




The Impact of Aquatic Programme Activities on the Quality of Life for People with Disabilities in the Western Cape, South Africa

Johane Botha¹, Hannah Kate Connelly¹, Monique Rose Haydricks¹ and Makhaya Johannes Malema^{1,*} 

¹Department of Sports, Recreation and Exercise Science, Faculty of Community and Health Sciences, University of the Western Cape, South Africa

Abstract:

Introduction: Aquatic activities have been shown to enhance an individual's independence in functionality and contribute to an improved overall quality of life. The benefits that aquatic activities offer during rehabilitation or recreation have often been overlooked or underestimated for those with physical disabilities. Engaging in leisure, recreation, and physical activities, specifically water-based activities, can improve a person with disabilities' body composition, mobility, and overall quality of life.

Aim of the Study: This study aimed to investigate the impact of aquatic program activities on the quality of life of people with disabilities in the Western Cape.

Methods: This study used quantitative research methods that used a cross-sectional design. A total of 39 participants over the age of 18 years who participated in aquatic activities completed the questionnaire on Google Forms. The researchers explained the study details to the participants and clarified any questions before administering the questionnaire. Descriptive statistics were used to report the data for an individual's quality of life.

Results: Results of this study report that individuals engaging in multiple aquatic activities or participating more frequently tended to have higher Quality of Life scores. The current study demonstrated that participation in aquatic activities enhances the individual's feelings of independence about their functionality. Aquatic activities offer numerous benefits that improve the overall well-being of the individual.

Conclusion: The results contribute to the growing understanding of the positive effects of aquatic interventions, advocating for their inclusion in rehabilitation, recreational, and wellness programmes for individuals with disabilities.

Keywords: Aquatic activities, Aquatic environment, Disabilities, Physical disability, Physical therapy, Quality of Life.

© 2025 The Author(s). Published by Bentham Open.

This is an open access article distributed under the terms of the Creative Commons Attribution 4.0 International Public License (CC-BY 4.0), a copy of which is available at: <https://creativecommons.org/licenses/by/4.0/legalcode>. This license permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.



Received: June 21, 2024
Revised: September 12, 2024
Accepted: September 18, 2024
Published: February 26, 2025

*Address correspondence to this author at the Department of Sports, Recreation and Exercise Science, Faculty of Community and Health Sciences, University of the Western Cape, South Africa; E-mail: mmalema@uwc.ac.za

Cite as: Botha J, Connelly H, Haydricks M, Johannes Malema M. The Impact of Aquatic Programme Activities on the Quality of Life for People with Disabilities in the Western Cape, South Africa. *Open Public Health J*, 2025; 18: e18749445336312. <http://dx.doi.org/10.2174/0118749445336312240930090044>



Send Orders for Reprints to
reprints@benthamscience.net

1. INTRODUCTION

Participating in physical or sporting activities has been shown to have lasting benefits for individuals across various groups [1]. People with physical disabilities have fewer opportunities to participate in physical activities, even though their activity requirements are the same as

those of any other individual [2]. The main challenge is that physical activities are not adapted to meet the needs of people with disabilities, resulting in exclusion from participation [3]. Limited participation in physical activities leads to people with disabilities living sedentary lifestyles, which negatively impacts their cardiometabolic

profile, including increased risk of diabetes mellitus, insulin resistance, decrease in insulin sensitivity, increased adipose tissue, obesity, and reduced functionality of the cardiorespiratory system [4]. On the contrary, engaging in physical activity opens up opportunities that promote inclusion, improve an individual's self-esteem and self-confidence, and aid in reducing a person's level of depression and anxiety [5, 6]. Participating in adventurous leisure, recreation, and physical activities can be considered for people with disabilities. Such activities have the potential to assist people with disabilities to embrace their condition by engaging in adventure-seeking activities [5, 6]. Engaging in leisure, recreation, and physical activities, specifically water-based activities, can improve a person with disabilities' body composition, mobility, and overall quality of life (QoL) [5, 6]. People living with a condition such as Ankylosing Spondylitis (classified as a form of disability) who participate in water-based activities, as opposed to land-based activities, have reported improvement in their pain score and in the perception of their QoL [7, 8].

