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Jason Scott

University of Tennessee-Knoxville, jlscott@utk.edu

Angela Wozencroft

University of Tennessee-Knoxville

Vincenzo Nocera

University of Tennessee-Knoxville

Kelsey Webb

University of Tennessee-Knoxville

Jodi Anderson

University of Tennessee-Knoxville
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Aquatic Therapy Interventions and Disability: A Recreational Therapy Perspective

Authors

Jason Scott, Angela Wozencroft, Vincenzo Nocera, Kelsey Webb, Jodi Anderson, Avery Blankenburg, Darrien Watson, and Sophie Lowe

Abstract

Aquatic therapy interventions are critical for individuals with disabilities and the role of the therapist is just as critical for successful and effective interventions. The field of therapeutic recreation trains students to develop and implement evidence-based facilitation techniques including the use of aquatic therapy to assist in helping clients achieve a change in functional status. This review of the literature examined the impact of aquatic therapy interventions on a variety of disabilities including osteoarthritis, multiple sclerosis, Cerebral palsy, autism spectrum disorder, and mental health from a recreational therapy (RT) perspective. This review provides a variety of information on the positive benefits that may occur using aquatic therapy for diverse conditions. Examples include relaxation, stretching, and aerobic exercise and each has the ability to improve strength. It does appear that aquatic therapy interventions can provide a wide array of benefits that may reduce the burden associated with a variety of disabilities. These benefits may be useful in increasing the overall quality of life of a diverse group of disabilities. Likewise, due to the nature of RT, recreational therapists are in a unique position to provide plan and develop aquatic therapy interventions. However, it is the authors' suggestion that those providing this service attend intensive training in order to provide aquatic therapy effectively. Additional research may be necessary to provide a more cohesive understanding of the impact of aquatic therapy on a variety of populations. Nonetheless, the information gleaned from this review, justify that aquatic therapy has benefits for a diverse clientele and thus may be useful in the implementation of RT programs.

Keywords: disability, recreation therapy, aquatic interventions, physical activity, swimming

There is a growing number of aquatic interventions used with individuals with disabilities to recover from illnesses, diseases, and disabling conditions. For example, previous research on aquatic interventions describes the numerous physical benefits such as decreased pain (Baena-Beato et al., 2014; Cantarero-Villanueva et al., 2012), bone loss prevention (Tsukahara et al., 1994), improved functional and motor performance (Fragala-Pinkham et al., 2014; Hillier et al., 2010; Salem & Jaffee Gropack, 2010), increased strength (Kargarfard et al., 2013; Chi et al., 2011), increased endurance (Routi et al., 1994), improved fitness (Wang et al., 2007; Driver et al., 2004), and improved pulmonary function (Ferreira et al., 2013; Getz, et al., 2006). Furthermore, aquatic therapy has been shown to have a number of psychological benefits including improved body image (Smith & Michel, 2006), decreased depression (Benedict & Freedman, 1993), enhanced mood (Assiss et al., 2006), decreased anxiety (Rogers et al., 2014), and improved quality of life (Lai et al., 2014; Maniu et al. 2013). The use of aquatics as a treatment modality dates to ancient times with the Greeks, Romans, Egyptians, Hindus,

Japanese, and Chinese all having recordings of using water for therapeutic purposes (Broach, 2016).

To achieve these positive health outcomes, the role of the therapist is critical for the aquatic intervention to result in restoration, remediation, and rehabilitation (Broach, 2016). Aquatic professionals must acquire knowledge in the functional areas of cognition, social interactions, emotional function, and physical functioning prior to working with individuals with disabilities in the water (Grosse, 2012). Furthermore, aquatic professionals must understand how to employ the necessary aquatic interventions and be keenly aware of potential risks and contraindications when working with individuals with concomitant impairments to promote safety of the individual when entering the water (Grosse, 2012). The field of therapeutic recreation trains students to become recreational therapists (RTs) to provide a variety of treatment interventions using various facilitation techniques and treatment modalities to assist vulnerable populations on the road toward recovery and rehabilitation. RTs are uniquely trained to provide therapeutic services to restore function and independence as well as quality of life in those that experience illnesses or disabling conditions (“About Recreational Therapy”, n.d.). Recreational therapy (RT) focuses on improving one’s health in the physical, cognitive, emotional, social, and leisure domains.

RTs provide individualized, client-centered care to help clients achieve the highest level of functioning and independence (“About Recreational Therapy”, n.d.). Using the properties of water through aquatic interventions remains a focus of many RT interventions. Allied health professionals such as occupational, physical, and RTs have utilized evidence-based practices of aquatic therapy as a treatment modality. RTs have been providing aquatic interventions for a number of years and findings have indicated the therapeutic benefits of warm water interventions, aquatic therapy interventions and aquatic exercise individuals with disabilities (Dattilo & McKenney, 2016).

