Effectiveness of Physical Activity in Relation to the Quality of Life for Individuals with Disabilities

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of

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faculty in partial fulfillment of requirements for the degree of

Doctorate

of

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Abstract

Purpose: Adults with disabilities often face challenges meeting the recommended guidelines for physical activity, impacting their occupational engagement and quality of life (QoL). This study investigated the effects of a 6-week exercise program on timed-repetition-maximum in specific exercises and QoL of adults with disabilities.

Methods: A quasi-experimental design was used to collect data from 10 adults with disabilities, measuring the impact of a 6-week exercise training program on QoL. Physical activity was measured utilizing a timed-repetition-maximum test of four different exercises. Exercises were chosen by researchers to correlate with functional movement needed for daily occupations. QoL was measured using the Physical and Psychosocial Domains of the World Health Organization Quality of Life Scale-Disabilities (WHOQOL-DIS).

Results: A positive correlation was present between the 6-week exercise program and timed-repetition-maximum, as well as QoL. Results from all areas measured showed increases from the pre-test to the post-test.

Conclusion: The results of the present study suggest that participation in a structured physical fitness program can positively impact QoL for adults with disabilities.

Key Words: physical activity, disability, quality of life, timed-repetition-maximum, occupational engagement, exercise

Introduction

According to Matuska and Barrett (2014), “occupational patterns should enable people to meet important needs such as supporting biological health and physical activity [PA]” (p. 169). An emphasis on PA is discussed within biological health. PA is an attribute of movement capabilities that require energy expenditure, such as walking to class, taking the stairs, propelling oneself in a wheelchair, or cleaning the house. It has been suggested that regular PA may have a positive impact on functional activities, engagement in occupation, and quality of life (QoL) in all individuals (Wagstaff, 2005). According to the American Occupational Therapy Association (2014), the term occupation refers to the daily life activities in which people engage. Whereas function is the ability of a person to perform whole-body tasks or skills that are part of the usual performance of humans, consistent with the individual’s purpose and priorities (Fell, 2018). QoL is considered the well-being amongst individuals, and includes physical, psychological, social, emotional, communicative, and material domains (Felce & Perry, 1995; Felce, 1997). According to the Health and Human Services Office, and Council on Sports (2017), “25.6% of persons with a disability reported being physically inactive during a usual week, compared to 12.8% of those without a disability” (para. 7). The Americans with Disabilities Act (ADA) (2019) defines disability as “a physical or mental impairment that substantially limits one or more major life activities of such individual” (para. 8). Low levels of PA in individuals with disabilities result from numerous functional limitations and physical and social barriers.

Problem

Individuals with disabilities have difficulty meeting the recommended 150-minutes of weekly moderate-intensity PA due to their functional limitations impacting their independence in daily activities and QoL (Centers for Disease Control and Prevention, 2018). Limitations of disability vary within each individual and can include decreased mobility, decreased endurance, higher levels of pain, lack of self-confidence, among others. Deficits in these areas have led to lower PA levels within this population. “Low PA and fitness were found to be associated with larger activities of daily living (ADL) dependence” (Komatsu et al., 2013). In addition to individual limitations, there are community and social barriers. The most commonly reported barriers for exercise among people with physical disabilities are inaccessible facilities, associated costs, problems with transportation to and from the facility, and lack of energy and motivation (Junker & Carlberg, 2011). The barriers, among other challenges, make it difficult for individuals with disabilities to engage in daily PA and limit community involvement.

Background and Need

According to the Centers for Disease Control and Prevention (2018), “adults of all shapes, sizes, and abilities can benefit from being physically active, including those with disabilities” (para. 4). Individuals who meet PA guidelines have shown a higher self-reported QoL. “Adults with chronic conditions or disabilities, who are able, should follow the key guidelines for adults and do both aerobic and muscle-strengthening activities. Recommendations emphasize that moving more and sitting less will benefit nearly everyone” (Piercy et al., 2018). Participation in occupations that are meaningful to an individual is a significant factor impacting QoL. Additionally, Schalock et al. (2005) identified that community integration and participation, community roles, and social supports could be indicators of QoL (Hall, 2017).

Many contextual and personal factors affect participation in exercise. Individuals with disabilities feel as if they know too little about their own body and disability to participate in PA, indicating a decreased sense of belonging in any fitness facility (Junker & Carlberg, 2011). People with disabilities "are looked upon, identified, judged, and represented primarily through their bodies, which are perceived in popular consciousness to be imperfect, incomplete and inadequate" (Hargreaves, 2000, p. 185). The stereotypical gym setting values physique and strength, promoting slogans such as "no pain, no gain." Phrases like these contraindicate the restrictions of individuals with disabilities who go to the gym to be active, maintain, and improve function. This type of language can be a factor indicating instructors' lack of knowledge about disabilities and their skill to adapt exercise to meet the needs of all individuals. Exercise programs specifically designed for individuals with disabilities are limited (Kotte, Groot, Winkler, Huijgen, & Takken, 2014, p. 1307). Therefore, individuals with disabilities do not have an equal opportunity for guidance throughout exercise programs. Creating more opportunities to participate in PA has a high potential to increase QoL, including social support from family and friends, playing a vital role in exercise participation. According to Hall (2017), people with disabilities face unwelcoming communities and often face "antagonistic looks, body language and verbal comments that [are] intimidating and hurtful" (p. 860). Therefore, the lack of inclusion in the community has the potential to impact QoL negatively.

