

Aquatic Programs for Individuals with Osteoarthritis and Rheumatoid Arthritis: Self-Reported  
Changes in Activities of Daily Living

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### Abstract

Arthritis is the inflammation of any joint in the body, involving continuous symptoms that are highly variable and dependent on the person. Osteoarthritis and rheumatoid arthritis have been shown to affect a person's ability to be independent in performing activities of daily living, and aquatic therapy has been shown to decrease pain and improve functional abilities. The purpose of this study was to determine the level of self-reported functional improvement in those who continued to participate in a specialized aquatic program in the Puget Sound region or in the Metro Vancouver area of British Columbia.

The effectiveness of such programs was evaluated from the client's point of view by means of a survey distributed to 14 community centers in Washington and British Columbia that offered aquatics programs for people with arthritis. Centers used the Arthritis Foundation Aquatics Program in Washington and the Arthritis Society's Water Works program in British Columbia. A total of 353 surveys were sent to aquatic facilities and 131 (37%) surveys were returned.

Mean Health Assessment Questionnaire score for all respondents was 0.89 (SD = 0.65). Respondents rated their abilities to perform ADLs and IADLs before they started the aquatics program and after they started the aquatics program. There was a statistically significant increase in ability for all areas: dressing ( $p < .001$ ), arising ( $p < .001$ ), eating ( $p = .008$ ), walking ( $p < .001$ ), hygiene ( $p < .001$ ), reach ( $p < .001$ ), gripping/opening things ( $p < .001$ ), and errands/chores ( $p < .001$ ).

The results of this study indicate that a majority of the respondents reported that they were now able to perform the tasks in their daily lives with less difficulty than prior to participating in the arthritis aquatics program, that attending the classes was meaningful to them, and that the classes allowed them to socialize with others who also have arthritis. Occupational therapists may wish to consider referring to an aquatic program when considering treatment options for their clients with arthritis.

Arthritis is the inflammation of any joint in the body and involves continuous symptoms that are highly variable and depend on the person (Brewerton, 1992). According to the Centers for Disease Control and Prevention (CDC), the 2003-2005 National Health Interview Survey (NHIS) indicated that in the United States an estimated 46 million adults (22%) have doctor-diagnosed arthritis and 19 million (9% of all adults) have arthritis and arthritis-attributable activity limitation (CDC, 2009). Based on 2003 NHIS data, an estimated 67 million (25%) adults aged 18 years and older will have doctor-diagnosed arthritis by the year 2030 and an estimated 25 million adults (37%) of those with arthritis will report arthritis-attributable activity limitations. Arthritis can be local or systemic, acute or chronic and the effects are almost always multiple, changing, and unpredictable (Banwell & Gall, 1988). Two of the most common types are osteoarthritis and rheumatoid arthritis.

Osteoarthritis is known by many different names, including degenerative joint disease, osteoarthrosis, hypertrophic arthritis, and degenerative arthritis and occurs most often in older people; however, younger people may get osteoarthritis primarily from prior joint injuries (Arthritis Foundation, 2009; National Institute of Arthritis and Musculoskeletal and Skin Diseases [NIAMS], 2006). The term osteoarthritis is misleading because there is no inflammation of the joint; rather, it is a disorder where the cartilage and bone of a joint deteriorate (Brewerton, 1992). Heberden's nodes and other interphalangeal nodes develop in the joints and are usually painless. Depending on the severity of the osteoarthritis, however, the pain, discomfort, and stiffness can be debilitating (Ehrlich, 1973). Osteoarthritis is a chronic condition characterized by the breakdown of joint cartilage that serves to cushion the ends of the bones, allowing for smoother movement of joints and absorption of the shock of movement (Arthritis Foundation, 2009; NIAMS, 2006). The disappearance of cartilage causes the bones to rub against each other, resulting in stiffness, pain, swelling, and loss of movement and over time, the joint may lose its normal shape (Arthritis Foundation, 2009; NIAMS, 2006). Despite the prevalence of the disease, the cause is still not completely understood and currently there is no cure. Many different

factors play a role in whether or not a person develops osteoarthritis, including age, obesity, injury or overuse, genetics, improperly formed joints, and stresses on the joints from certain jobs and from playing sports (Arthritis Foundation, 2009; NIAMS, 2006).

There are several stages of osteoarthritis (Arthritis Foundation, 2009). First, as one ages, cartilage loses elasticity and is more easily damaged by injury or use. Wear on the cartilage causes changes to underlying bone. The bone then thickens and cysts may occur under the cartilage. Bony growths, called spurs or osteophytes, develop near the end of the bone at the affected joint and pieces of bone or cartilage may float loosely in the joint space. As a result, the joint lining, or the synovium, becomes inflamed due to the cartilage breakdown, causing release of cytokines (inflammation proteins) and enzymes that damage the cartilage further. Deterioration of cartilage can affect the shape and makeup of the joint so that it does not function smoothly, which can mean that a person limps when walking or has trouble going up and down stairs (Arthritis Foundation, 2009). The joint fluid comes to contain insufficient hyaluronan, affecting the joint's ability to absorb shock (Arthritis Foundation, 2009).

Rheumatoid arthritis is the most common type of chronic inflammatory arthritis and the cause is not known. Long-term joint damage can occur and result in chronic pain, loss of function, and disability (CDC, 2009). Rheumatoid arthritis differs from osteoarthritis and is a systemic inflammatory disease which can occur in multiple joints of the body (CDC, 2009; Thompson, 1996). The synovial membrane, which lines the joints, is primarily affected by the inflammatory process, however, this process can also affect other organs (CDC, 2009). The inflamed synovium leads to break down of cartilage and bone in a joint that can cause joint deformity. As a result, pain, swelling, and redness are common symptoms of this disease (CDC, 2009). Rheumatoid nodules are bumps that develop under the skin and may appear in clusters or as a single nodule (Thompson, 1996). The cause of these nodules is not known, however, it is thought that their development is triggered by pressure (Thompson, 1996). Other common symptoms include fatigue, stiffness particularly in the morning or when sitting for long

periods of time, weakness, flu-like symptoms, occurrence of flares followed by remission, muscle pain, loss of appetite, depression, weight loss, anemia, and cold or sweaty hands and feet (Arthritis Foundation, 2009; Yasuda, 2001). The damage to the joints can lead to limited range of motion, which results in greater difficulty with daily tasks, such as grasping a fork, combing hair, or buttoning a shirt (Arthritis Foundation, 2009).

Rheumatoid arthritis is believed to be an autoimmune disorder and can arise at any age. Women are two to three times more likely to develop rheumatoid arthritis than men (Arthritis Foundation, 2009; CDC, 2009). According to the Arthritis Foundation (2009), rheumatoid arthritis progresses in three stages. The first stage is characterized by swelling of the synovial lining, causing pain, warmth, stiffness, redness, and swelling around the joint. During the second stage, there is a growth of cells, or pannus, which causes the synovium to thicken. In the third stage inflamed cells release enzymes that may damage the bone and cartilage, which usually causes alterations in joint shape and alignment resulting in decreased movement and increased pain. Rheumatoid arthritis is a chronic disease and frequent flares in disease activity often occur.