Previous research of RTs using aquatic therapy as a treatment modality has focused on patients with osteoarthritis (OA), multiple sclerosis (MS), cerebral palsy (CP), and Autism Spectrum Disorder (ASD). Aquatic interventions employed by RTs have provided similar benefits regardless of the disabling condition (Kensinger et al., 2017). The purpose for this paper is to highlight the benefits of aquatic interventions as a therapeutic modality and provide further specifics on the role of the RTs in working with diverse populations.

Osteoarthritis

Osteoarthritis (OA) is the most common joint condition and occurs when cartilage in the joints breaks down causing significant pain, joint stiffness, and swelling in

the joint (Felson, 2004). According to the Centers for Disease Control and Prevention, over 30 million people are currently living with OA in the United States (Osteoarthritis, 2019, How many people have OA? section) and the physical pain associated with OA may be alleviated through aquatic interventions employed by RTs. Through the use of warm water exercises administered by RTs along with the weightlessness of the water, individuals impacted by OA experienced increased satisfaction, less joint pain and pressure on the joints, improved balance, improved cardiovascular strength and increases in range of motion (Zych, 2011). In addition, the warm water reduces stiffness and allows joints and muscles to relax, making exercises more effective than land exercises based on aquatic interventions administered by RTs (Guo et al., 2009). Davis and Nelson (2015) described additional benefits such as increased motor functioning improved quality of life are associated with aquatic therapy interventions for individuals with osteoarthritis.

Multiple sclerosis

Multiple sclerosis (MS) is a disease of the central nervous system that disrupts the flow of information within the brain, and between the brain and body. The National MS Society reports that close to 1 million people (18 years or older) have MS in the United States and over 2.3 million globally (National Multiple Sclerosis Society, n.d.). Common symptoms that individuals with MS experience include fatigue, muscle weakness, heat intolerance, pain, anxiety, stress, depression, and cognitive dysfunction (National Multiple sclerosis society, n.d). RTs support individuals with MS by developing activities in the water that are fun yet challenging to produce outcomes of positive emotions such as enjoyment and reduction in overall symptoms (Broach et al., 2007). Additionally, Broach et al. (2007) found that individuals with MS reported increases in levels of energy, movement, social interactions, and improved ability to relax after aquatic interventions administered by RTs.

Cerebral palsy

Cerebral Palsy (CP) is caused by brain injury or malformation early on in a child's development and is a neurological impairment that affects the nervous system causing movement disorders. The Centers for Disease Control and Prevention reports that CP is one of the most prevalent childhood motor system disorders impacting anywhere from 1.5 to more than 4 per 1,000 births in the world (Data and Statistics for Cerebral Palsy, 2019, Prevalence and Characteristics section). The primary characteristics of cerebral palsy include weakness, paralysis, poor muscle tone, and a lack of coordination (Cerebral Palsy Alliance Research Foundation, 2018). According to Passmore and colleagues (2018), warm water aquatic therapy, instructed by RTs who have obtained a certification in aquatic therapy, has the ability to increase the range of motion of the cervical spine in individuals with CP as the water temperature aids in relaxation and increased blood flow which

contributes to an increased range of motion. While other populations may benefit from warm water therapy, this intervention has specifically shown to help individuals with CP who generally experience a sequence of pain (Passmore et al., 2018). Interestingly, it has been found that using the aquatic interventions were effective for increasing the overall range of motion in the cervical spine in individuals with CP (Passmore, et. al., 2018).

Autism Spectrum Disorder

Autism spectrum disorder (ASD), which conservatively impacts 1 in every 56 individuals (Baio et al., 2014), is a neurodevelopmental disability that includes difficulties with social communication and interaction, the presences of restrictive and repetitive patterns of behaviors, interests, and activities. ASD is believed to impact individuals throughout their lifetime (American Psychiatric Association, 2013). One common characteristic of ASD is stereotypical repetitive behaviors. These debilitating behaviors are considered common, as it is believed that 88% of children, with autism spectrum disorder, perform at least one stereotypical repetitive behavior (Chebli et al., 2016). Examples include whole body movements (example: rocking back and forth), hand gyrations (example: flapping of the hands), object manipulation (example: manipulating a stress ball), and vocal stereotypes (example: repetitive phrases) (MacDonald et al., 2007). Additional characteristics include interferences with social skills (Jones et al., 1990), impaired communication (Shriberg et al., 2001), delayed skill acquisition (Ming et al., 2007), exclusion from peers (Church et al., 2000), and reduced learning potential (Morrison & Rosales-Ruiz, 1997). There are a variety of reasons why aquatics may be considered a pragmatic treatment modality for those with ASD. This includes, the buoyancy of water reduces tension on the body, the consistent and moderate temperature as well as gravity eliminated environment is well tolerated for those with sensory processing difficulties (Vonder Hulls et al., 2006), water activities have reduced external demands such as communication that are not required for swimming proficiency, and the repetitive nature of swimming skills may be a good match for those with ASD (Lawson et al., 2014).