Participation in PA is positively associated with the physical and total QoL amongst individuals with disabilities. Concerning PA, as one integrates muscle strength, maintenance of limb functioning, and hand coordination throughout daily activities to further increase vocational opportunities, QoL is improved (Chen & Chang, 1999; Frey, Stanish, & Temple, 2008). Older individuals who do not engage in PA often tend to have higher rates of frailty, decreased QoL, and a higher cost of living compared to other individuals their age (Schijndel-Speet, Evenhuis, Wijck, Montfort, & Echteld, 2017). In accordance to Hall (2017), a lack of physical engagement led to decreased muscle strength, which in turn resulted in reduced ability to complete ADLs, negatively impacting their social participation, vocational involvement, and QoL. However, individuals with disabilities who engaged in PA more often displayed lower rates of depression, fatigue, and pain (Motl, McAuley, Snook, & Gliottoni, 2009). Overall, engagement in PA may increase QoL, social participation, and community involvement.

While engagement in movement has shown to increase QoL, previous literature has not addressed specific functional tasks and occupations. One participant in a study by Flecky, Bornman, Boyer, and Huckabee (2019) stated:

> I think it's easy to get caught up in working on just performance skills and not really looking at if there is improvement or no improvement in that area affecting participation. We need to be intentional with finding out if it's impacting their participation, but sometimes we forget to bring it back full circle to function and participation and what matters most to them. (p. 6)

Junker and Carlberg (2011) found multiple positive effects of exercise, including reduced spasticity, a sensation of more flexibility, and improvements in ADLs and walking ability. Therefore, engagement in PA has the potential to increase functional skills that support ADLs, work, and leisure.

Purpose

The purpose of this quasi-experimental quantitative study was to determine whether completing a 6-week exercise training program has an effect on functional skills related to occupations and self-reported QoL for adults with disabilities participating at TNT Kid's Fitness and Gymnastics in Fargo, North Dakota. Researchers examined the effects of timed-repetition-maximum in specific exercises, including step-ups, body-weight squats, overhead press, and kettlebell swings for adults with disabilities. In addition, data was collected to measure the impact of a 6-week exercise training program on QoL for adults with disabilities.

Methodology

The Institutional Review Board at the University of Mary approved this quasi-experimental quantitative research study. Using this type of research design allows for causal claims to be made while considering alternate explanations. According to DePoy and Gitlin (2016), this research design includes outcome measures, experimental units, and treatments. However, there was no randomization of participants or procedures.

Participants

Through a partnership with TNT Kid's Fitness and Gymnastics, a non-probability convenience sample was used to recruit participants. A memorandum of understanding was obtained (see Appendix A and Appendix B). TNT Kid's Fitness and Gymnastics is a non-profit level 501(c)(3) organization that offers a variety of programs for individuals of all ages and ability levels to provide growth, learning, PA, and social integration (TNT Kid's Fitness and Gymnastics, 2019). A total of 12 adult participants with a variety of disabilities in the facility's No Limits Fitness program were recruited. Inclusion criteria for the study required participants to attend 4 out of the 6 total sessions, as well as completion of the pre-test and post-test. Inability to meet the criteria resulted in only 10 participants being included in the study. All participants fell within an age range of 22 to 66 years.

Table 1
Participant Demographic Information

Characteristics	*Total*
Sex	
Male	10
Female	2
Age	
Under 30	10
30 & Older	2
Employment Status*	
Employed	9
Unemployed	3

*Paid or unpaid vocational opportunities within the community.

Procedure

Participants of this study completed a timed-repetition-maximum test and QoL questionnaire in a pre-test post-test format, each lasting approximately 60-minutes. Exercises included step-ups, bodyweight squats, overhead press, and kettlebell swings. Between the pre-test and post-test, participants attended a 6-week exercise program led by trained fitness coaches employed at TNT Kid's Fitness and Gymnastics. The duration of each class was approximately 50-minutes and included two 5-minute cardiovascular warm-ups, a 5-minute dynamic warm-up, and a high-intensity interval circuit. Upon completion of each session, participants and coaches gathered for a debrief huddle, which emphasized the positives of the group and provided affirmation for work ethic.

Instrumentation

The data for this study was obtained through two separate forms of measurement, a timed-repetition-maximum test and the World Health Organization Quality of Life Scale-Disabilities (WHOQOL-DIS) questionnaire. The researchers of the proposed study developed the timed-repetition-maximum test. A set of four exercises that correlate with occupational skills needed for daily activities were selected. As stated in the procedures section, exercises included step-ups, bodyweight squats, overhead press, and kettlebell swings. A written and visual description of each of the four exercises is included in Appendix C. To ensure reliability, researchers gathered before data collection and practiced scoring videos of different individuals completing the chosen exercises. Each researcher individually scored the exercises, and then the results were compared to ensure consistency. Scoring discrepancies were reviewed by all researchers to increase the reliability of the data collected. Also, researchers were randomly assigned to observe a pair of participants during the pre-test and post-test.

The Physical and Psychosocial Domains of the WHOQOL-DIS assessed the self-rated QoL in individuals participating in the study. This assessment was designed specifically for individuals with disabilities. Researchers acquired permission from the authors of the WHOQOL-DIS before use. Appendix D includes a copy of the WHOQOL-DIS assessment, and Appendix E contains the permission to use the assessment. The Cronbach alpha value, a measure of internal reliability, is 0.852 for the WHOQOL-DIS. The Physical and Psychosocial Domains have Cronbach alpha values of 0.816 and 0.818, respectively (Power & Green, 2010). The WHOQOL-DIS measures an individual's self-perception about their QoL. Authors of the WHOQOL-DIS found that those who reported they were not disabled scored a higher self-reported QoL. Individuals who said they believed they were disabled scored a lower QoL.