The goals of any treatment plan for osteoarthritis or rheumatoid arthritis include controlling pain and other symptoms, improving the ability to function in daily activities, and slowing the progress of the disease (Arthritis Foundation, 2009). Most treatment plans will include a combination of medications, weight control, occupational therapy and physical therapy, joint protection, and exercise (Arthritis Foundation, 2009).

### **Medication and weight control**

Over-the-counter pain relievers can help with symptoms and most doctors initially recommend acetaminophen (Tylenol) because it has fewer side effects than other drugs; however, if pain continues, the doctor may recommend non-steroidal anti-inflammatory drugs (NSAIDs) (aspirin, ibuprofen, and naproxen) which help relieve pain and swelling (Arthritis Foundation, 2009; Ogiela & Zieve, 2009).

Corticosteroids injected directly into the joint can also be used to reduce swelling and pain, however, relief only lasts for a short time (Arthritis Foundation, 2009; Ogiela & Zieve, 2009). Many people use over-the-counter remedies such as glucosamine, an amino sugar that seems to be involved in the formation and repair of cartilage, and chondroitin sulphate, part of a protein that gives cartilage elasticity. There is some evidence that these supplements can help control pain, although they do not seem to cause new cartilage to grow (Arthritis Foundation, 2009; Ogiela & Zieve, 2009). In addition to medications, maintaining a recommended weight can lessen pain by reducing stress on affected joints and specifically helps ease pressure on weight-bearing joints such as the hips, knees, back and feet (Arthritis Foundation, 2009).

### **Occupational therapy, physical therapy, and joint protection**

Osteoarthritis and rheumatoid arthritis can affect a person's ability to do tasks such as bathing, dressing, and walking. Occupational therapists focus on helping people with arthritis engage in meaningful occupations. They help people manage daily activities and can instruct them in ways to perform tasks without putting damaging stress on joints (Arthritis Foundation, 2009). Physical therapists work on strengthening muscles, improving flexibility, and increasing joint mobility as well as specific exercise programs and pain management techniques (Arthritis Foundation, 2009). Both therapies rely on the use of joint protection principles in the context of daily living, mobility, and exercise. Both therapies may also prescribe or fabricate splints and braces in order to stabilize joints and reduce pain and recommend adaptive devices that can help the patient complete tasks more comfortably (Arthritis Foundation, 2009). Joint protection and managing joint pain and damage before they become severe are important and can be achieved by keeping active, pacing activities during the day, knowing when to take breaks, using good body mechanics, using assistive devices when suitable, and organizing and simplifying daily routines (Arthritis Foundation, 2009). Both therapies may use a variety of exercise programs to help people with arthritis maintain mobility and function.

**Exercise**

Exercise is the most effective nondrug treatment for reducing pain and improving movement for a person with osteoarthritis or rheumatoid arthritis. Research has shown that people with osteoarthritis or rheumatoid arthritis can exercise safely (Arthritis Foundation, 2009). Moderate physical activity on a regular basis has been found to decrease fatigue, strengthen muscles and bones, increase flexibility and stamina, and improve the general sense of well-being (Arthritis Foundation, 2009). Van Baar, Assendelft, Dekker, Oostendorp, and Bijlsma (1999) conducted a systematic review of randomized clinical trials on the effectiveness of exercise therapy in patients with osteoarthritis of the hip or knee. They found that effect sizes indicated small beneficial effects on two disability outcome measures, small-to-moderate beneficial effects of exercise therapy on pain, and moderate-to-great beneficial effects on the patient's global assessment. Van Baar et al. concluded that there is evidence of beneficial effects of exercise therapy in patients with osteoarthritis of the hip or knee. They cautioned, however, that the small number of good studies restricted drawing firm conclusions.

**Aquatic therapy**

Aquatic therapy is being defined in this study as specifically designed activities in water by qualified instructors to aid in the restoration, extension, maintenance and quality of function for persons with acute, transient, or chronic disabilities, syndromes or diseases (Aquatic Therapy & Rehab Institute, 2004). The Arthritis Foundation Aquatic Program (Arthritis Foundation, 2009), is a recreational group exercise program that was co-developed with the YMCA of America in 1983 and was updated in 2009. In Canada, The Arthritis Society and a team of health professionals developed a similar program, Water Works, a recreational physical activity program for people with arthritis (The Arthritis Society, 2009). Both programs are conducted in warm water (83-90 degrees Fahrenheit) and can be graded for participants with different ability levels. Although the classes are held in the water, it is not necessary for participants to have good swimming abilities to participate in the basic level of the programs.

Exercises in the basic classes are meant to improve range of motion, muscle strength, and endurance with optional resistance equipment, socialization activities and include an optional moderate-intensity endurance component (Arthritis Foundation, 2009). The Plus version of both programs and optional deep-water exercises supplement the activities in the basic level with more intense endurance-building and muscle-strengthening exercises. The classes meet two to three times per week for six to ten weeks or indefinitely. An eight hour workshop is required to be qualified to teach the classes. Frequently, instructors are fitness or health professionals, such as occupational therapists, although there are no professional requirements beyond the workshop certification.

Submerging in a warm water pool has a number of physical properties that may be beneficial for people with arthritis. The specific heat and thermal conductivity of water results in heat transfer from the warm water to the client's body (Cameron, 2003). The increase in temperature of soft tissues can increase vasodilation and circulation, decrease joint stiffness, and increase range of motion, potentially enhancing functional ability (Cameron, 2003). Buoyancy is an upward force exerted by the water in the opposite direction of the force of gravity and this property decreases stress and compression on weight bearing joints, muscles, and connective tissues which can result in reduced pain (Cameron, 2003; Millar, 2003). Hydrostatic pressure is the pressure applied by the water on the body when submerged in water, and this property can assist in promoting circulation and increasing venous return (Cameron, 2003). The viscosity of water provides resistance to a client's motions. This resistance occurs against the direction of movement and increases as the speed of the movement increases (Cameron, 2003). Exercising in warm water can produce psychological effects of relaxation and the support of the warm water can provide a calming and comforting environment for clients (Cameron, 2003). Participating in water aerobic exercise with proper frequency, duration, and intensity, can improve a client's aerobic and functional ability and decrease pain (Millar, 2003).

Wang, Belza, Thompson, Whitney, and Bennett (2007) examined the effects of aquatic exercise on flexibility, strength, aerobic fitness, self-reported physical functioning, and pain in adults with osteoarthritis of the hip or knee. They found that aquatic exercise had no effect on self-reported physical functioning and pain; however there was a statistically significant improvement in hip and knee flexibility, strength, and overall aerobic fitness. The aquatic exercise did not worsen joint conditions. This study, however, had a fairly small sample size (N = 38). In contrast, Hinman, Heywood, and Day (2007) conducted a single-blind randomized controlled trial (N = 64) that examined the effects of aquatic physical therapy for those with hip and knee osteoarthritis. Compared to the control group, who received no intervention, the aquatic therapy group had less pain and joint stiffness and greater physical function. These benefits were maintained 6 weeks after the conclusion of the intervention, and 84% of the participants continued with aquatic therapy independently. Hinman et al. noted, however, that it was not clear whether the benefits were attributable to the specific intervention or to a placebo effect.

