ Post-Secondary School
☐ Post-Secondary School – Graduate (Masters/Doctoral)
☐ Other:_________________________________

Employment Situation:

☐ I am employed
  ☐ Full - time
  ☐ Part - time
☐ I am self - employed
☐ I am unemployed
☐ I am on disability
  ☐ Short - term
  ☐ Long - term
  ☐ Insurance involvement (i.e. WSIB, liability, etc)
☐ I am a student
☐ I am retired

Marital Status:

☐ I am single
☐ I am married
☐ I am divorced
☐ I am separated
☐ I am widowed
☐ I am living in a common law situation
☐ I am single but share accommodation
Medical Information

Name: __________________________________________

What is the primary reason for the cause of your pain?

__________________________________________________________________
__________________________________________________________________

When was this condition first diagnosed?

__________________________________________________________________

Please list any other medical physical conditions that you have

__________________________________________________________________
__________________________________________________________________
__________________________________________________________________

Have you received prior treatment interventions for pain other than medications?

☐ Yes ☐ No

If yes please list (also approximate date if possible)

__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
Please list your medication in the chart below indicating the name, dosages, what the medication is for, and if you experience any side effects.

<table>
<thead>
<tr>
<th>NAME OF MEDICATION</th>
<th>DOSAGE (amount &amp; number of times per day)</th>
<th>What is this medication used for? i.e. pain, heart, etc</th>
<th>Do you experience any side effects? If so, please list</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>
**HUMAN ACTIVITY PROFILE**

The list of items describe common activities that people do in their daily lives.

Use the following instructions in making your responses:

Place an X in the column marked **Still Doing This Activity** if:
- you completed the activity unassisted the last time you had the need or opportunity to do so.

Place an X in the column marked **Have Stopped Doing This Activity** if:
- you have engaged in the activity in the past, but you probably would not perform the activity today even if you had the opportunity.

Place an X in the column marked **Never Did This Activity** if:
- you have never engaged in the specific activity.