The overall time frame of the study was 8-weeks. Weeks 1 and 8 were reserved for the pre-test and post-test while weeks 2 through 7 were observation sessions of the intervention. Each intervention was held one time per week for 50-minute sessions. The pre-test and post-test each took approximately 60-minutes to complete the testing and questionnaire. Attendance was taken at the start of every class and totaled following the completion of the study.

Data Collection

Participant demographics, including age, gender, and employment, were acquired during the pre-test. Appendix F includes a copy of the demographic form. Before the timed-repetition-maximum test, each participant practiced five repetitions of each exercise tested to ensure understanding. During the test, the coach instructed individuals to give their best effort.

Each exercise took place in a different quadrant of the gym. The coach separated participants into pairs, and one partner completed the exercise for 2-minutes while the other person rested. A 30-second break between each set allowed time for the pair to transition. After both partners completed an exercise, they rotated to the next station. Two participants required exercise modifications, such as maintaining a seated position for some exercises. Therefore, modifications were made to complete the timed-repetition-maximum test. Researchers verbally administered the WHOQOL-DIS with each participant. A numerical visual aid assisted with comprehension and communication during administration (see Appendix G). For the pre-test and post-test, researchers scored a randomly assigned pair of participants. Researchers maintained a distance from the participants, making efforts not to cause any form of distraction. The data collection form created by the researchers can be found in Appendix H.

Intervention

The intervention for this study was 6-weeks of the No Limits Fitness class at TNT Kid's Fitness and Gymnastics. Every week, one of the six researchers observed the class, and recorded behaviors, noted the weekly exercise regimen, and took attendance to ensure compliance of the study parameters. A different researcher observed each week to eliminate any potential biases. Refer to Figure 1 for the weekly exercise regimens.

Table 2

Weekly Workout Regimen

	Warm-up	Workout of the Day
Week 1	Dynamic warm-up consisting of 2 laps down and back, 10 high knees, 10 butt-kickers, 10 jump ups, 10 leg kicks, 10 s quick feet, 10 wood chops	20 burpee jumps over PVC pipe (or 3-min) 40 crossack squats holding PVC pipe (or 3-min) 2-min of leg lifts/sit-ups 5 burpee jumps over PVC 10 crossack squats
Week 2	Dynamic warm-up, refer to Week 1 Daily specific warmup consisting of 30 s wall-sits 3x each, 30 s squat to a target 3x each, 5 push-ups, 5 overhead slam balls	90 s rounds alternating with a partner (5 rounds) Rounds 1 to 2, 5 to 6, 9 to 10 consisted of 10 squats and 8 burpees Rounds 3 to 4 and 7 to 8 consisted of 10 slam balls and 8 burpees
Week 3	Dynamic warm-up, refer to Week 1 Daily specific warm-up consisted of 3 rounds of 10 small hops, 10 tall hops, 3 box jumps, 3 box step-ups, 2 burpees, and one lap down and back	12-min as many rounds as possible (AMRAP) 8 to 10 burpees 20 kettlebell box step-ups (high box) 30 kettlebell swings

		3 complete rounds; burpees and 20 kettlebell box step-ups in addition (not complete round)
Week 4	Dynamic warm-up, refer to Week 1 Daily specific warm-up consisted of 10 PVC around the worlds, 10 PVC front raises, 10 PVC left/right arm raises, 10 PVC press, 10 PVC behind the neck press, 10 PVC good-mornings, 10 PVC torso twists Practice strict press with heavy body bars	4 rounds of 2-min hard cardio directly into a heavy strict press. The class was split into two groups.
Week 5	Dynamic warm-up, refer to Week 1 Daily specific warm-up consisted of running down and back, 10 kettlebell swings, and carry 2 kettlebells or dumbbells down and back	12 to 15-min AMRAP 1 round included: running down and back, kettlebell or dumbbell carry down and back, and kettlebell swings The workout consisted of 4 rounds: Down and back increased from 1 to 6 kettlebell or dumbbell carry down and back increased from 1 to 6 kettlebell swing increased from 5 reps to 20 reps
Week 6	Dynamic warm-up, refer to Week 1 Daily specific warm-up consisted of 5 burpees with a kettlebell, 5 kettlebell high pulls, 5 kettlebell halos, 5 kettlebell squats, 5 push-ups	The workout consisted of 4 rounds of each station: Stations included: 8 kettlebell front squat, 16 kettlebell deadlift with high-pull, 16 plank kettlebell taps, 16 push-ups (4 sets of 4)

Note. Each session started with a 10-minute cardiovascular warmup of individuals' choice.

Data Analysis

Analysis of the data was performed using the Statistical Package for Social Sciences (SPSS) software. An alpha level of 0.05 was used to determine if the findings were statistically significant. Two participants did not meet the inclusion criteria for this study. Therefore, their data were excluded from the analysis. The independent variable of this study was the 6-week exercise training program. The dependent variables were timed-repetition-maximum and self-reported QoL. Researchers used SPSS to run a paired sample *t*-test to determine if there was a significant difference between our pre-test and post-test results. Kellar and Kelvin (2013)

explain that a paired sample *t*-test is used when data gathered from the pre-test and post-test come from the same participant, and they are not independent of each other. Utilization of these inferential statistics can help determine if PA had an impact on QoL. Researchers utilized member checking, an audit trail, and peer debriefing to ensure the accuracy and trustworthiness of this study.