The effects of aquatic therapy and other aerobic activities have been compared. Silva, Valim, Pessanha, Oliveira, Myamoto, Jones, et al. (2008) conducted a randomized clinical trial that investigated the effects of hydrotherapy versus conventional land-based exercise for the management of patients with osteoarthritis of the knee. The researchers' definition of hydrotherapy was consistent with the definition of aquatic therapy used in the present study. Silva et al. found that reductions in pain and improvements in score on the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and Lequesne index were similar for both groups and that pain before and after a 50-foot walk test significantly decreased during the 18 weeks of the study in both groups. At the 18 week follow-up, however, they found that the water-based exercise group experienced a significantly greater decrease in pain than the land-based exercise group before and after the 50-foot walk test. Similarly, Franssen, Nairn, Winstanley, Lam, and Edmonds, (2007) conducted a randomized controlled clinical trial to determine the benefits of Tai Chi versus hydrotherapy classes for those with chronic symptomatic hip

or knee osteoarthritis. They found that both classes significantly improved in the physical component summary score. Only the hydrotherapy class, however, achieved significant improvements in physical performance measures and provided greater relief of joint pain. A limitation was that 8 of the 56 participants in the Tai Chi class withdrew from the study because they did not enjoy the classes or they thought that the classes exacerbated their knee pain. Presumably, those eight, had they stayed in the study, would have resulted in a reduction in the mean Tai Chi group scores, which would have been likely to increase group differences.

Suomi and Collier (2003) investigated the effectiveness of the National Arthritis Foundation (NAF) aquatic and on-land exercise programs on functional fitness and perceived ability to perform activities of daily living (ADL) in older adults with osteoarthritis or rheumatoid arthritis. They found that after the two exercise programs, the aquatic and on-land participants showed significant improvements on 9 of the 12 functional fitness measures, 3 of the 4 ADL, and 7 of the 8 hand held isometric strength tests when compared to a control group. Suomi and Collier concluded that both NAF exercise classes appeared to be effective. The participants, however, were exercising at least once a week on their own and they were able to perform ADL with moderate difficulty. Thus, the results may not be generalizable to all persons with arthritis who may not exercise outside of an NAF class.

Smith, MacKay-Lyons, and Nunes-Clement (1998) investigated the effects of an aquaerobics program on individuals with rheumatoid arthritis. They had 24 participants randomly assigned to two groups. The aquaerobics group attended an aquaerobics class three times per week for 10 weeks while the range of motion group participated in a 10-week home program of range of motion and strengthening exercises. They found no significant group effects and both groups showed similar decreases in active joint count (AJC) and erythrocyte sedimentation rate (ESR), which are general indicators of disease. Both groups showed improved grip strength. They did find significantly greater improvements for the range of motion group in self-reported walking ability and total Health

Assessment Questionnaire score. These findings suggest that participation in either program may result in improved exercise tolerance without exacerbating joint activity. Smith et al. stated that additional study is needed to explore the impact of aquatic exercise on functional outcomes.

Belza, Topolski, Kinne, Patrick, and Ramsey, (2002) set out to identify characteristics of and outcomes for participants who adhered to a community-based aquatic exercise program. They recruited 249 adults with osteoarthritis from Washington state and they were randomized into a 20-week Arthritis Foundation aquatic exercise program (n = 125) or a wait-list control group (n = 124). Belza et al. found that baseline to post-intervention change in scores showed that those who adhered to the treatment-group reported improved quality of well-being, physical function, and change in arthritis quality of life compared to controls, as measured by the Quality of Well Being Scale, Health Assessment Questionnaire, Center for Epidemiological Studies-Depression Scale, and a single arthritis quality of life rating-item. Quality of well-being and depressed mood improved for adherents, but not for non-adherents.

Osteoarthritis and rheumatoid arthritis have been shown to affect a person's ability to be independent in performing ADL. The unique nature of aquatic therapy has been shown to decrease pain and improve functional abilities by combining exercise and heat in an activity that supports and protects joints. It is important to understand and take into account the clients' experiences as individuals with osteoarthritis or rheumatoid arthritis and who have attended arthritis aquatic programs. With this type of information, occupational therapists and physical therapists can determine whether aquatic therapy is a beneficial and meaningful activity for a particular client and who would be likely to persist with the aquatics program. For occupational therapists, having an understanding of the meaning and value people with arthritis find in aquatic therapy programs can help occupational therapists encourage clients who may benefit from aquatic exercise programs. Therefore, the purpose of this study was to determine the level of self-reported functional improvements in activities of daily living in those who

have arthritis and who have continued to participate in a specialized aquatic program in the Puget Sound region of Washington and the Metro Vancouver area of British Columbia, in order to evaluate the effectiveness of such programs from the client's point of view. If response rates justified it, a second purpose was to compare the experiences of people with osteoarthritis and rheumatoid arthritis and to compare the experiences of people who attended the classes in the Metro Vancouver area of British Columbia and in the Puget Sound area in Washington state in order to detect possible diagnostic or geographic differences.

## **Method**

### **Research Design**

Surveys are particularly useful as a research method for examining phenomena that can be assessed through self-observation, such as attitudes and values (Portney & Watkins, 2009). Each respondent is exposed to the same questions in the same way, reducing potential bias from interactions with an interviewer, and surveys provide anonymity, encouraging honest and candid responses (Portney & Watkins, 2009). Respondents can take the time to think about their answers and to consult records for specific information. The primary disadvantage of surveys is the potential for misunderstanding or misinterpreting the questions or response choices and the unknown accuracy or motivation of the respondent (Portney & Watkins, 2009). Another disadvantage of surveys is that the response rate is often quite low. Receiving responses from 60% to 80% of a sample is considered excellent, however, realistically, it can be expected that the return rate will be between 30% and 60% (Portney & Watkins, 2009). Based on this projection, 250 to 300 surveys were distributed in order to receive at least 100 responses.

### **Participants**

The ideal population for this study consisted of all people with osteoarthritis or rheumatoid arthritis who participated in an aquatic therapy program in North America. The accessible population

consisted of persons with osteoarthritis or rheumatoid arthritis who participated in the Arthritis Foundation Aquatics program in the Puget Sound region and the Arthritis Society's Water Works program in the Metro Vancouver area of British Columbia. Inclusion criteria were: 1) self-report that a physician has confirmed a diagnosis of osteoarthritis or rheumatoid arthritis in any joint, 2) participation for a minimum of two months in an aquatic therapy program designed for arthritis, and 3) proficiency in English and cognitive ability for completing the questionnaire.

### **Instrument**

A survey was created for the purposes of this study and reliability and validity of this instrument were not previously established. A portion of the survey was the Health Assessment Questionnaire (HAQ-DI) which was originally developed in 1978 by James F. Fries, MD, and colleagues at Stanford University (Stanford University, 2003). The HAQ-DI is sensitive to change and is a good predictor of future disability and it has demonstrated reliability and validity in different languages and contexts (Stanford University, 2003). Test-retest correlations range from 0.87 to 0.99 and correlations between interview and questionnaire format range from 0.85 to 0.95 (Stanford University, 2003). Validity has been demonstrated in literally hundreds of studies (Stanford University, 2003).