<table>
<thead>
<tr>
<th></th>
<th>Still Doing This Activity</th>
<th>Have Stopped Doing This Activity</th>
<th>Never Did This Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Getting in and out of chairs (without assistance)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Listening to the radio</td>
<td></td>
<td></td>
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<tr>
<td>3.</td>
<td>Reading books, magazines or newspapers</td>
<td></td>
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<tr>
<td>4.</td>
<td>Writing letters, notes</td>
<td></td>
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<tr>
<td>5.</td>
<td>Working at a desk or table</td>
<td></td>
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<tr>
<td>6.</td>
<td>Standing (for more than 1 minute)</td>
<td></td>
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<tr>
<td>7.</td>
<td>Standing (for more than 5 minutes)</td>
<td></td>
<td></td>
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<tr>
<td>8.</td>
<td>Dressing or undressing (without assistance)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Getting clothes from drawers or closets</td>
<td></td>
<td></td>
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<tr>
<td>10.</td>
<td>Getting in or out of a car (without assistance)</td>
<td></td>
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<tr>
<td>11.</td>
<td>Dining at a restaurant</td>
<td></td>
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<tr>
<td>12.</td>
<td>Playing cards / table games</td>
<td></td>
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<tr>
<td>13.</td>
<td>Taking a bath (no assistance needed)</td>
<td></td>
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<tr>
<td>14.</td>
<td>Putting on shoes, stockings, or socks (no rest or break needed)</td>
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<tr>
<td>15.</td>
<td>Attending a movie, play, church event, or sports activity</td>
<td></td>
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<tr>
<td>16.</td>
<td>Walking 30 yards (27 metres)</td>
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<tr>
<td>17.</td>
<td>Walking 30 yards (27 metres) non-stop</td>
<td></td>
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<tr>
<td>18.</td>
<td>Dressing/undressing (no rest or break needed)</td>
<td></td>
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<tr>
<td>19.</td>
<td>Using public transportation or driving a car (99 miles / 160 km or less)</td>
<td></td>
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<tr>
<td>20.</td>
<td>Using public transportation or driving a car (100 miles / 160 km or more)</td>
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<tr>
<td>21.</td>
<td>Cooking your own meals</td>
<td></td>
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<tr>
<td>22.</td>
<td>Washing or drying dines</td>
<td></td>
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<tr>
<td>23.</td>
<td>Putting groceries on shelves</td>
<td></td>
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<tr>
<td>24.</td>
<td>Ironing or folding clothes</td>
<td></td>
<td></td>
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<tr>
<td>25.</td>
<td>Dusting/polishing furniture or polishing a car</td>
<td></td>
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<tr>
<td>26.</td>
<td>Showering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27.</td>
<td>Climbing 6 steps</td>
<td></td>
<td></td>
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<tr>
<td>28.</td>
<td>Climbing 6 steps non-stop</td>
<td></td>
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<tr>
<td>No.</td>
<td>Activity</td>
<td>Still Doing This Activity</td>
<td>Have Stopped Doing This Activity</td>
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<tr>
<td>29.</td>
<td>Climbing 8 steps</td>
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<tr>
<td>30.</td>
<td>Climbing 12 steps</td>
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<tr>
<td>31.</td>
<td>Walking ¼ block on level ground</td>
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<tr>
<td>32.</td>
<td>Walking ½ block on level ground non-stop</td>
<td></td>
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<tr>
<td>33.</td>
<td>Making a bed (not changing sheets)</td>
<td></td>
<td></td>
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<tr>
<td>34.</td>
<td>Cleaning windows</td>
<td></td>
<td></td>
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<tr>
<td>35.</td>
<td>Kneeling, squatting to do light work</td>
<td></td>
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<tr>
<td>36.</td>
<td>Carrying a light load of groceries</td>
<td></td>
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<tr>
<td>37.</td>
<td>Climbing 8 steps non-stop</td>
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<tr>
<td>38.</td>
<td>Climbing 12 steps non-stop</td>
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<tr>
<td>39.</td>
<td>Walking ½ block uphill</td>
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<tr>
<td>40.</td>
<td>Walking ¾ block uphill non-stop</td>
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<tr>
<td>41.</td>
<td>Shopping (by yourself)</td>
<td></td>
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<tr>
<td>42.</td>
<td>Washing clothes (by yourself)</td>
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<tr>
<td>43.</td>
<td>Walking 1 block on level ground</td>
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<tr>
<td>44.</td>
<td>Walking 2 blocks on level ground</td>
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<tr>
<td>45.</td>
<td>Walking 1 block on level ground non-stop</td>
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<tr>
<td>46.</td>
<td>Walking 2 blocks on level ground non-stop</td>
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<tr>
<td>47.</td>
<td>Scrubbing (floors, walls, or cars)</td>
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<tr>
<td>48.</td>
<td>Making a bed (changing sheets)</td>
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<tr>
<td>49.</td>
<td>Sweeping</td>
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<tr>
<td>50.</td>
<td>Sweeping (5 minutes non-stop)</td>
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<td>51.</td>
<td>Carrying a large suitcase, or bowling (one game)</td>
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<td>52.</td>
<td>Vacuuming carpets</td>
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<tr>
<td>53.</td>
<td>Vacuuming carpets (5 minutes non-stop)</td>
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<tr>
<td>54.</td>
<td>Painting (interior/exterior)</td>
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<td>55.</td>
<td>Walking 6 blocks on level ground</td>
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<tr>
<td>56.</td>
<td>Walking 6 blocks on level ground non-stop</td>
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<tr>
<td>57.</td>
<td>Carrying out the garbage</td>
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<tr>
<td>58.</td>
<td>Carrying a heavy load of groceries</td>
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<tr>
<td>59.</td>
<td>Climbing 24 steps</td>
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<tr>
<td>60.</td>
<td>Climbing 36 steps</td>
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<tr>
<td>61.</td>
<td>Climbing 24 steps non-stop</td>
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<tr>
<td>62.</td>
<td>Climbing 36 steps non-stop</td>
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<tr>
<td>63.</td>
<td>Walking 1 mile (1.6 km)</td>
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<tr>
<td>64.</td>
<td>Walking 1 mile (1.6 km) non-stop</td>
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<tr>
<td>65.</td>
<td>Running 110 yards (100 metres) or playing softball/baseball</td>
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<tr>
<td>66.</td>
<td>Dancing (social)</td>
<td></td>
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<tr>
<td>67.</td>
<td>Doing calisthenics (or aerobic dancing (5 minutes non-stop)</td>
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<tr>
<td>68.</td>
<td>Mowing the lawn (power mower, but not a riding mower)</td>
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<tr>
<td>69.</td>
<td>Walking 2 miles</td>
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<tr>
<td>70.</td>
<td>Walking 2 miles non-stop</td>
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<tr>
<td>71.</td>
<td>Climbing 50 steps (2½ floors)</td>
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<tr>
<td>72.</td>
<td>Shovelling, digging or spading</td>
<td></td>
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</table>
**Participant code:**