Results

A paired-samples t-test was conducted to compare the results of a 6-week exercise training program on four different timed-repetition-maximum exercises (figure 1) and participants' self-reported QoL (figure 2). There was a positive difference in mean scores pre-test to post-test for all exercises and QoL domains tested: squats (M = 21.8, SD = 26.87), kettlebell swings (M = 4.0, SD = 14.14), overhead press (M = 18.4, SD = 14.61), step-ups (M = 6.2, SD = 15.82), physical WHOQOL-DIS (M = 0.8, SD = 2.57), and psychosocial WHOQOL-DIS (M = 0.3, SD = 5.89). The overall pre-test and post-test for the WHOQOL-DIS domains are (M = 1.1, SD = 5.95). These results suggest that participating in a 6-week exercise training program affects the capability of individuals to perform the four exercises used for the time-repetition-maximum test and correlates to increased self-reported QoL. During the 6-week exercise program, researchers observed improved physical performance due to staff motivation, socialization, and exercise activity preferences.

Figure 1

Summary of Pre-Test and Post-Test Timed-Repetition Maximum Mean Scores

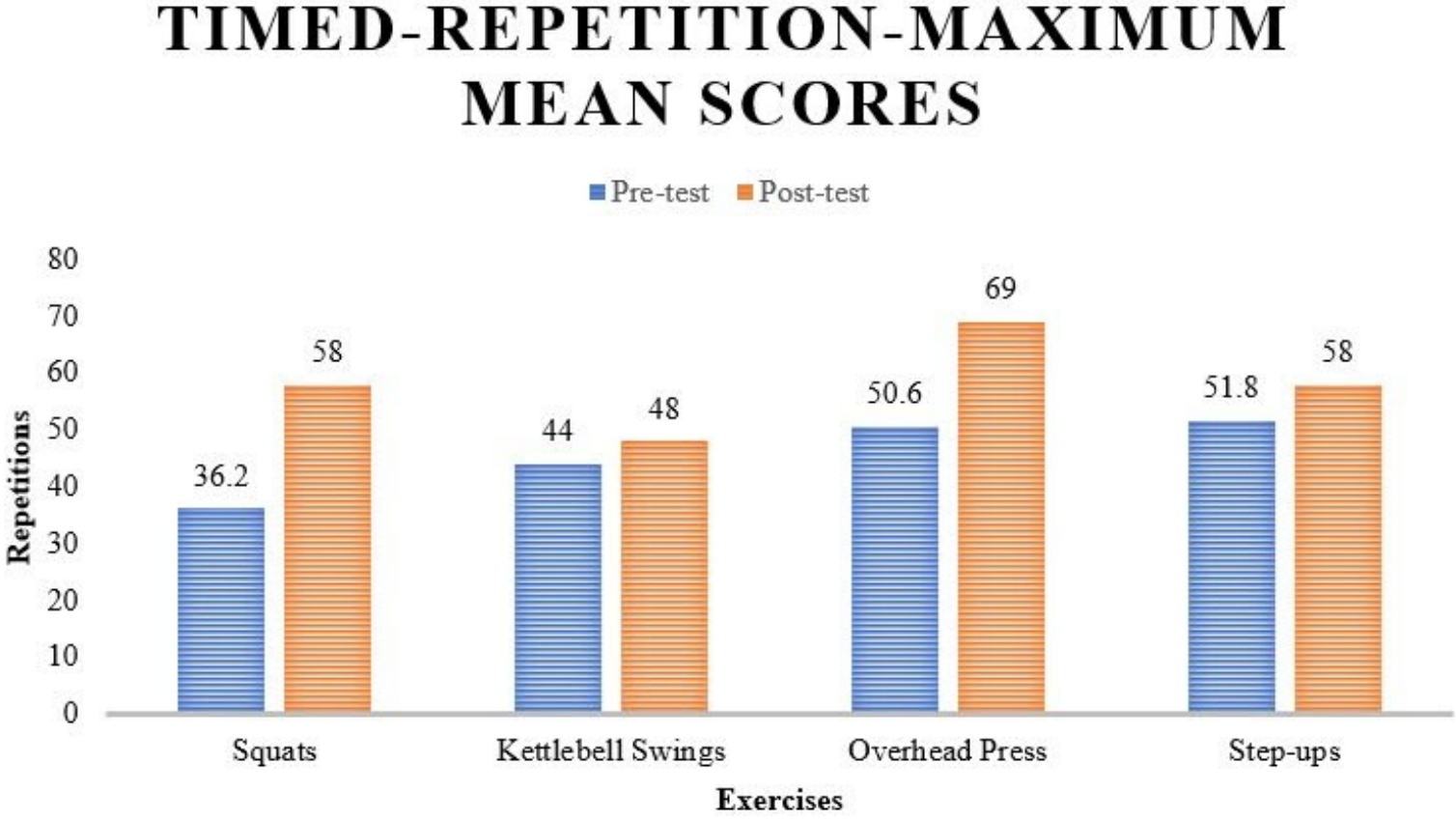
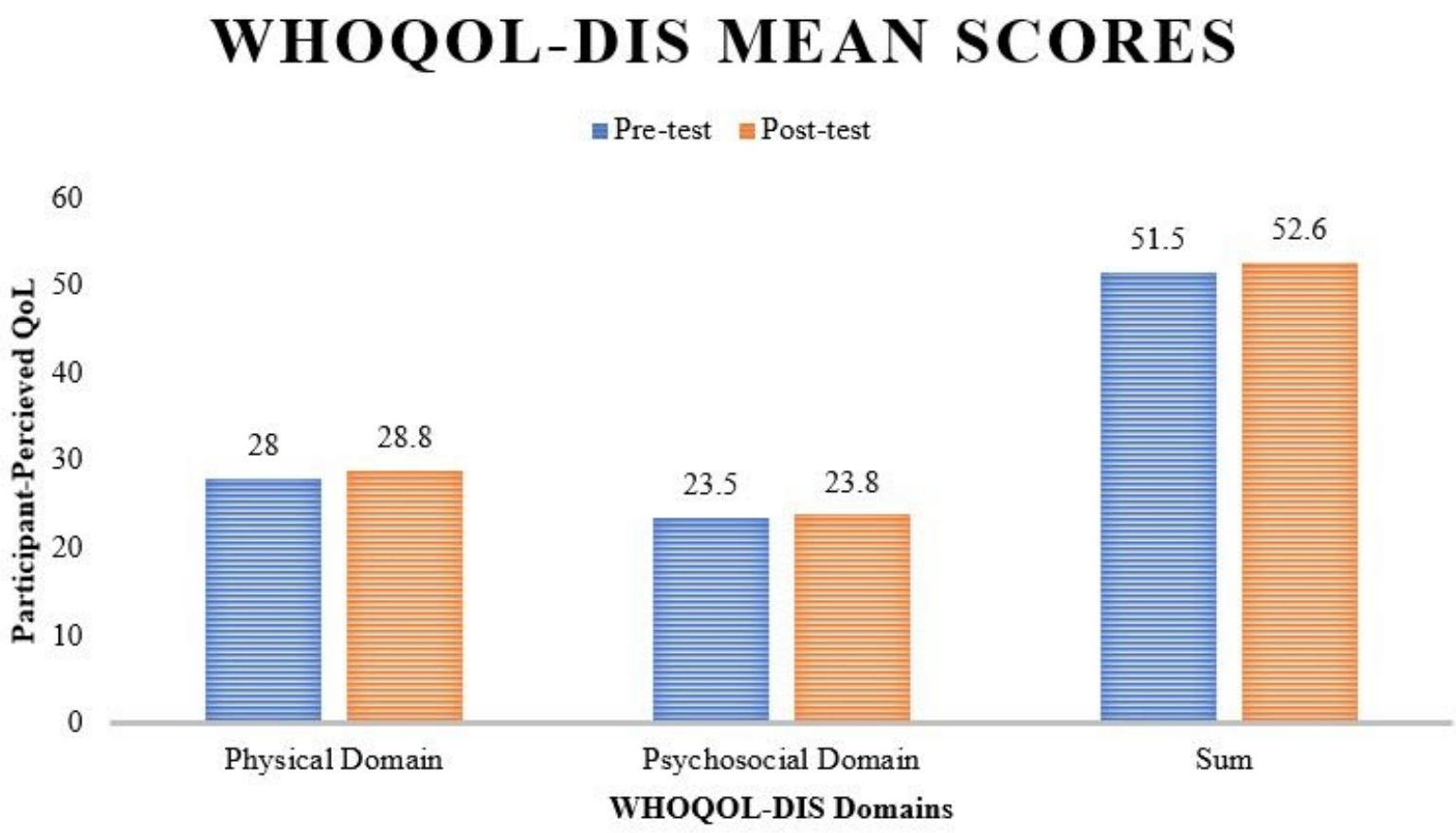