QoL is defined "as an individual's perception of their position in life in the context of the culture and value systems in which they live and concerns their goals, expectations, standards, and concerns" [9]. QoL includes a person's social, mental, and physical function and their limitations caused by particular disabilities and diseases [5, 6]. Many factors influence the QoL of a person with a disability. The factors of interest in the current study are physical and mental health, the opportunity to develop one's interests, and to carry out physical activities [5, 6]. The benefits of improved QoL through participation in sports and different recreational activities have often been overlooked or underestimated, especially for people with physical disabilities [10]. Disabilities, in general understanding, can be perceived from functional limitations, legal definitions, and subjective definitions. Functional limitations refer to the medical understanding of disability, such as the effects of physical and mental impairments on an individual's ability to perform daily activities [11].

Examples of physical disability include limitations on the limbs, such as congenital disorders or amputations, impairments of the nervous system, and sensory dysfunctions [2, 6]. Sensory dysfunctions refer to visual, hearing, and speech limitations and chronic diseases of the internal organs. Functional limitations can also include mental disabilities [2, 6]. Mental disability relates to a reduced level of intellectual performance [2, 6]. Legal definitions of disability are measured against a specific governmental criterion, which determines whether an individual qualifies for support and benefits based on their level of functioning [11]. The subjective definition refers to the individual's self-identification as disabled, which is a self-diagnosed condition [11]. Given this complexity, it is important to understand the physical activities available and viable for people with disabilities. This notion reflects the decline in physical activities often experienced by people with disabilities, such as reduced mobility [12]. Accordingly, the definition that will be used in our study is the one relating to functional limitations.

The types of physical therapy and activities that people with disabilities perform are often land-based [4]. Hydrotherapy and other water-based activities supply alternative options and benefits away from a typical rehabilitative environment [4]. During hydrotherapy, people with disabilities can participate in different types of exercises, allowing social interaction as the activity can allow group sessions [4]. Performing physical activities in groups helps to form social bonds, which, therefore, leads to higher levels of engagement [10]. WHO states that "water and its recreational use have been recognized as a major influence of health and well-being" and that "waterside environments contribute to making people happy and healthy" [2]. According to Hammill, hydrotherapy aids in "aerobic capacity, improves muscle strength and endurance, increases joint range of motion (anti-spasticity), decreases muscle fatigue and joint pain, enhances cardiorespiratory functioning, and has a reduced cardio-metabolic risk profile" [4]. The warmth of hydrotherapy pools can help with muscle relaxation and has been shown to reduce pain perception [13, 14]. Furthermore, learning to control breathing while exercising in water stimulates both the circulatory and respiratory systems [5, 6]. An aquatic environment can help to relax contracted muscles and increase an individual's range of motion [5]. Due to water's buoyancy, a person with disabilities is supported without the resistance of gravity, improving postural balance, passively strengthening weakened muscles, and enabling greater independence in functionality while in water [4, 6, 15, 16]. These factors indicate the need for the current study, which seeks to investigate and understand the impact of aquatic programs. Therefore, this study aimed to investigate the impact of aquatic program activities on the QoL for people with disabilities in the Western Cape, South Africa.

2. METHODOLOGY

2.1. Research Design

The study used quantitative research methods employing a cross-sectional design to achieve the aim of the current study. The objective of the study was to determine the QoL for people with disabilities in the Western Cape, South Africa. Quantitative research methods focus on the quantity of responses and can be numerically presented [17]. This approach was used to generalize the research result, collect reliable and accurate data, and facilitate quick data collection. Cross-sectional methods were used because, according to Creswell, survey studies help to generalize from a sample to a population, allowing inferences about characteristics, attitudes, or behaviors of the specific population [17]. The present study hypothesized that people with disabilities' QoL would be influenced by the aquatic program activities they engage in.

2.2. Sampling and Sample Size

There are over seven clubs and centers that offer aquatic programs for people with disabilities in the Western Cape province, with more than 50 people having signed up for the

aquatic programs. Using Slovin's formula $n = \frac{N}{1 + Ne^2}$, the current study needed 44 participants. Purposeful sampling resulted in 39 participants over the age of 18 who participated in aquatic activities and completed the questionnaire on Google Forms.