The survey used in the current study consisted of two parts (see Appendix). The first addressed demographic items such as gender, time elapsed since diagnosis of osteoarthritis or rheumatoid arthritis, severity and location of osteoarthritis or rheumatoid arthritis, and how long the respondent has been participating in the aquatic program. The second part of the survey included the HAQ-DI and also focused on the perceived effects of the aquatic therapy on ease of movement, pain, balance, energy, and ability to perform ADL. Responses were elicited to questions about tasks such as self-care and chores, pain, health, other interventions being received for the condition, who referred them to the aquatic therapy program, and why they decided to continue to participate. Finally, an open-ended question allowed respondents to elaborate on any issue they believed to be relevant to the study.

**Procedure**

Approval for this study was granted from the University of Puget Sound Institutional Review Board and funding was provided by the Department of Occupational Therapy at the University of Puget Sound. A pilot test of the survey was conducted with an occupational therapy instructor and an occupational therapy student who both have arthritis to identify any modifications or rewording that would be necessary to decrease bias and increase the clarity of the instrument. The researcher identified qualified aquatic facilities that provided aquatic therapy programs based on The Arthritis Foundation Aquatic Program or the Arthritis Society's Water Works program by means of internet searches, telephone conversations, and discussions with the Washington branch of the Arthritis Foundation and the Arthritis Society in British Columbia. Cooperation in distributing the surveys at the facilities was sought through telephone conversations from the directors and instructors of aquatic programs.

Each survey included a cover letter explaining the purpose of the study. The researcher delivered the surveys to the directors of the aquatic programs in person for further distribution of the surveys to potential participants. Self-addressed postage paid envelopes were included. Each return envelope was coded to allow the researcher to track which facilities returned surveys. Participants were told that by returning the survey, they were giving their consent to participate in the study. One week after the distribution of the surveys, a follow-up telephone call was made to all facilities in order to encourage further responses and to ask if more surveys were needed. One facility requested eight more surveys.

**Data Analysis**

Data were entered into the Statistical Package for the Social Sciences (SPSS). The responses from American and Canadian respondents were generally similar, therefore data from all surveys were pooled for analysis to determine general responses to questions. Descriptive statistics for frequency,

central tendency, standard deviation, and range of the responses were calculated as appropriate for each item. Differences between groups on demographic variables and response variables and among response variables were examined via *t*-tests. Comparisons between the response variables from the facilities in Washington and in British Columbia as well as comparisons between people with osteoarthritis and rheumatoid arthritis were conducted via *t*-test.

### Results

The participants in this study came from seven aquatic facilities in the Puget Sound region of Washington State that offered the Arthritis Foundation Aquatics Program and from seven aquatic facilities in the Metro Vancouver area of British Columbia that offered the Arthritis Society's Water Works program. A total of 353 surveys were sent to these facilities: 208 to those in Washington and 145 to those in British Columbia. There were 131 (37%) surveys returned. Eight surveys were discarded, three that were returned blank and five because the respondents reported that they did not have arthritis which resulted in 123 (35%) of usable surveys.

Descriptive statistics summarizing the characteristics of the sample are shown in Tables 1 and 2. Approximately two thirds of the respondents were from Washington and one third were from British Columbia. The majority of the respondents were female, older adults, and osteoarthritis was the most commonly reported diagnosis, as expected based on demographics of arthritis reported in the literature. There were 104 respondents who reported the year they were diagnosed with arthritis, which was a mean of 13 years prior: 1997 (SD = 11.62); however, the mode was 1 year prior (2009). Comorbid diagnoses reported included recent surgery, fibromyalgia, multiple sclerosis, Achilles tendon pain, bursitis, lupus, polymyalgia rheumatic, chondromyalgia, a herniated disc, cerebral vascular accident, macular degeneration, and osteoporosis. There were no statistically significant differences in gender, type of arthritis, HAQ scores, pain, or health levels between Washington and British Columbian respondents. There was a statistically significantly difference in mean ages of American and Canadian

respondents,  $t(118) = 2.410, p = .017$ , with the mean age of respondents from British Columbia older than Washington respondents. There is a statistically significant association between HAQ-DI score and perceived level of pain and HAQ-DI score and perceived level of health, in that lower score (higher levels of performance) on the HAQ-DI tend to be associated with lower levels of pain and better perceived health,  $\chi^2(3, N = 117) = 14.55, p = .002$  and  $\chi^2(3, N = 118) = 14.16, p = .003$  respectively. A statistically significant association between perceived level of pain and perceived level of health was also found in that lower levels of perceived pain was associated with better perceived health,  $\chi^2(9, N = 118) = 56.443, p < .001$ .

Frequency and duration of participation in aquatics classes is summarize in Tables 3 and 4. Respondents ( $N = 123$ ) reported that they attended an arthritis aquatics class a mean of 2.68 ( $SD = 1.00$ ) times per week for a mean of 4.84 ( $SD = 2.39$ ) years. An independent t-test showed statistically significant differences in frequency and duration of attendance between Washington and British Columbian respondents. Washington respondents attended classes statistically significantly more frequently,  $t(120.9) = -3.732, p < .001$ , however, British Columbian respondents attended classes for more years,  $t(104.4) = 3.388, p = .001$ .

Who recommended the aquatics class to the participants is summarized in Figure 1. The majority of participants were referred by a doctor and a physical therapists, whereas only a small proportion of participants were referred by an occupational therapist. Reasons the participants have continued to attend the arthritis aquatics class is summarized in Figure 2. The most common responses were that they liked the exercise and they felt better after the class. "Other" responses provided by the respondents were: 7 (5.7%) reported that it helps with balance/pain/weight/energy/ sleep, 5 (4.1%) reported the class keeps them walking, 5 (4.1%) reported they like the warm water or like going into the hot tub after exercising, 4 (3.3%) continued to attend because it is covered by insurance, and 1 (0.8%) reported that a spouse or friend goes with them.

The joint or joints affected by arthritis and, on a scale of one to ten, the severity of pain in that joint are summarized in Table 5. The most common joint affected was the knee which also had the most pain associated with that joint. The back and hips were also commonly reported with moderate amounts of pain associated with those joints. The ankles, which were not reported very often, also had moderate amounts of pain, third most pain after knees and hips.

The HAQ-DI calls for assigning a score of function on a scale of 0 (can perform the item without any difficulty), 1 (can perform the item with some difficulty), 2 (can perform the item with much difficulty), and 3 (unable to perform the item). The mean HAQ-DI score for all respondents was 0.89 (SD = 0.65). HAQ-DI scores for respondents from British Columbia were not statistically significantly different from those for respondents from Washington. On a scale of 0 (no pain), to 100 (severe pain), the mean pain reported by all respondents was 38.6 (SD = 24.90). On a scale of 0 (very well), to 100 (very poor), the mean health reported by all respondents was 32.8 (SD = 21.59). The pain and health ratings for respondents from British Columbia were not statistically significantly different from those of respondents from Washington. For the ADL section of the HAQ-DI, 50% or more of the respondents reported that they were able to do all the tasks “without any difficulty” except for “climb up five steps” where only 48.3% reported “without any difficulty.” The most commonly used aids for ADLs were canes for walking (27.3%) and walkers (12.4%), while the most common response for requiring help from another person was for walking (6.6%). For the instrumental activities of daily living (IADL) section of the HAQ-DI, 50% or more of the respondents reported that they were able to do all the tasks “without any difficulty” except for “take a tub bath,” where 36.8% reported “without any difficulty” and “chores such as vacuuming or yard work” where only 22.9% reported “without any difficulty.” The most commonly used aids for IADL were raised toilet seats (25.0%) and bathtub bars (26.7%), while the most common response for requiring help from another person was for gripping and opening things (32.5%), errands and chores (27.5%), and reaching (15.0%).