Figure 2
Summary of Pre-Test and Post-Test WHOQOL-DIS Mean Scores



Discussion

This study aimed to determine the effect of participating in a 6-week exercise training program on timed-repetition-maximum scores and QoL. Following the exercise program, participants' timed-repetition-maximum test results increased in all four exercises tested. Individuals showed the most significant improvement in repetitions of squats and overhead press. Although the margin of mean scores was not as substantial, there was an increase from pre-test to post-test in step-ups and kettlebell swings. While results were not considered significant, mean scores from both the Physical and Psychosocial Domains of the WHOQOL-DIS assessment increased from pre-test to post-test.

Timed-Repetition-Maximum Exercises

The exercises chosen within the study were selected to reflect occupational engagement. Each exercise increases one's strength and coordination of movements needed for occupations or one's daily life activities. Kao and Wang (2018) discovered that many individuals with an intellectual disability take part in unskilled work with additional focus on manual labor. It was found "that lifting work occurred mostly below the chest level and included cardboard or material handling, lifting baking shelves and so on" (Kao & Wang, 2018, p. 101). Therefore, squats and kettlebell swings were selected to simulate lifting skills within various occupations such as ADLs, instrumental activities of daily living (IADLs), and work. Occupations specific to squats and kettlebell swings include toileting, care of pets, community mobility, home management, and cooking. This study found a substantial increase in participant's mean scores of squats and a small increase in mean scores of kettlebell swings. These findings could be attributed to the multidimensional components of a kettlebell swing versus a squat, which is a

more commonly used movement. Many participants met the criteria for squats, which is a component of performing a kettlebell swing. However, when swinging the kettlebell, many repetitions were not recorded due to participants not meeting the criteria of having elbows extended when completing the motion.