2.3. Inclusion and Exclusion Criteria

The present study was conducted in the Western Cape province, South Africa. The study included individuals who met the study's definition of disability as a functional limitation, were over the age of 18, and participated in aquatic activities. Exclusion criteria were those under the age of eighteen years old and individuals with intellectual disabilities who were unable to read and understand the information independently. This exclusion was intended to avoid response bias.

2.4. Research Instrument

Data was collected using a Google Form questionnaire, an accessible research instrument with features such as multiple-choice questions and Likert scales. The questionnaire consisted of two sections: Section A and Section B. Section A included demographic information and a Par-Q+ subsection (e.g., "Has your doctor ever said you have a heart condition or high blood pressure?" and "Has your doctor ever said that you should only do medically supervised physical activity?"). Section B consisted of three parts:

- Part 1 included questions based on aquatic activity participation (e.g., "Which aquatic activity or activities do you participate in?" and "How long have you been participating in aquatic activities?").
- Part 2 included questions based on quality of life (e.g., "How much do you enjoy life?" and "How healthy is your physical environment?").
- Part 3 included questions based on participation in society (e.g., "How much of a problem did you have because of barriers or hindrances in the world around you?" and "How much has your health been a drain on the financial resources of you or your family?"). Each section consisted of statements and questions, which were followed by a series of answers.

Participants were prompted to choose the answer that best corresponded with how they felt about the question or statement.

2.5. Procedure for Data Collection

In the data collection process, Google Forms served as the primary tool for administering questionnaires. Participants were provided with the information sheet, research proposal document, ethics approval from the University of the Western Cape, and questionnaire (in Microsoft Word format) to read before completing the official form. Participants were given a link to the Google Form, allowing for easy online access. Participants spent approximately fifteen to twenty minutes completing the questionnaire, varying according to the level of their disability. Assistance from family members and caregivers was allowed in the case of an individual with a physical disability who could not complete the questionnaire independently.

2.6. Validity and Reliability of the Research Instrument

The research instrument used is the official WHOQOL-BREF questionnaire, which has been used in previous research. The WHOQOL User Manual (WHOQOL User Manual) guided the setup of the questionnaire, including scoring, cleaning the data, allocating domains (physical, psychological, environmental, and social), and transforming scores to zero to one hundred scales [18]. Examples of some of the answers to the Quality of Life questions and corresponding scoring include (1 = "Very Poor"; 2 = "Poor"; 3 = "Neither poor nor good"; 4 = "Good"; and 5 = "Very Good"). A Cronbach's alpha test was conducted to assess the reliability of the research instrument [18], reporting 0.80, which is considered a good and acceptable score [19, 20].

2.7. Statistical Analysis

Descriptive statistics were used to describe the participant's QoL and the impact of aquatic activities. This approach was suitable due to the study's short duration and low participation rate. Descriptive statistics included means and standard deviations to describe the participants' QoL and the impact of aquatic activities. All statistical analysis was performed using IBM SPSS Statistics version 26 [21].

2.8. Ethics

The study received ethics approval from the University of the Western Cape's Biomedical Research Ethics Committee (Reference number: BM23/4/26). The study conforms to the Helsinki Declaration of 1975. All participants provided written consent to participate in the study. Consent was obtained from participants 24 hours prior to data collection; this was necessary to allow participants to make an informed decision about their participation in the study. The researchers explained the study details to the participants, clarified any questions, and provided an information letter before administering the questionnaire. Participants were informed that their participation was voluntary and that they could withdraw at any point during the data collection process without any prejudice. The study followed the guidelines of the Protection of Personal Information Act 4 of 2013 (POPIA) for handling personal information. Participants were assured that their names and identities would remain confidential, they would be assigned unique research numbers during data coding, and the questionnaire would not require personal details. The data collected on Google Forms was secured on password-protected laptops and drives with specific access codes, accessible only to the three researchers and supervisors. No data was collected in hard copy.

3. RESULTS

The results section will first report the demographic information of the participants, followed by the descriptive data. This study aimed to investigate the impact of aquatic program activities on the QoL for people with disabilities in

South Africa. The data is reported in tables and graphs to convey the information completely and accurately to the reader.