<table>
<thead>
<tr>
<th></th>
<th>Still Doing This Activity</th>
<th>Have Stopped Doing This Activity</th>
<th>Never Did This Activity</th>
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<tbody>
<tr>
<td>73</td>
<td>Shovelling, digging or spading (5 minutes non-stop)</td>
<td></td>
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</tr>
<tr>
<td>74</td>
<td>Climbing 80 steps (2½ floors) non-stop</td>
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<tr>
<td>75</td>
<td>Walking 3 miles of golfing 18 holes without a riding cart</td>
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<td>76</td>
<td>Walking 3 miles non-stop</td>
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<tr>
<td>77</td>
<td>Swimming 25 yards (23 metres)</td>
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<tr>
<td>78</td>
<td>Swimming 25 yards (23 metres) non-stop</td>
<td></td>
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<tr>
<td>79</td>
<td>Bicycling 1 mile (1.6 km)</td>
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<tr>
<td>80</td>
<td>Bicycling 2 miles (3.2 km)</td>
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<tr>
<td>81</td>
<td>Bicycling 1 mile (1.6 km) non-stop</td>
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<tr>
<td>82</td>
<td>Bicycling 2 miles (3.2 km) non-stop</td>
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</tr>
<tr>
<td>83</td>
<td>Running or jogging ¼ mile (400 metres)</td>
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<tr>
<td>84</td>
<td>Running or jogging ½ mile (800 metres)</td>
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<tr>
<td>85</td>
<td>Playing tennis or racquetball</td>
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<td></td>
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<tr>
<td>86</td>
<td>Playing basketball/soccer (game play)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>87</td>
<td>Running or jogging ¼ mile (400 metres) non-stop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>88</td>
<td>Running or jogging ¼ mile (800 metres) non-stop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>89</td>
<td>Running or jogging 1 mile (1.6 km)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90</td>
<td>Running or jogging 2 miles (3.2 km)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>91</td>
<td>Running or jogging 3 miles (4.8 km)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>92</td>
<td>Running or jogging 1 mile (1.6 km) in 12 minutes or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td>93</td>
<td>Running or jogging 2 miles (3.2 km) in 20 minutes or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td>94</td>
<td>Running or jogging 3 miles (4.8 km) in 30 minutes or less</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**FOR RESEARCH PROJECT STAFF ONLY**

- **MAS** - The most advanced activity marked X in the 1st column ("Still Doing This Activity")
- **Maximum Activity Score (MAS)**
- **Adjustment** - Number of activities marked X in the 2nd column ("Have Stopped Doing This Activity") that are below the MAS level
- **Adjusted Activity Score (AAS)**
  - AAS = MAS - Adjustment

| MAS | Maximum Activity Score (MAS) | Adjustment | Adjusted Activity Score (AAS) |
**Brief Patient Health Questionnaire™ (PHQ-Brief)**

This questionnaire is an important part of providing you with the best health care possible. Your answers will help in understanding problems that you may have. Please answer every question to the best of your ability unless you are requested to skip a question.

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Sex</th>
<th>Female</th>
<th>Male</th>
<th>Today’s Date</th>
</tr>
</thead>
</table>

1. **Over the last 2 weeks, how often have you been bothered by any of the following problems?**

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Several days</th>
<th>More than half the days</th>
<th>Nearly every day</th>
</tr>
</thead>
</table>
   a. Little interest or pleasure in doing things | □ | □ | □ | □ |
   b. Feeling down, depressed, or hopeless | □ | □ | □ | □ |
   c. Trouble falling or staying asleep, or sleeping too much | □ | □ | □ | □ |
   d. Feeling tired or having little energy | □ | □ | □ | □ |
   e. Poor appetite or overeating | □ | □ | □ | □ |
   f. Feeling bad about yourself, or that you are a failure, or have let yourself or your family down | □ | □ | □ | □ |
   g. Trouble concentrating on things, such as reading the newspaper or watching television | □ | □ | □ | □ |
   h. Moving or speaking so slowly that other people could have noticed Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual | □ | □ | □ | □ |
   i. Thought that you would be better off dead, or of hurting yourself in some way | □ | □ | □ | □ |