When asked how their pain had changed since beginning the arthritis aquatics program, 6 (5.3%) reported it increased, 28 (24.8%) reported it stayed the same, 53 (46.9%) reported that it decreased, and 26 (23.0%) reported that it decreased significantly. When asked how their ease of movement had changed since beginning the aquatics program, 9 (8.0%) reported that it decreased significantly, 13 (11.5%) reported that it decreased, 24 (21.2%) reported that it stayed the same, 50 (44.2%) reported it increased, and 17 (15.0%) reported that it increased significantly. When asked how their balance had changed since beginning the aquatics program, 4 (3.5%) reported that it decreased significantly, 12 (10.5%) reported that it decreased, 38 (33.3%) reported that it stayed the same, 44 (38.6%) reported it increased, and 16 (14.0%) reported that it increased significantly. When asked how their energy had changed since beginning the aquatics program, 9 (7.8%) reported that it decreased significantly, 4 (3.5%) reported that it decreased, 25 (21.7%) reported that it stayed the same, 54 (47.0%) reported it increased, and 23 (20.0%) reported that it increased significantly.

There was a statistically significant increase in ability for all ADL and IADL areas ,dressing, arising, eating, walking, hygiene, reach, gripping/opening things, and errands/chores, for the respondents before they started the aquatics program and after they had been participating in the aquatics program (See Table 6). Qualitative results obtained from the open ended question will be discussed in the next section.

### **Discussion**

The majority of the survey's respondents were female, indicating that the majority of the participants in the aquatics programs were women or that women were much more likely to return the survey. It is not unusual for women to be predominant in arthritis aquatics programs as they are more likely to be affected by arthritis than men (Arthritis Foundation, 2010). The statistically significant difference in age between the respondents from British Columbia and the respondents from Washington may indicate that either older individuals are more likely to attend the arthritis aquatics

classes in British Columbia than younger individuals, older individuals are more likely to return the survey, or not as many young individuals are diagnosed with arthritis in Canada. Whatever the cause of the age difference, the pain and health ratings were statistically similar for the two sets of respondents. There were no other statistically significant differences in response between those from British Columbia and Washington. No statistical comparisons of respondents with osteoarthritis and rheumatoid arthritis were done because there were an insufficient number of respondents with rheumatoid arthritis.

Associations between HAQ-DI scores, perceived level of pain, and perceived level of health indicate that as respondents' performance on the HAQ-DI improved, they have less pain, better health, and as respondents report less perceived pain they have more perceived health in regards to their arthritis. A large majority of respondents (70.3%) reported that since they started the aquatics program, their pain has either decreased or decreased significantly. This is in contrast to Wang, et al. (2007), who found that the self-reported physical functioning and pain were not affected by the aquatic exercise, however, they did find a statistically significant improvement in hip and knee flexibility, strength, and overall aerobic fitness. The results of the current study support those of Hinman et al. (2007), who found that the group who received aquatic therapy intervention for osteoarthritis of the knee showed less pain and joint stiffness and greater physical function.

Some interesting information was obtained from the open-ended question at the end of the survey. A number of respondents reported that they have participated in the aquatics program for many years. They expressed the theme that during that time, their arthritis has advanced, however they feel that the aquatics program has helped slow that progression. One respondent said "I am 12 years older than when I started the aquatic exercises and there is a big difference between 66 and 78. My arthritis has worsened through the years but quite frankly I'm sure I would be far worse if I hadn't been taking the aquatic. If I am away for more than a week I definitely notice the difference." Another said

“It is difficult to judge how effective the program has been because I have taken it for 13 years and during that time my arthritis has obviously progressed. My sense tells me that I would have been in a much worse condition without the program, particularly my balance, my flexibility, which is very good, and also my general sense of well being.”

Many of the respondents expressed that it is important for them to stay active and that the aquatics program helps with maintaining muscle tone, strength, balance, and flexibility. One person said “I feel it is good to stay active and maintain the use of my joints and my muscle strength.” Another reported “I was able to move with the buoyancy of the water so that my body could limber up. There was no way I could ever do the movements I can in water.” Another participant said “The buoyancy of the water helps reduce the stress (weight) for my hips.” Another said “[I] feel like a normal human being when in the water. Will continue until disease so severe that am unable to.”

Perhaps the most recurring theme expressed by respondents was that of having the opportunity to be social. Many of the respondents expressed that the aquatics class has helped them become social by allowing them to move in their communities and meet other people who also have arthritis. “[It] motivates me to get out of the house and reduces sense of isolation. Can be more honest about how I’m doing around other participants vs. friends and family.” Another said that “For me the class was and is a ‘do or die’ event in my life. The instruction with others and having their stories is an important part of the exercise program. I am sooo grateful that I have found this type of treatment.” Another said “Its excellent to get out and meet others and to keep social contacts.”

The results of this current research are supported by the study conducted by Belza et al. (2002) in which they found that quality of well-being and depressed mood improved for adherents, but not for non-adherents. The participants who attend the aquatics classes regularly expressed that they are better able to perform ADL and IADL tasks with greater ease and they felt better than before they started the classes. It is important to note that the participants who have attended the classes for a

greater number of years still have a chronic illness that has progressed over time. Those participants expressed that even though their ability to function in their environments had decreased, they felt that the aquatic classes had helped slow the progression of their arthritis and that they have been able to function at a higher level for a longer period of time.

### **Implications for Therapy**

It is interesting to note that the most likely referral source of patients to the arthritis aquatics programs are physicians, followed by physical therapists, people who refer themselves, a friend with arthritis, advertisements, a relative, and a friend without arthritis. The least likely to refer people to these programs were occupational therapists. The four respondents who did report being referred to the arthritis aquatics program by occupational therapists were respondents from British Columbia, which may indicate that more people in that province see an occupational therapist for treatment of their arthritis. It may also be that occupational therapists in Washington and British Columbia simply do not realize that the arthritis aquatics classes are available as a beneficial option for their clients. This may be because aquatic therapy is not a traditional treatment modality in the field of occupational therapy. Another interpretation could be that people with arthritis may have had an aquatics program recommended to them by another health care professional prior to seeing an occupational therapist.

Nevertheless, the results of this study indicate that a majority of the respondents reported outcomes from their aquatic programs that were consistent with occupational therapy goals, including they were now able to perform the tasks in their daily lives with less difficulty, attending the classes was meaningful to them, and that the classes allowed them to socialize with others who also have arthritis. These findings may suggest that occupational therapists need to consider slowing of disease symptoms as a positive clinic outcome when dealing with chronic diseases that are expected to progress. Without the aquatics classes, all participants may have been further limited in many areas of their lives, including ADL, mobility, leisure, sociability, and satisfaction with their lives, as expressed in the open ended

question. All these areas fall within the Occupational Therapy Practice Framework (Roley, DeLany, Barrows, Brownrigg, Honaker, Sava, et al., 2008) and are therefore relevant to occupational therapists.