Although, this treatment modality has been recommended for those with ASD, only two studies have investigated aquatic therapy from a TR perspective. For example, Gaskell and Janssen (2014) used the Aquatic Behavior Observation Scale (ABOS) to explore the effectiveness of a structured aquatic swimming program in three males ages 6.5 to 8 years old. In this investigation, aquatic therapy techniques included Ai Chi, Ai Chi Ne, and the Halliwick Method. In terms of *oriented to the present*, they found that two participants showed improvements in relations to others while one participant showed improvements in maintaining boundaries of others. In terms of *social and communication skills*, one of the participants showed improvements in all five domains (eye contact, verbalization,

vocalization, interpretation, and decreased gestural imitation), whereas one participant improved in vocalization and interpretation and the final participant improved in verbalization. In terms of *control of emotions*, two participants should improvements in impulsivity. Finally, in terms *response to stimuli*, one participant improved their vestibular gravity, whereas the remaining participants improved their proprioception (Gaskell & Janssen, 2014). Furthermore, Lawson and colleagues (2014) used a sensory supported swimming intervention to explore its impact on improvement of skills, interest in swimming, and physical activity levels of youth with ASD ages 4 to 15 years old reporting that about 27% of participants improved skills within their starting level, 63% advanced one skill level, and 10% advanced two skill levels. Additionally, approximately 85% of parents reported that their children were more physically active when participating in the intervention. Furthermore, about 92% of parents reported that their child had an increased interest in swimming following the intervention. Finally, about 88% of parents responded positively about participating in family swimming activities (Lawson et al., 2014).

Those with ASD experienced an increase in social skills and interaction, communication skills and vocalization, maintaining attention, controlling impulsivity, ability to relate to surroundings, and ability to realize proprioception. Of particular concern for individuals with ASD, is drowning prevention as drowning is the third leading cause of death for children with ASD (CDC stat). Due the benefits, of aquatic therapy interventions, it is of the authors' recommendation that these programs are promising; however, those providing this service should consider extensive training to prevent adverse events from occurring.

Mental Health

Serious mental illness (SMI) is characterized by psychotic disorders, schizophreniform disorders, and mood disorders that significantly inhibit the daily functioning of the individual. The National Alliance on Mental Health Illness summarizes that in 2018, 1 in 25 adults (11.4 million) are diagnosed with a SMI in the United States (Mental Health by the Numbers, 2019, You Are Not Alone section). The Diagnostic and Statistical Manual of Mental Disorders, 5th ed. distinguishes differences in SMI and having a "functional impairment" (Mental Illness Policy Organization, n.d.) by describing individuals with functional impairments are able to operate in their daily lives with moderate to low level interventions (i.e. counseling or mood-altering medications). However, those with SMI are seen regularly by a psychiatric professional and are monitored for safety in their daily lives (Mental Illness Policy Organization, n.d.). Adults living with serious mental illness report overall low mood and low motivation for daily activities. In turn, this means low physical activity and low overall health. Previous research shows a correlation between physical activity and an increase in mood in

adults with SMI (Walter, 2014). More specifically, Walter (2014) analyzed an aquatic RT program and its effects on mood in adults in a mental health facility living with SMI such as Major Depressive Disorder, Manic Depressive Disorder and Psychotic Disorder. Following just one aquatic physical activity session, the participants in this investigation, reported an increase in positive mood and a decrease in negative mood (Walter, 2014). More research is needed to support the findings of increased positive affect from aquatic interventions.

Conclusion

The purpose of this paper was to highlight the role of the therapist in aquatic interventions from the perspective of RTs. RTs are in a position to continue to employ aquatic interventions to meet the needs of individuals with disabilities. Furthermore, techniques such as water shiatsu or WATSU, Bad Ragaz and aquatic proprioceptive neuromuscular facilitation have been utilized by RTs to produce a functional change in individuals with disabilities. Each one of these aquatic interventions provides different functions such as relaxation, stretching, and aerobic exercise and each has the ability to improve strength.

A wide-range of certifications exist in aquatics that span from those that focus on specific populations (MS or OA) and/or intervention techniques (Halliwick, Bad Radgaz, or Watsu) as well as those dedicated to therapy and rehab (Aquatic Therapy & Rehab Industry Certification), aquatic fitness, and adaptive aquatic instructors (Jake, 2008). However, RTs and other allied health professionals must continually review the literature and attend workshops/seminars to employ effective evidence-based practices. Finally, it is the authors' recommendation that the aquatic protocols included in this review be examined to gain a more cohesive understanding of the current water-based modalities.

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