Table 1 above illustrates the demographic information of the participants. The age range of participants extended from eighteen years to over fifty years of age. Specifically, 8% fell within the eighteen to twenty-one age bracket, 17.9% in the 22-29 category, 15.4% in the 30-39 category, and 10.3% in the 40-49 category. The majority of participants were in the category of fifty years or older, at 51.3%. The majority of the participants were female, at 64.1%. The gender distribution consisted of twelve male participants, twenty-seven females, and one individual classified as “preferred not to say.” The education level of the participants varied, with 7% of participants having not completed high school, 7% having achieved a National Senior Certificate (NSC), 7% achieving a Certificate, 24% achieving a diploma, 31% achieving a Degree, 21% achieving a Postgraduate Degree and 3% having Secretarial qualifications. The questionnaire prompted participants to indicate the number of times they engaged in aquatic activities per week, which is represented in Fig. (1) and Table 2.

Fig. (1) and Table 2 illustrate the various QoL scores based on the frequency of participation in aquatic activities. There is a noticeable upward trend in QoL scores as the frequency increases.

Table 2 indicates that an increased frequency of participation leads to an increase in QoL based on the different domains included in the questionnaire. Six individuals participate in aquatic activities once per month with a QoL score of 63.11; one individual participates once

every two weeks with a QoL score of 62.24; eleven individuals participate once per week with a QoL score of 71.47; twelve participate two to five times per week with a QoL score of 65.77; and three participate every day with the highest QoL score of 73.33. An increase in the frequency of participation leads to a strong QoL mean increase in the Environmental Domain. Table 2 shows the following results: Once per month (61.25), Once every two weeks (28.13), Once per week (71.47), 2-5 times per week (72.40), and every day (73.33). The descriptive statistics (mean ± SD) and percentage of the QoL (physical, psychological, social, and environmental domains) of participants partaking in different activities are present in Fig. (2) and Table 3. The mean score and standard deviation for each domain were computed for each type of aquatic activity.

Fig. (2) and Table 3 illustrate the average QoL scores based on the type of aquatic activity that individuals partake in. It shows that those who participate in more than one aquatic activity have an enhanced QoL.

Table 3 indicates that an increased variety of activity participation leads to an increase in QoL based on the different domains included in the questionnaire. Four individuals participate in surfing with a QoL score of 64.92; thirteen individuals participate in aquatic therapy with a QoL score of 67.41; seven individuals participate in swimming with a QoL score of 69.43; three individuals participate in swimming and surfing with a QoL score of 63.95; five individuals participate in swimming and aquatic therapy, and one individual who participates in swimming, scuba diving, freediving, and paddling has a QoL score of 76.00. Eighteen of the individuals participate in aquatic therapy, while sixteen individuals participate in swimming.

Table 1. Demographic information.

Age		Gender		Education Level	
18-21	8%	Male	33.3%	Did not complete high school	7%
22-29	17.9%	Female	64.1%	National Senior Certificate	7%
30-39	15.4%	Other	2.6%	Certificate	7%
40-49	10.3%	-	-	Diploma	24%
50+	51.3%	-	-	Degree	31%
-	-	-	-	Post-graduate Degree	21%
-	-	-	-	Secretarial Qualifications	3%

Table 2. Participation frequency and its association with the different QoL domains.

	Once per Month N= 6 M±SD	Once Every two Weeks N= 1	Once per Week N= 11 M±SD	2-5 Times per Week N= 12 M±SD	Everyday N= 3 M±SD
Physical Domain	65.48 ±19.91	75.00	64.94±18.06	64.29±10.22	79.77±11.48
Psychological Domain	70.14 ±12.20	79.17	69.32±19.66	67.36±6.36	76.39±8.67
Social Domain	55.56 ±29.19	66.67	82.58±21.88	59.03±24.48	59.38±6.25
Environmental Domain	61.25 ±17.34	28.13	69.03±7.58	72.40±16.47	77.78±9.62
Average QOL	63.11	62.24	71.47	65.77	73.33