Adults with disabilities tend to engage in jobs that require good physical strength and operating speed to fulfill job requirements, of which upper limb motor function is an essential component. Subsequently, the overhead press was measured to correspond with upper limb mobility and strength. “The upper limbs play a fundamental part in the execution of activities in daily life as much as they do in the execution of occupational tasks” (Giangiardi et al., 2018, p. 264). Overhead occupations related to daily life include shopping, meal preparation and clean up, leisure participation, and grooming. Researchers examined an increase in overhead press repetitions from pre-test to post-test. Some repetitions performed by participants did not meet the overhead press criteria of bringing the bar from below the chin to above the head with extended elbows. Difficulty meeting criteria occurred more frequently during the pre-test. Potential factors that positively influenced the performance of overhead press post-test scores include task repetition of the exercise throughout the 6-week exercise program, resulting in increased muscle memory and improved understanding of the exercise.

Researchers determined step-ups corresponded to functional gross motor movements associated with ADLs, IADLs, leisure, and work. This exercise works on balance, which is vital for mobility in the home and community (American Occupational Therapy Association, 2014). For example, climbing a step-ladder, going up and down the stairs, stepping over the side of a tub for bathing, stepping into a vehicle, and hiking, are all occupations using the motion of step-ups. Gill et al. (2016) found the preservation of community mobility is integral to maintaining QoL, including participation in activities required to be fully independent and engaged in the community. Participants’ pre-test scores for step-ups were relatively high, which could have been due to participants frequently completing this exercise in daily warm-ups and classes. Conclusively, beginning with a high number of repetitions, the results were not as substantial for the post-test.

Quality of Life

Due to having a high validity and reliability, researchers chose the WHOQOL-DIS to measure QoL amongst participants in this study. Synonymous with previous research, the findings of this study showed an increase in self-reported QoL after engaging in PA in an exercise program. According to Motl et al. (2009), individuals with disabilities who were more physically active reported lower rates of depression, fatigue, and pain. A positive correlation between motor abilities and QoL justifies the importance of improving the motor skills of individuals with severe multiple disabilities; higher motor abilities significantly relate to higher QoL (Mensch et al., 2019).

Two domains of the WHOQOL-DIS were used to measure QoL. The first, Physical Domain, measured areas such as one’s perception of their energy, participation at work, dependence on medication, and daily living activities. The second, Psychosocial Domain, measured components of the individual, such as self-esteem, spirituality, body image, and positive or negative feelings about oneself. For both domains, there was a slight increase in QoL scores from the pre-test to the post-test. Caregiver support, staff motivation, the mood of the athlete, or preference of exercises performed potentially influenced an increase in scores.

Observations

After observing each No Limits Fitness session, researchers shared their findings at a research debriefing. During the data collection process, researchers noted observations that may have impacted the results of the study, such as social participation and motivation. For example, researchers observed participants encouraging one another during exercises with positive words and high fives. Other observations that could have impacted results included class engagement and dynamics. Examples include counting with the instructor during exercises and assisting with the set-up and clean-up of the class. Participants, the instructor, and caregivers danced between workout intervals to the music playing in the gym.

Additionally, the coach facilitated engagement by greeting every participant by name when entering the room. The sessions also began with a "question of the day," which consisted of the coach asking a question, such as "if you could learn a new skill, what would it be?" Each participant was allowed to respond to the question while everyone else listens to facilitate open conversation throughout the session. Each class session was terminated by gathering in a huddle, putting their hands together, and shouting, "One, two, three, TNT" to assist with transitioning. At the end of one session, a participant was slow to join the huddle, and another participant made sure he was included and encouraged him to put his hand in the huddle. Overall, the camaraderie and atmosphere of the class was uplifting and welcoming for all involved.

Implications for Practice

Although the Centers for Disease Control and Prevention (2018) guidelines suggest all individuals should participate in 150-minutes of moderate-intensity PA per week, individuals with disabilities often do not meet the recommendations. As a result, they may experience lower levels of physical mobility, endurance, and QoL. The effects of No Limits Fitness had small but positive effects in regards to QoL for adults with disabilities. Exercise programs specifically catered toward this population and corresponding to occupations are implicated for healthcare professionals, including clinicians, physical therapists, and occupational therapists, to include in treatment planning.

Barriers to PA are highly prevalent for adults with disabilities. Healthcare professionals and facility coaches should recognize and understand the effects barriers can have on occupational engagement and QoL. Creating more programs like No Limits Fitness to increase opportunities for engagement for this population should be considered. Healthcare professionals' awareness of programs, such as No Limit Fitness, may aid in the referral of clients with disabilities to exercise programs that meet their needs. It is paramount for healthcare professionals to educate individuals with disabilities and their caregivers on the positive effects of engaging in PA, and its impact on QoL.

Limitations

Limitations of the study include a small sample size and the use of a convenience sample recruitment process at TNT Kids Fitness and Gymnastics. Before the study, all participants were already taking part in weekly No Limits Fitness classes at the facility. However, the study was only conducted over 8-weeks, limiting researchers from observing the long-lasting effects of PA, especially regarding occupational performance. While the WHOQOL-DIS was explicitly designed for individuals with disabilities, the varying cognitive levels of our population could

have impacted the results. Also, staff members accompanying participants varied throughout the entirety of the program, which may have affected motivation levels attributing to pre-test and post-test scores. The limitations of the study decrease the generalizability of the results and the statistical power of the findings.