2. **Questions about anxiety.**

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Somewhat difficult</th>
<th>Very difficult</th>
<th>Extremely difficult</th>
</tr>
</thead>
</table>
   a. In the last 4 weeks, have you had an anxiety attack — suddenly feeling fear or panic? | □ | NO | YES |

If you checked “NO”, go to question #3.

   b. Has this ever happened before? | □ |
   c. Do some of these attacks come suddenly out of the blue — that is, in situations where you don’t expect to be nervous or uncomfortable? | □ |
   d. Do these attacks bother you a lot or are you worried about having another attack? | □ |
   e. During your last bad anxiety attack, did you have symptoms like shortness of breath, sweating, your heart racing or pounding, dizziness or faintness, tingling or numbness, or nausea or upset stomach? | □ |

3. **If you checked off any problems on this questionnaire so far, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?**

<table>
<thead>
<tr>
<th>Not difficult at all</th>
<th>Somewhat difficult</th>
<th>Very difficult</th>
<th>Extremely difficult</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

**Standard Health Assessment Tool:**

**Appendices:** Page 1
4. In the last 4 weeks, how much have you been bothered by any of the following problems?  
   a. Worrying about your health  
   b. Your weight or how you look  
   c. Little or no sexual desire or pleasure during sex  
   d. Difficulties with husband/wife, partner/lover, or boyfriend/girlfriend  
   e. The stress of taking care of children, parents, or other family members  
   f. Stress at work outside of the home or at school  
   g. Financial problems or worries  
   h. Having no one to turn to when you have a problem  
   i. Something bad that happened recently  
   j. Thinking or dreaming about something terrible that happened to you in the past - like your house being destroyed, a severe accident, being hit or assaulted, or being forced to commit a sexual act  

5. In the last year, have you been hit, slapped, kicked or otherwise physically hurt by someone, or has anyone forced you to have an unwanted sexual act?  

6. What is the most stressful thing in your life right now?  

7. Are you taking any medicine for anxiety, depression or stress?  

8. FOR WOMEN ONLY: Questions about menstruation, pregnancy and childbirth.  
   a. Which best describes your menstrual periods?  
      - Periods are unchanged  
      - No periods because pregnant or recently gave birth  
      - Periods have become irregular or changed in frequency, duration or amount  
      - No periods for at least a year  
      - Having periods because taking hormone replacement (estrogen) therapy or oral contraceptive (or does not apply)  

   a. During the week before your period starts, do you have a serious problem with your mood - like depression, anxiety, irritability, anger or mood swings?  
   b. If YES: Do these problems go away by the end of your period?  
   c. Have you given birth within the last 6 months?  
   d. Have you had a miscarriage within the last 6 months?  
   e. Are you having difficulty getting pregnant?
1. Throughout our lives, most of us have had pain from time to time (such as minor headaches, sprains, and toothaches). Have you had pain other than these everyday kinds of pain during the last week?
☐ Yes  ☐ No

2. On the diagram, please shade the area(s) where you feel pain. Put an X on the area that hurts the most.

3. Please rate your pain by circling the one number that best describes your pain at its worst in the past week.

   Pain as bad as you can imagine

4. Please rate your pain by circling the one number that best describes your pain at its least in the past week.

   Pain as bad as you can imagine

5. Please rate your pain by circling the one number that best describes your pain on the average.

   Pain as bad as you can imagine

6. Please rate your pain by circling the one number that tells how much pain you have right now.

   Pain as bad as you can imagine

7. Circle the number that best describes how, during the past week, pain has interfered with your:

   A. General activity
   0 1 2 3 4 5 6 7 8 9 10
   Does not interfere
   Completely interferes

   B. Mood
   0 1 2 3 4 5 6 7 8 9 10
   Does not interfere
   Completely interferes

   C. Walking ability
   0 1 2 3 4 5 6 7 8 9 10
   Does not interfere
   Completely interferes

   D. Normal work (includes both work outside the home and housework)
   0 1 2 3 4 5 6 7 8 9 10
   Does not interfere
   Completely interferes