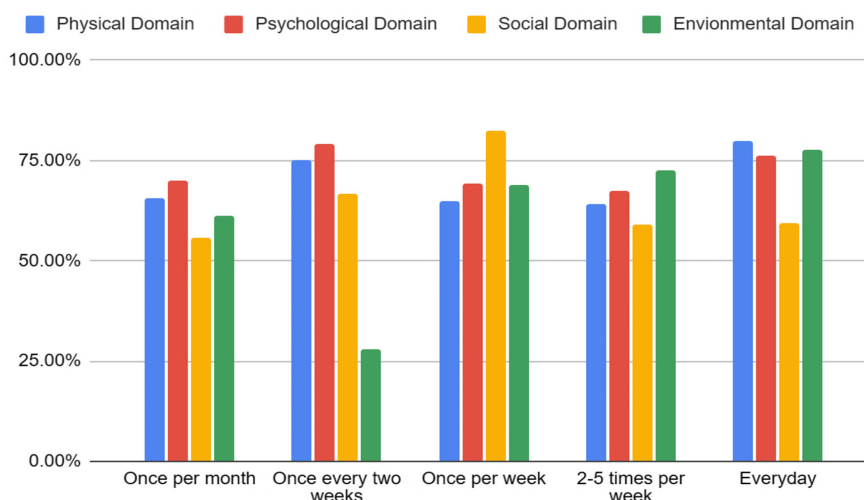


Fig. (1). Participation frequency and its association with the different QoL domains.

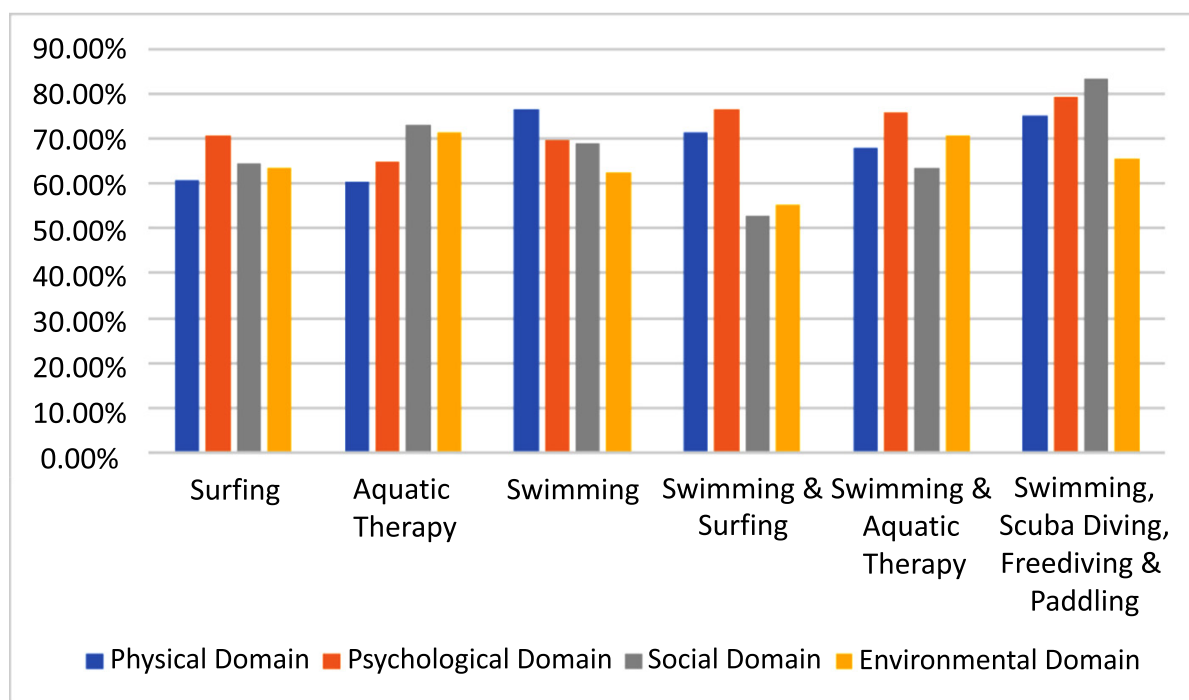


Fig. (2). The average scores of each domain based on the type of aquatic activity.

Table 3. The average scores of each domain based on the type of aquatic activity.