Suggestions for Future Research

Further research exploring the effects of PA on QoL is needed. Researchers suggest partnering with individualized community-based support services to measure aspects of occupations within the home of the participants. Conducting interviews with agencies may uncover how exercise may be beneficial for increasing participation in daily activities. Researchers suggest investigating the implications of an exercise program for improvement in skills needed for vocational performance. Repetition of the current study following a larger group of participants, not currently enrolled in an exercise program, may be beneficial for increasing the statistical power of the results. Recruiting participants from a broader geographical pool to measure the impact of PA over a longer duration of time may produce greater generalizability of results.

Conclusion

Our findings suggest that there is a positive correlation between PA and QoL for individuals with disabilities, specifically the physical and psychosocial aspects of life. Participating in a 6-week exercise program can improve one's physical performance and engagement in everyday occupations at home, work, and community settings. It is essential to understand the barriers and assets that impact participation of individuals with disabilities in exercise programs to promote increased QoL. Therefore, facilities such as TNT Kids Fitness and Gymnastics are important for enabling participation and an inclusive environment for all.

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Appendix A
Memorandum of Understanding

UNIVERSITY OF MARY
Program in Occupational Therapy
Division of Human Performance Sciences

A G R E E M E N T

WHEREAS, University of Mary, Bismarck, ND, hereafter referred to as the University, is currently conducting an *Occupational Therapy Curriculum* within the University and desires to obtain clinical education for the students enrolled in the curriculum;

WHEREAS ***TNT Kid's Fitness & Gymnastics*** hereafter referred to as the Facility, has an *Occupational Therapy Department* and is willing to furnish clinical education in *Occupational Therapy* for students of the University:

NOW, THEREFORE, in consideration of the mutual agreements set forth herein, **TNT Kid's Fitness & Gymnastics** agrees as follows:

1. *Responsibilities of the facility*:
   - Provide a jointly and appropriately planned and supervised program of clinical experience
   - Facility has ultimate responsibility for patient care
   - Maintain records and reports on each student's performance and inform the school of unsatisfactory performance on a timely basis
   - Evaluate the student's performance and provide a copy to the school
   - Permit the inspection of the facilities and the student's record
   - May request that a student be removed from the practice setting when appropriate and may remove a student immediately if deemed necessary. The facility will notify the school in the event a student is removed for any reason.
   - May remove a student whose health status is hazardous to the service recipients or personnel
   - Provide the academic and clinical credentials of any person supervising or teaching the student
   - Provide student access to emergency services via calling 911 in accordance with facility's policies, with student responsible for costs if appropriate
   - Provide updated information on a timely matter to the school including health requirements
   - The Facility assumes no obligation for compensation or reimbursement to the student under this Agreement, nor shall facility be responsible for Workers Compensation or any other benefits.

In addition, the facility will provide the following

_____ Yes ___x__ No A room at or nearby the facility free or at a reduced cost
_____ Yes ___x__ No Meals free of charge ___/day
_____ Yes ___x__ No Stipend
_____ Yes ___X__ No Other _____

2. *Responsibilities of the school*:
   - Provide student information that is legally permissible
   - Provide information about the program and University objectives
   - Assure that the student has been informed about the health requirements of the facility and meets these health requirements
   - Conduct a multi-state criminal background check including OIG excluded provider status on any students provided to Facility under this MOU that is not more than one year old
   - Assure that the prerequisite coursework for the particular type of experience has been successfully completed
   - Designate a faculty member to coordinate with the facility - arbitration of disputes shall be the responsibility of the faculty member in charge of clinical education
   - Enforce the rules and regulations governing the students
   - Provide proof of professional liability insurance covering the student(s) in a minimum amount of $1,000,000 per occurrence and $3,000,000 aggregate
   - Remove the student from the practice setting if requested by the facility.
   - Assure that the student has been provided a copy of this Agreement prior to their clinical rotation and has read and understands their responsibilities.

3. *Responsibilities of the student*:
   - Serve others in ways that model the professional, religious, ethical, and humanistic values inherent in the Benedictine tradition of health care established by the University sponsors, the Sisters of Annunciation Monastery;
   - Follow the administrative policies of the facility
   - Follow the facility's regulations regarding professional attire
   - Follow the schedule and operating hours of the facility
   - Gain written permission from the facility before publishing any written material relating to the clinical education experience
   - Provide transportation to and from facility
     Subsidize and provide documentation and proof of immunization and criminal background check results as required by the facility

4. *General*
   - It is understood that students and supervising faculty may have access to patient records or other personal health information (PHI) as part of this clinical experience. All patient records are and shall remain the property of the Facility. College agrees that is employees and students shall maintain patient confidentiality with respect to any PHI or other confidential information to which they may have access. College employees and students shall fully comply with applicable federal, state, local and Facility laws, rules and policies concerning patient confidentiality, including requirements imposed by the Health Insurance Portability and Accountability Act of 1996, as amended (HIPAA). Facility may require that each participating student execute a document acknowledging this requirement.
   - It is also understood that student or school may have access to student information as part of this MOU. Student and School agree to maintain the confidentiality of any educational records pertaining to students at facility pursuant to the Family Educational Rights and Privacy Act.
   - This agreement is of indefinite duration, however, it is subject to termination by either party upon 90 days' written notice to the other, delivered by registered mail.
   - This agreement shall be effective when executed by both parties.
   - Each party shall be responsible for claims, losses, damages, and expenses that may arise out of negligent acts or omissions of that party or its agents, employees, or students in performance of this agreement.
   - It is mutually agreed that there shall be no discrimination on the basis of race, color, religion, sex, age, national origin, disability, marital status or public assistance, in accordance with applicable laws.