### **Limitations**

This questionnaire was sent to the directors of the aquatics programs at each aquatic facility so that the director or the instructor could distribute the survey to the participants who attended the arthritis aquatics class. Although the researcher informed the directors of the purpose of the study, there was no control over how that was communicated to potential participants. Another limitation of this study was that participants were recruited only from aquatic facilities that offered the specialized arthritis aquatics classes in which the participants have chosen to continue to attend the classes because they feel they are benefiting from the class. Not included in this sample were the people with arthritis who did not believe they were benefiting from the classes and presumably thus stopped attending. Finally, it is important to note that most of the participants who reported they have attended the class for greater than three years have attended for an amount of time in which progression of the disease would be expected. Therefore their functional abilities would have been expected to decline since they started attending the aquatics classes many years ago. The participants who reported this also reported, however, that they believed that if they had not been attending the classes for as long as they had, their condition would be far worse.

### **Future Research**

Future research should focus on recruiting those individuals who have attended either the Arthritis Foundation's Aquatics Program or the Arthritis Society's Water Works program but have chosen to discontinue their participation. It is important not only to understand what participants report as favourable outcomes of the aquatics class but also what they report as unfavourable. In this respect, the data will potentially be less biased towards the positive. It might be beneficial to extend the survey to include a larger variety of regions in the United States and in Canada in order to determine if there

are any significant differences in response geographically. Because this study found that the participants valued the social and supportive aspect of the classes, research should be conducted in order to investigate the social outcomes of aquatic therapy as study variables. This study found that for those who had participated in the aquatics classes for a period of time, their arthritis progressed, however, they felt that their arthritis would have been worse if they did not participate in the classes.

### **Conclusion**

A large majority of the respondents reported that they felt they have improved or significantly improved in ADL and IADL as a result of their participation in an aquatics therapy class. They indicated the perceived benefits range from pain reduction and improved health to increased social participation and mobility in their communities, which are among the goals of occupational therapy. Participation in these aquatics programs may be beneficial for those with arthritis who receive occupational therapy services. The results of this study can better inform occupational therapists as to the potential benefits for their clients who are limited by the symptoms of osteoarthritis or rheumatoid arthritis. One respondent articulated the sentiment expressed by many when she said “Arthritis aquatics program gives me the freedom to move freely, with great joy and enthusiasm and enriches my life greatly.”

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Table 1

*Demographics*

Nationality, n (%)	American	Canadian	All
	81 (65.9%)	42 (34.1%)	123 (100%)
Gender, n (%)			
Women	70 (86.4%)	35 (88.3%)	105 (85.3%)
Men	11 (13.6%)	7 (16.7%)	18 (14.6%)
Type, n (%)			
OA	51 (63.0%)	32 (76.2%)	83 (67.5%)
RA	10 (12.3%)	6 (14.3%)	16 (13.0%)
OA and RA	1 (1.4%)	2 (4.8%)	3 (2.4%)
Don't Know	13 (16.0%)	1 (2.4%)	14 (11.4%)
Other	6 (7.4%)	1 (2.4%)	7 (5.7%)
Age in years, (SD)*			
	69.0 (11.41)	74.07 (9.67)	70.76 (11.070)

\* = Statistically Significant Difference,  $p < .05$

Table 2

*Health Status*

Nationality, n (%)	American	Canadian	All
	81 (65.9%)	42 (34.1%)	123 (100%)
HAQ Score, (SD)	0.83 (.64)	0.99 (.66)	0.89 (.65)
Scale of 0 (without any difficulty) – 3 (unable to do)			
Pain Level, (SD)	39.71 (25.61)	36.52 (23.73)	38.58 (24.90)
Scale of 0 (no pain) – 100 (severe pain)			
Health Level (SD)	34.52 (21.48)	29.69 (21.70)	32.82 (21.59)
Scale of 0 (very well) – 100 (very poor)			

Table 3

*Frequency of Attendance per Week*

	Frequency		
	American	Canadian	All
	n = 81 (65.9%)	n = 42 (34.1%)	N = 123 (100%)
1 time per week	7 (8.6%)	2 (4.8%)	9 (7.3%)
2 times per week	25 (30.9%)	25 (59.5%)	50 (40.7%)
3 times per week	30 (37.0%)	15 (35.7%)	45 (36.6%)
4 times per week	9 (11.1%)	0 (0%)	9 (7.3%)
5 or more times per week	10 (12.3%)	0 (0%)	10 (8.1%)

Table 4

*Participation in an Aquatics Program*

	Duration		
	American	Canadian	All
	n = 81 (65.9%)	n = 42 (34.1%)	N = 123 (100%)
3 – 6 months	19 (23.5%)	1 (2.4%)	20 (16.3%)
7 – 12 months	7 (8.6%)	4 (9.5%)	11 (8.9%)
1 year – 1 year, 6 months	8 (9.9%)	3 (7.1%)	11 (8.9%)
1 year, 7 months – 2 years	5 (6.2%)	2 (4.8%)	7 (5.7%)
2 years – 2 years, 6 months	5 (6.2%)	2 (4.8%)	7 (5.7%)
2 years, 7 months – 3 years	7(8.6%)	5 (11.9%)	12 (9.8%)
Greater than 3 years	30 (37.0%)	25 (59.5%)	55 (44.7%)

Table 5

*Joints Affected and Severity*

Location, n (%)	Severity, Mean (SD)
Knees, 74 (60.2%)	6.0 (2.44)
Back, 48 (39.0%)	5.6 (2.50)
Hip, 47 (38.2%)	6.0 (2.46)
Hand, 43 (35.0%)	5.1 (2.51)
Finger, 37 (30.1%)	5.2 (2.54)
Shoulder, 31 (25.2%),	5.2 (2.25)
Neck, 30, (24.4%)	5.4 (2.53)
Wrist, 19 (15.4%)	5.0 (2.44)
Foot, 18 (14.6%)	5.6 (2.83)
Ankle, 14 (11.4%)	5.9 (2.63)
Elbow, 11 (8.9%)	4.5 (2.34)
Toe, 7 (5.7%)	5.4 (1.90)

Table 6

*Increase in ability to perform ADL and IADL Tasks*

ADL/IADL	<i>t</i> value, <i>p</i> value
Dressing	$t(105) = -7.008, p < .001$
Arising	$t(104) = -8.081, p < .001$
Eating	$t(103) = -2.726, p = .008$
Walking	$t(105) = -7.839, p < .001$
Hygiene	$t(102) = -3.606, p < .001$
Reaching	$t(103) = -6.690, p < .001$
Gripping/opening things	$t(103) = -4.664, p < .001$
Errands/chores	$t(103) = -7.595, p < .001$