	Surfing N= 4 M±SD	Aquatic Therapy N= 13 M±SD	Swimming N= 7 M±SD	Swimming & Surfing N= 3 M±SD	Swimming & Aquatic Therapy N= 5 M±SD	Swimming, Scuba Diving, Freediving & Paddling N= 1 M±SD
Physical Domain	60.71±20.20	60.44±15.32	76.53±12.00	71.43±9.45	67.86±14.06	75
Psychological Domain	70.83±12.27	64.74±16.55	69.64±7.50	76.39±2.41	75.83±12.98	79.17
Social Domain	64.58±7.98	73.08±31.94	69.05±19.67	52.78±24.06	63.33±27.39	83.33
Environmental Domain	63.54±25.45	71.39±7.42	62.50±17.02	55.21±28.18	70.63±14.92	65.63
Average QOL	64.92	67.41	69.43	63.95	69.41	76

4. DISCUSSION

This study aimed to investigate the impact of aquatic program activities on the QoL for people with disabilities in South Africa. The results of this study report that individuals engaging in multiple aquatic activities or participating more frequently tended to have higher QoL scores. Consistent with previous research, engaging in water-based activities holds significant potential for enhancing the well-being of individuals with disabilities [7]. According to Escobar *et al.*, aquatic activities have been linked to improvements in body composition, mobility, and overall quality of life [6]. Furthermore, research by Dundar *et al.* indicates that individuals with disabilities experience a reduction in their pain scores and an enhanced perception of their quality of life [8]. This is compounded by the social injustice and inequalities they face within their community and society at large [22].

The present study lays a foundation of literature regarding QoL and people with disabilities. There is overwhelming evidence that supports aquatic therapy as a means to promote individuals' optimal functional independence [23-25]. This notion is justified by the results of the current study, in which the four domains (physical, psychological, social, and environmental) of QoL illustrate the functional independence achieved by participants in this study. A study by Schalock and Keith [26] and Schalock [27] reported eight domains of QoL, including personal development, self-determination, interpersonal relations, social inclusion, rights, emotional well-being, physical wellbeing, and material well-being. The current study aligns with these eight domains. Each domain of QoL is further explained and detailed in the results of this study. QoL represents participants' satisfaction with their lives and livelihood, which is important in various contexts of their lives.

The results of the current study showed that engaging in aquatic activities can help to decrease an individual's level of anxiety and depression and improve both their self-confidence and self-esteem, as aligned with the study by Henrykowska *et al.* [6]. Additionally, the current study demonstrated that participation in aquatic activities enhances the individual's feelings of independence regarding their functionality. The results of this study align with the literature, which states that participation in aquatic activity simultaneously contributes to improved psychological QoL and self-determination and benefits for their general health and social components [4, 6, 15, 16]. The results from this study highlight that QoL can be improved by engaging in multiple water-based activities. QoL, as recognized by Puce *et al.*, contributes to physical, mental, and social well-being, and its improvement has often been neglected in the context of physical disabilities [28]. The literature states that traditional land-based therapies are predominant in the field of physical therapy for individuals with disabilities; however, water-based activities present alternative and advantageous options [4]. Water-based activities have been shown to enhance body composition, mobility, and overall QoL for individuals with disabilities. Furthermore, the aquatic environment

not only offers a different rehabilitative setting but also facilitates social interaction through group sessions, promoting higher engagement levels [28].

QoL domains identified and reported by the present study are deemed crucial and relevant for the well-being of people with disabilities. Although the results report the main four domains of QoL, it is important to understand the QoL that is influenced by the aquatic program activities. The results of the study demonstrate the importance of aquatic program activities that go beyond therapy into spaces of health promotion and public health. The current study encourages explorations on this topic and warrants further investigation to determine associations and correlations in the QoL domains.

CONCLUSION AND FUTURE RESEARCH

The results contribute to the growing understanding of the positive effects of aquatic interventions, advocating for their inclusion in rehabilitation, recreational, and wellness programs for individuals with disabilities. Future researchers should determine whether the reported aquatic activities are group or individual activities. This is an aspect that could add valuable insights into the social dynamics of water-based activities. Furthermore, having a larger population, including other provinces around South Africa and individuals under the age of eighteen, would increase the significance of the study.