   E. Relations with other people
   0 1 2 3 4 5 6 7 8 9 10
   Does not interfere
   Completely interferes

   F. Sleep
   0 1 2 3 4 5 6 7 8 9 10
   Does not interfere
   Completely interferes

   G. Enjoyment of life
   0 1 2 3 4 5 6 7 8 9 10
   Does not interfere
   Completely interferes

Educational material provided by Janssen-Ortho Inc.
8. Circle the word(s) that best describe(s) your pain:

- Tingling
- Cramping
- Exhausting
- Radiating
- Boring
- Continuous
- Shooting
- Heavy
- Penetrating
- Stabbing
- Tender
- NAGLING
- Burning
- Splitting
- Excruciating
- Deep
- Piercing
- Unbearable
- Numb
- Aching
- Lancing
- Throbbing
- Cutting
- Growing
- Tearing
- Sharp

9. What pain medications are you currently taking?

________________________________________________________________________
________________________________________________________________________

10. What pain medications have you taken in the past?

________________________________________________________________________
________________________________________________________________________

11. Other methods used to relieve my pain include (please check all that apply):

- Warm compresses
- Cold compresses
- Relaxation techniques
- Distraction
- Biofeedback
- Hypnosis
- Other (please specify) ____________________________

12. In the past week, how much relief have pain treatments or medications provided? Please circle the one percentage that best shows how much relief you have received.

- 0%
- 10%
- 20%
- 30%
- 40%
- 50%
- 60%
- 70%
- 80%
- 90%
- 100%

- No relief
- Complete relief

13. If you take pain medications, how many hours does it take before the pain returns?

- Pain medication doesn't help at all
- 1 hour
- 2 hours
- 3 hours
- 4 hours
- 5 to 12 hours
- More than 12 hours
- I do not take pain medications

14. I prefer to take my pain medications:

- On a regular basis
- Only when necessary
- I do not take pain medications

15. I take my pain medications (in a 24-hour period):

- Not every day
- 1-2 times a day
- 3-4 times a day
- 5-6 times a day
- More than 6 times a day

16. Do you feel you need a stronger type of pain medication?

- Yes
- No
- Uncertain

17. Do you feel you need to take more of the pain medication than your doctor has prescribed?

- Yes
- No
- Uncertain

18. Are you concerned that you use too much pain medication?

- Yes
- No
- Uncertain

If yes, why:

________________________________________________________________________
________________________________________________________________________

19. Are you having problems with side effects caused by your pain medication?

- Yes
- No

If yes, what side effects:

________________________________________________________________________
________________________________________________________________________

20. Do you feel you need to receive further information about your pain medication?

- Yes
- No

21. Medications not prescribed by my doctor that I take for pain are:

________________________________________________________________________
________________________________________________________________________

Notes

________________________________________________________________________
________________________________________________________________________

References:

- Copyright 1991 Charles S. Cleveland, Ph.D.
- Pain Research Group
- Used by permission.
Pain Catastrophizing Scale

<table>
<thead>
<tr>
<th>Name:</th>
<th>Age:</th>
<th>Gender:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>✡Male ✡Female</td>
<td></td>
</tr>
</tbody>
</table>

Everyone experiences painful situations at some point in their lives. Such experiences may include headaches, tooth pain, joint or muscle pain. People are often exposed to situations that may cause pain such as illness, injury, dental procedures or surgery.

Instructions:
We are interested in the types of thoughts and feelings that you have when you are in pain. Listed below are thirteen statements describing different thoughts and feelings that may be associated with pain. Using the following scale, please indicate the degree to which you have these thoughts and feelings when you are experiencing pain.

<table>
<thead>
<tr>
<th>RATING</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEANING</td>
<td>Not at all</td>
<td>To a slight degree</td>
<td>To a moderate degree</td>
<td>To a great degree</td>
<td>All the time</td>
</tr>
</tbody>
</table>

When I'm in pain …

<table>
<thead>
<tr>
<th>Number</th>
<th>Statement</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I worry all the time about whether the pain will end.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>I feel I can't go on.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>It's terrible and I think it's never going to get any better</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>It's awful and I feel that it overwhelms me.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>I feel I can't stand it anymore</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>I become afraid that the pain will get worse.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>I keep thinking of other painful events</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>I anxiously want the pain to go away</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>I can't seem to keep it out of my mind</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>I keep thinking about how much it hurts.</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>I keep thinking about how badly I want the pain to stop</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>There's nothing I can do to reduce the intensity of the pain</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>I wonder whether something serious may happen.</td>
<td></td>
</tr>
</tbody>
</table>