Figure 1

*Who Referred the Participants to the Aquatics Class*

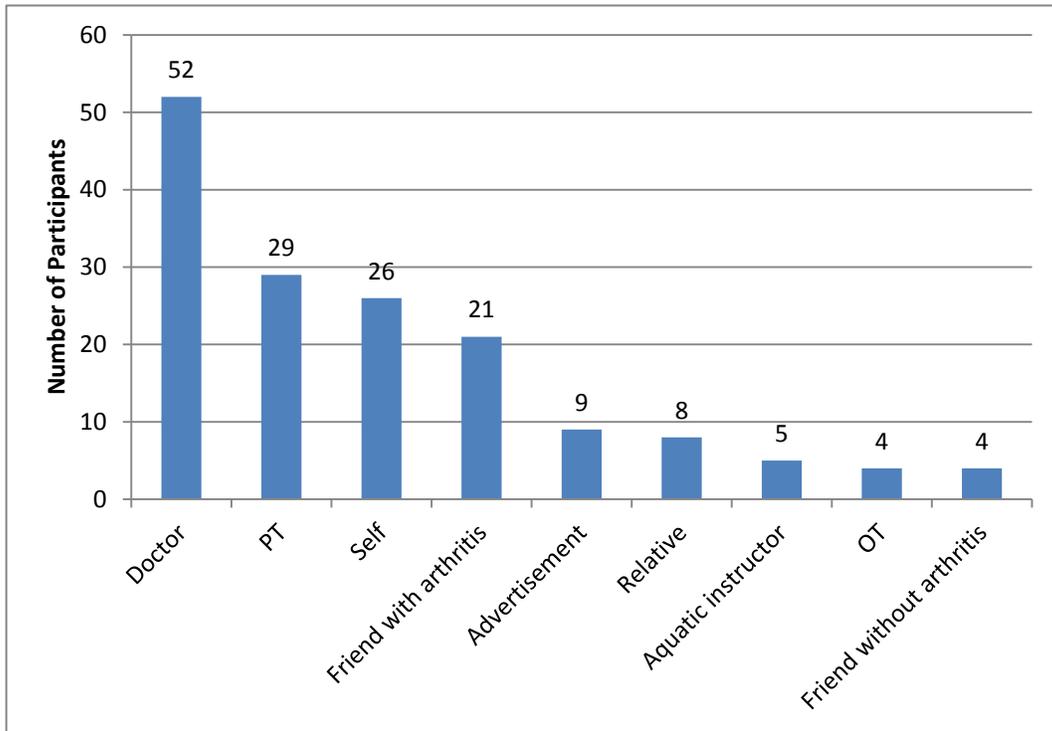
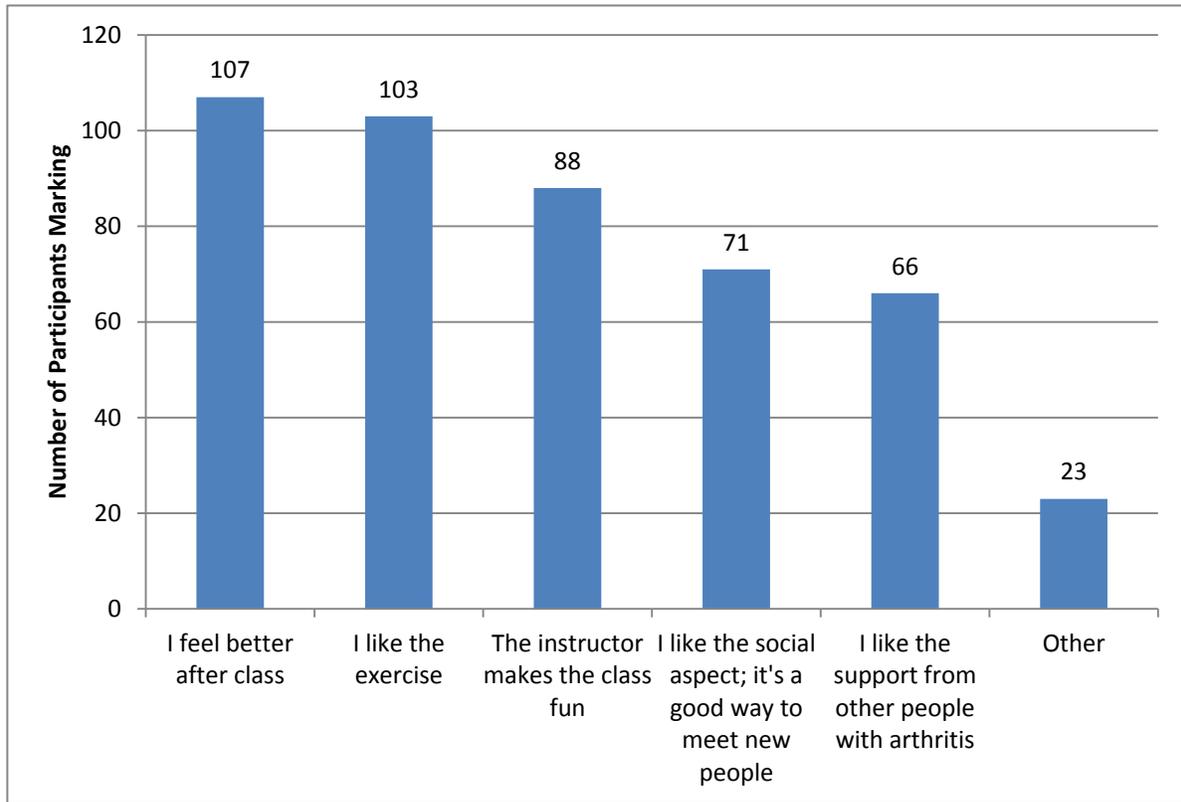


Figure 2

*Reasons for Continuing the Aquatics Program*



## Appendix A

**Aquatic Exercise for Osteoarthritis and Rheumatoid Arthritis****FIRST, PLEASE ANSWER A FEW QUESTIONS ABOUT YOURSELF****1. Who recommended an arthritis aquatic class to you? (place an "x" in all boxes that apply)**

- Doctor
- Occupational Therapist
- Physical Therapist
- Friend with arthritis
- Friend without arthritis
- A relative
- Other (please specify): \_\_\_\_\_

**2. How many times a week do you attend an aquatic class? (circle the appropriate response)**

- 1) 1 time per week
- 2) 2 times per week
- 3) 3 times per week
- 4) 4 times per week
- 5) 5 or more times per week

**3. How long have you participated in an aquatic class? (circle the appropriate response)**

- 1) 0 – 6 months
- 2) 7 – 12 months
- 3) 1 year – 1 year and 6 months
- 4) 1 year and 7 months – 2 years
- 5) 2 years – 2 years and 6 months
- 6) 2 years and 7 months - 3 years
- 7) More than 3 years

**4. Why have you continued to attend the aquatic class? (Place an "x" in all boxes that apply)**

- I like the exercise
- I feel better after class
- The instructor makes the class fun
- I like the support from other people with arthritis
- I like the social aspect; it is a good way to meet new people
- Other (Please specify): \_\_\_\_\_

5. What is your current age? \_\_\_\_\_

6. Gender:  Male  Female

7. Type of arthritis:  Osteoarthritis  Rheumatoid Arthritis  Other  I Don't know

8. When were you diagnosed with arthritis? Year \_\_\_\_\_ Month (if known) \_\_\_\_\_

9. In which joint or joints is your arthritis located and how severe is your arthritis (0 = not severe; 10 = very severe)? (Circle the appropriate number related to how severe your arthritis is)