LIMITATIONS

This study is not without its limitations. Firstly, the reliance on Google Forms as the primary method of data collection may have introduced a limitation in terms of depth and context. The preference would have been to conduct in-person visits to the chosen institutions, allowing for a more immersive and thorough understanding of the aquatic activities. Including children under the age of 18 in the study would have been preferred, given the significant number of children participating in surfing events. Additionally, the willingness and extent of assistance from institutions involved may have impacted the quality and completeness of the data. The lack of control over the geographical distribution across provinces introduces another limitation, given the absence of a question specifically addressing the locations where the participants engage in their aquatic activities. These limitations emphasize the importance of considering these factors in the interpretation of the study's outcomes and suggest directions for future research. The results of this study cannot be generalized due to the small sample size, which impacts this aspect.

AUTHORS' CONTRIBUTION

M.J. and M.: Wrote the manuscript; J.B., H., K.C., M., R.H.: contributed to the study's concept and design.

LIST OF ABBREVIATIONS

- QoL = Quality of Life
- NSC = National Senior Certificate

POPIA = Protection of Personal Information Act 4 of 2013

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study received ethics approval from the University of the Western Cape's Biomedical Research Ethics Committee, South Africa (Reference number: BM23/4/26).

HUMAN AND ANIMAL RIGHTS

All human research procedures followed were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT FOR PUBLICATION

All participants provided written consent to participate in the study.

STANDARDS OF REPORTING

STROBE guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

The data set of this study is available on request to the corresponding author [M.M].

FUNDING

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

ACKNOWLEDGEMENTS

The authors wish to acknowledge all the participants from the study.