University

By _____ **Date** _____
Executive Vice President

By _____ **Date** _____
Program Director in Occupational Therapy

By _____ **Date** _____
Academic Fieldwork Coordinator

Facility
By Leslie Pladson Frie **Date** 1/29/19
Clinical Coordinator of Clinical Education

By Kimberly Pladson **Date** 1-29-19
Facility Administrator

Appendix B
Memorandum of Understanding: Signed Agreement Letter

TNT Kid's Fitness & Gymnastics

2800 Main Ave. Fargo, ND. 58103 • tntkidsfitness.org • (701)365.8868

University of Mary Research Agreement Letter

July 22, 2019

After reading the Institution Review for Human Subjects Research proposal that TNT received from Dr. Kevin Anderson, TNT Kid's Fitness & Gymnastics grants permission to conduct the research outlined in the proposal at the TNT facility, located at 2800 Main Ave in Fargo, ND.

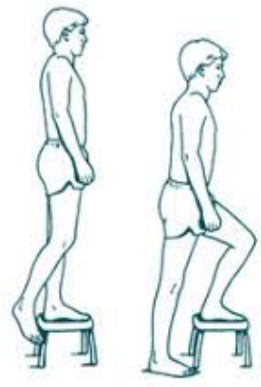
In addition to, TNT understands that the results of this study will be shared at a research colloquium and potentially published.

Ryan L Williams

Ryan Williams
Chief Operating Officer
TNT Kid's Fitness & Gymnastics

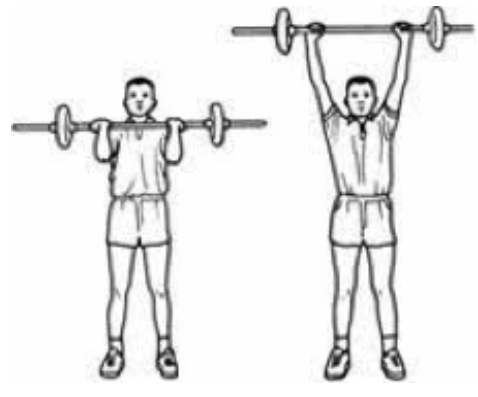
Appendix C
Exercises for the Timed-Repetition-Maximum Tests

Step-Ups



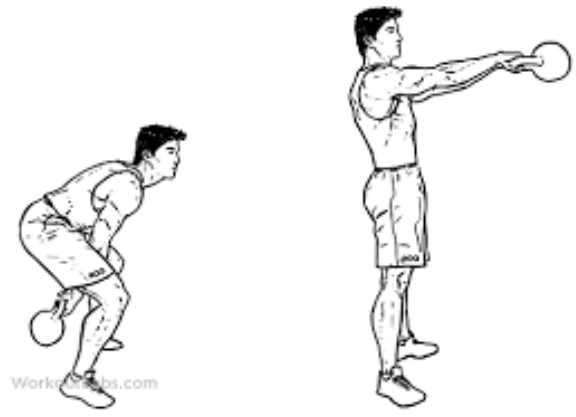
To start, stand in front of the step platform. Next, step up with your right foot flat on the platform then bring your left foot up onto the box. Lastly, step down with your right foot then left foot (Turbulencetraining4u, n.d.).

Overhead Press



To start, stand with feet shoulder width apart while holding the lifting bar at shoulder level, elbows bent, and palms facing outward. Next, press the bar overhead until arms are straightened but not locked. Lastly, lower the bar back down to shoulder level (Project Swole, 2010).

Kettlebell Swing



First, stand behind the kettlebell with feet slightly wider than shoulder width apart and grasp the handle of the kettlebell with an overhand grip. While grasping the kettlebell, drive hips forward while keeping back straight. Continue driving hips forward and straightening knees until kettlebell is at shoulder level (WorkoutLabs, n.d.).

Bodyweight Squat

First, stand with feet shoulder width apart and toes pointed forward. Next, slowly lower the body by bending at the knees and hips while keeping the back as straight as possible. Lastly, after bending knees down to 90 degrees, straighten legs and return to starting position (WorkoutLabs, n.d.).

Appendix E
Consent to use WHOQOL-DIS Assessment

Dear Mr. Kolander,

Thank you for submitting the online form and for your interest in WHO Quality of Life instruments.

On behalf of the World Health Organization, we are pleased to authorize your request to reproduce and/or translate the WHO Quality of Life (WHOQOL-100/WHOQOL-BREF/WHOQOL-DIS) as detailed in your application form, subject to the terms and conditions of the non-exclusive license below.

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If you have any other questions regarding permissions, please contact us. We thank you for your interest in WHO published materials. We take this opportunity to wish you all the best with your WHOQOL project.

With our best regards,

Dolores

Ms Dolores Campanario
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Appendix F: Participant Demographics

Please fill out this information to help us conduct better results for our study. Your name will not be shared with anyone other than the researchers.

Name _____

Age _____

Sex (circle one): Male Female I do not wish to share

Anything else? Years a part of TNT?

Appendix G
Visual Aid Modification