Location (joints affected):

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Severity Level:

Not severe										Severe	
0	1	2	3	4	5	6	7	8	9	10	
0	1	2	3	4	5	6	7	8	9	10	
0	1	2	3	4	5	6	7	8	9	10	
0	1	2	3	4	5	6	7	8	9	10	
0	1	2	3	4	5	6	7	8	9	10	
0	1	2	3	4	5	6	7	8	9	10	
0	1	2	3	4	5	6	7	8	9	10	

10. What treatments are or have you received for your arthritis? (Place an "x" in all boxes that apply)

- Occupational Therapy
- Physical Therapy
- Acetaminophen (Tylenol)
- Non-steroidal anti-inflammatory drugs (NSAIDs) (Aspirin, Ibuprofen, Naproxen)
- Corticosteroids
- Glucosamine and/or chondroitin sulphate
- Exercise other than an arthritis aquatic program
- Other (Please specify): \_\_\_\_\_

**HEALTH ASSESSMENT QUESTIONNAIRE (HAQ-DI)©**

**11. Please place an “x” in the box which best describes your abilities OVER THE PAST WEEK:**

WITHOUT ANY DIFFICULTY      WITH SOME DIFFICULTY      WITH MUCH DIFFICULTY      UNABLE TO DO

**DRESSING & GROOMING**

**Are you able to:**

Dress yourself, including shoelaces and buttons?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shampoo your hair?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**ARISING**

**Are you able to:**

Stand up from a straight chair?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Get in and out of bed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**EATING**

**Are you able to:**

Cut your own meat?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lift a full cup or glass to your mouth?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Open a new milk carton?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**WALKING**

**Are you able to:**

Walk outdoors on flat ground?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Climb up five steps?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**12. Please check any AIDS OR DEVICES that you usually use for any of the above activities:**

<input type="checkbox"/> Devices used for Dressing (button hook, zipper pull, etc.)	<input type="checkbox"/> Built-up or special utensils	<input type="checkbox"/> Crutches
<input type="checkbox"/> Special or built-up chair	<input type="checkbox"/> Cane	<input type="checkbox"/> Wheelchair
	<input type="checkbox"/> Walker	<input type="checkbox"/> Other _____

**13. Please check any categories for which you usually need HELP FROM ANOTHER PERSON:**

<input type="checkbox"/> Dressing and grooming	<input type="checkbox"/> Arising	<input type="checkbox"/> Eating	<input type="checkbox"/> Walking
--	----------------------------------	---------------------------------	----------------------------------

**14. Please place an "x" in the box which best describes your abilities OVER THE PAST WEEK:**

WITHOUT ANY DIFFICULTY      WITH SOME DIFFICULTY      WITH MUCH DIFFICULTY      UNABLE TO DO

**HYGIENE**

**Are you able to:**

Wash and dry your body?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Take a tub bath?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Get on and off the toilet?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**REACH**

**Are you able to:**

Reach and get down a 5 pound object (such as a bag of sugar) from above your head?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bend down to pick up clothing from the floor?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**GRIP**

**Are you able to:**

Open car doors?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Open previously opened jars?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Turn faucets on and off?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**ACTIVITIES**

**Are you able to:**

Run errands and shop?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Get in and out of a car?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do chores such as vacuuming or yard work?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**15. Please check any AIDS OR DEVICES that you usually use for any of the above activities:**

<input type="checkbox"/> Raised toilet seat	<input type="checkbox"/> Bathtub bar	<input type="checkbox"/> Long-handled appliances for reach
<input type="checkbox"/> Bathtub seat	<input type="checkbox"/> Long-handled appliances in bathroom	<input type="checkbox"/> Jar opener (for jars previously opened)
<input type="checkbox"/> Other _____		

**16. Please check any categories for which you usually need HELP FROM ANOTHER PERSON:**

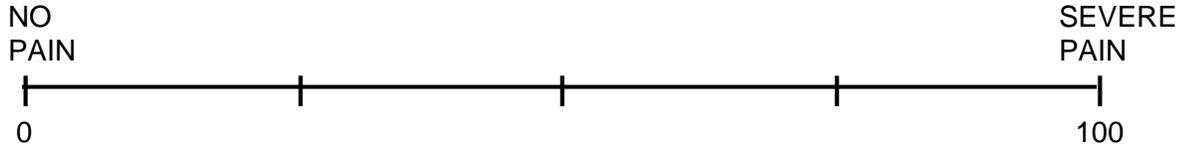
<input type="checkbox"/> Hygiene	<input type="checkbox"/> Reach	<input type="checkbox"/> Gripping and opening things	<input type="checkbox"/> Errands and chores
----------------------------------	--------------------------------	--	---

**17. Your ACTIVITIES:** To what extent are you able to carry out your everyday physical activities such as walking, climbing stairs, carrying groceries, or moving a chair?

COMPLETELY 
 MOSTLY 
 MODERATELY 
 A LITTLE 
 NOT AT ALL

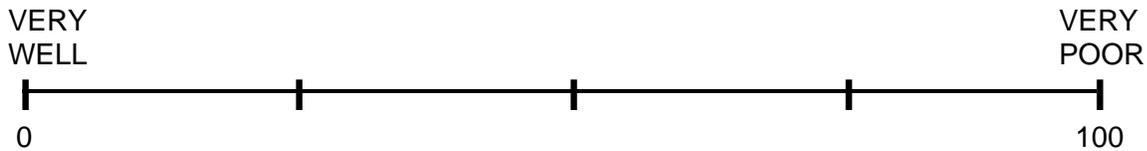
**18. Your PAIN:** As an average, how much pain have you had IN THE PAST WEEK?

PLACE A SINGLE VERTICAL MARK THROUGH THE LINE TO INDICATE THE SEVERITY OF THE PAIN.



Your HEALTH: Please rate, in general, how well you feel you are doing.

**19. PLACE A SINGLE VERTICAL MARK THROUGH THE LINE TO INDICATE HOW WELL YOU ARE DOING.**



**NOW, THINK ABOUT YOUR ABILITY TO PERFORM THE ACTIVITIES BELOW BEFORE AND AFTER YOU JOINED AN ARTHRITIS AQUATICS PROGRAM.**

**20. Please place the appropriate NUMBER listed below in each box that best describes your abilities BEFORE and AFTER you started an arthritis aquatics program:**

- 4 = WITHOUT ANY DIFFICULTY
- 3 = WITH SOME DIFFICULTY
- 2 = WITH MUCH DIFFICULTY
- 1 = UNABLE TO DO

	BEFORE the aquatic program	AFTER the aquatic program
Dressing and grooming	<input type="checkbox"/>	<input type="checkbox"/>
Arising	<input type="checkbox"/>	<input type="checkbox"/>
Eating	<input type="checkbox"/>	<input type="checkbox"/>
Walking	<input type="checkbox"/>	<input type="checkbox"/>
Hygiene	<input type="checkbox"/>	<input type="checkbox"/>
Reach	<input type="checkbox"/>	<input type="checkbox"/>
Gripping and opening things	<input type="checkbox"/>	<input type="checkbox"/>
Errands and chores	<input type="checkbox"/>	<input type="checkbox"/>