REFERENCES

- [1] Devine-Wright H, Godfrey C. Surf therapy: The long-term impact. 2018. Available from: https://www.researchgate.net/profile/Hannah-Devine-Wright/publication/325217666_Surf_therapy_the_long-term_impact/links/5afe9cf50f7e9b98e019938e/Surf-therapy-the-long-term-impact.pdf
- [2] Health inequities lead to early death in many persons with disabilities. 2022. Available from: <https://www.who.int/news/item/02-12-2022-health-inequities-lead-to-early-death-in-many-persons-with-disabilities>
- [3] Pitchford EA, Dixon-Ibarra A, Hauck JL. Physical activity research in intellectual disability: A scoping review using the behavioral epidemiological framework. *Am J Intellect Dev Disabil* 2018; 123(2): 140-63. <http://dx.doi.org/10.1352/1944-7558-123.2.140> PMID: 29480777
- [4] Ellapen TJ, Hammill HV, Swanepoel M, Strydom GL. The benefits of hydrotherapy to patients with spinal cord injuries. *Afr J Disabil* 2018; 7(0): 450. <http://dx.doi.org/10.4102/ajod.v7i0.450> PMID: 29850439
- [5] Henrykowska G, Soin J, Siermontowski P. Scuba diving as a form of rehabilitation for people with physical disabilities. *Int J Environ Res Public Health* 2021; 18(11): 5678. <http://dx.doi.org/10.3390/ijerph18115678> PMID: 34073170
- [6] Henrykowska G, Soin J, Pleskacz K, Siermontowski P. Influence of scuba diving on the quality of life of people with physical disabilities. *Healthcare (Basel)* 2022; 10(5): 761. <http://dx.doi.org/10.3390/healthcare10050761> PMID: 35627898
- [7] Escobar LT, Sanders ME, Lawson D, Benitez CB. A case study: Mobility and health impact of an aquatic fitness program for a woman with intellectual and physical disabilities. *Int J Aquat Res Educ* 2013; 7(2): 6.
- [8] Dundar U, Solak O, Toktas H, *et al.* Effect of aquatic exercise on ankylosing spondylitis: A randomized controlled trial. *Rheumatol Int* 2014; 34(11): 1505-11. <http://dx.doi.org/10.1007/s00296-014-2980-8> PMID: 24626605
- [9] Defar S, Abraham Y, Reta Y, *et al.* Health related quality of life among people with mental illness: The role of socio-clinical characteristics and level of functional disability. *Front Public Health* 2023; 11: 1134032. <http://dx.doi.org/10.3389/fpubh.2023.1134032> PMID: 36875411
- [10] Murphy NA, Carbone PS. Promoting the participation of children with disabilities in sports, recreation, and physical activities. *Pediatrics* 2008; 121(5): 1057-61. <http://dx.doi.org/10.1542/peds.2008-0566> PMID: 18450913
- [11] Grönvik L. Defining disability: Effects of disability concepts on research outcomes. *Int J Soc Res Methodol* 2009; 12(1): 1-18. <http://dx.doi.org/10.1080/13645570701621977>
- [12] Tsalis G, Kyriakidou G. Effects of aquatic interventions on physical health indicators in people with intellectual disabilities: A review. *Healthcare (Basel)* 2023; 11(14): 1990. <http://dx.doi.org/10.3390/healthcare11141990> PMID: 37510431
- [13] Terrens AF, Soh SE, Morgan P. Perceptions of aquatic physiotherapy and health-related quality of life among people with Parkinson's disease. *Health Expect* 2021; 24(2): 566-77. <http://dx.doi.org/10.1111/hex.13202> PMID: 33591629
- [14] Zivi I, Maffia S, Ferrari V, *et al.* Effectiveness of aquatic versus land physiotherapy in the treatment of peripheral neuropathies: A randomized controlled trial. *Clin Rehabil* 2018; 32(5): 663-70. <http://dx.doi.org/10.1177/0269215517746716> PMID: 29232980
- [15] Carrasco AC, Silva MF, Dela Bela LF, *et al.* Evaluation of quality of life in individuals with chronic stroke who underwent aquatic exercises: A case series. *NeuroRehabilitation* 2021; 48(4): 563-70. <http://dx.doi.org/10.3233/NRE-210008> PMID: 33967065
- [16] Lopes JT, Masdemont M, Cruz GMV. Adaptive surfing: Leisure, competition or therapy? *Cad Educ, Tecnol* 2018; 11(1): 148-59. <http://dx.doi.org/10.14571/brajets.v11.n1.148-159>
- [17] Creswell JW. *A Concise Introduction to Mixed Methods Research*. California: SAGE Publications 2021.
- [18] Programme on mental health: WHOQOL user manual. 1998. Available from: <https://iris.who.int/handle/10665/77932>
- [19] Tavakol M, Dennick R. Making sense of Cronbach's alpha. *Int J Med Educ* 2011; 2: 53-5. <http://dx.doi.org/10.5116/ijme.4dfd.8dfd> PMID: 28029643
- [20] Bland JM, Altman DG. *Statistics Notes: Cronbach's Alpha*. *BMJ* 1997; 314(7080): 572. <http://dx.doi.org/10.1136/bmj.314.7080.572> PMID: 9055718
- [21] George D, Mallery P. *IBM SPSS Statistics 26 Step by Step: A Simple Guide and Reference*. (16th ed.), New York: Routledge 2019. <http://dx.doi.org/10.4324/9780429056765>
- [22] Guntur G, Solikhin MN, Fauzi F, Bin Shahril MI, Salimin NB. The benefits of scuba diving for people with physical disabilities: A systematic review of the literature. *J Keolahragaan* 2023; 11(1): 66-75. <http://dx.doi.org/10.21831/jk.v11i1.60136>
- [23] Chiquoine J, Martens E, McCauley L, Van Dyke JB. Aquatic therapy. In: McCarthy J, Ed. *Canine Sports Medicine and Rehabilitation*. CRC Press 2018; pp. 208-26. <http://dx.doi.org/10.1002/9781119380627.ch9>
- [24] Global burden of neurological disorders: Estimates and projections. 2013. Available from: http://www.who.int/mental_health/neurology/chapter_2_neuro_orders_public_h_challenges.pdf (Accessed on: August 30, 2024)
- [25] Becker BE, Cole AJ. *Comprehensive Aquatic Therapy*. (3rd ed.),

- Pullman: Washington State University Publishing 2011.
- [26] Schalock RL, Keith KD, Verdugo MÁ, Gómez LE. Quality of life model development and use in the field of intellectual disability. In: Schalock RL, Ed. *Enhancing the Quality of Life of People with Intellectual Disabilities: From Theory to Practice*. Springer 2011; pp. 17-32.
- [27] Schalock RL. *Quality of Life: Conceptualization and Measurement*. American Association on Mental Retardation 1996.
- [28] Puce L, Okwen PM, Yuh MN, *et al.* Well-being and quality of life in people with disabilities practicing sports, athletes with disabilities, and para-athletes: Insights from a critical review of the literature. *Front Psychol* 2023; 14: 1071656. <http://dx.doi.org/10.3389/fpsyg.2023.1071656> PMID: 36844305