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Keywords: successful aging; osteoarticular and musculoskeletal disorders; chronic pain; quality of life; BMI.

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Physical Activity Level and Time of Participation in a Water Aerobics Project for the Elderly: Analysis of the Association with Quality of life, Musculoskeletal and Osteoarticular Disorders, Chronic Pain and Body Mass Index

Anna Regina Grings Barcelos [α], Daiane Bolzan Berlese [σ], Marcus Levi Lopes Barbosa [ρ] & Geraldine Alves Dos Santos [ω]

Abstract- The objective was to analyze the association between the physical activity level (PAL) and time of participation in the practice of water aerobics with the variables successful aging (SA), quality of life (QOL), musculoskeletal and osteoarticular disorders (MOD), chronic pain (CP) and body mass index (BMI). The method has a quantitative, descriptive and cross-sectional design. The non-probabilistic sample, for convenience, comprised 101 elderly people over 60 years of age, of both genders, who regularly participate in water aerobics activities in the city of Dois Irmãos, in the state of Rio Grande do Sul. The following instruments were used: Multidimensional Pain Assessment Scale, EUROHIS-QOL, IPAQ, SOC and Body Mass Index. Descriptive analyses of frequency, comparison, correlation and multiple linear regression were used. The results showed that the irregularly active group has adequate perception of QOL and longer participation in water aerobics activities associated with lower intensity of pain perception. Likewise, better QOL and control attitudes are associated with lower prevalence of MOD. The longer time of participation in the project is associated with disability, evidencing the group's weakness in the sense of carrying out more intense activities. However, they are physically active and in sufficiently good health to practice water aerobics, considering their skills and limitations. The active group reveals an association of the PAL with SA and medical healing attitudes, solicitude, emotion and control. These characteristics prove the relation of the time of participation in the pain condition scope, thus revealing the hopelessness in the medical healing and, conversely, express self-sufficiency in the ability to deal with limitations and discomfort of the conditions resulting from a chronic condition. Given this scenario, the sense of participation in physical activities has been gaining strength as one of the principles that aim to promote the improvement of QOL and physical functionality of the elderly population.

Keywords: successful aging; osteoarticular and musculoskeletal disorders; chronic pain; quality of life; BMI.

I. Introduction

One of the greatest cultural achievements of a people in its humanization process is the aging of its population, reflecting an improvement in living conditions. According to United Nations Population Fund projections, one in 9 people in the world is 60 years of age or older, and a 1 to 5 growth is estimated around 2050. In 2050, for the first time, there will be more elderly people than children under 15 years of age. In 2012, 810 million people were aged 60 or over, making up 11.5% of the global population. This number is projected to reach 1 billion in less than ten years and more than to double in 2050, reaching 2 billion people or 22% of the global population (IBGE, 2016).

Within the scope of the Brazilian population, rapid and profound changes have reflected in economic growth, in the labor market and in the profile of demands for public policies. Among the main changes, Camarano (2014) highlights the sharp fall in fertility and mortality at all ages and population aging, as well as the emergence of new forms of family arrangements. Considering that aging is a natural, universal, irreversible phenomenon and does not occur simultaneously and equally among human beings, it is essential to ratify the inclusion of physical activities in the daily lives of the elderly in the context of improving the quality of life (Borges et al., 2017).

In view of the demographic growth and the changes in the age pyramid, associated with the heterogeneity of the aging process, there is a recurring need to envision preventive and health care actions, to cover the maintenance of the organic function and the social well-being of the elderly population. Likewise, quality of life is important, as there is a new sensitivity to old age, derived from the aging of the population, the presence of a greater number of active and healthy elderly people and the constant dissemination of information about the importance of a healthy lifestyle and the search for medical and social resources that improve and prolong life (Neri, 2011). In view of this, several organizations emphasize the benefits of physical activity for the health and well-being of individuals of all ages. Moreover, it has been proven that the use of quantitative assessments is useful to estimate levels of physical activity based on self-reported data on the type, frequency and intensity of exercises (Taylor, 2015).

With regard to active aging, the World Health Organization (WHO) recommends that elderly people aged 65 and over engage in at least 150 minutes per week of moderate intensity activities or at least 75

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minutes per week of vigorous intensity or an equivalent combination moderate and vigorous activity. Aerobic activity should be performed in sessions of at least 10 minutes to obtain additional health benefits, in addition to daily routine activities. Elderly people with little mobility should perform physical activities to improve balance and avoid falls on three or more days a week. When they are unable to practice the amounts of physical activity due to health conditions, they should be as physically active as their skills and conditions allow (World Health Organization, 2010).

Given this perspective, the practice of water aerobics has been growing among the elderly population, as well as scientific investigations that seek to test and prove the benefits associated with its execution. In this context, it is important to highlight the characteristics related to the physical properties of the water environment. The practice of water-based exercises produces physiological and biomechanical responses different from those of the terrestrial environment, since individuals immersed in the liquid environment are subjected to a set of forces that act on them (Kruel et al., 2013; Baun, 2010).

Considering the above, the objective of this study was to analyze the association between the physical activity level and time of participation in the practice of water aerobics with successful aging, quality of life, prevalence of musculoskeletal and osteoarticular disorders, chronic pain and body mass index in elderly people participating in a water aerobics program in the city of Dois Irmãos, in Rio Grande do Sul.

II. Method

The present study has a quantitative, descriptive and cross-sectional design. The population of this study was composed of elderly people who participate in the water aerobics project offered by the Municipal Administration of Dois Irmãos, through the Department of Health, Social Assistance and Environment. A total of 230 elderly residents of the city aged over 60 years participate in the project.

The sample of this study was non-probabilistic, for convenience, and comprises 101 participants, of both genders, aged over 60 years, consisting of elderly people who regularly participate in water aerobics activities. The inclusion criteria established were to be aged over 60 years, not to be institutionalized or hospitalized, to have mental and health conditions to have independence and autonomy to participate in the study and sign an informed consent form. The exclusion criteria determined by the research were to present dementia, frailty syndrome, to be hospitalized or institutionalized.

The data collection instruments used in this study refer to sociodemographic variables and the presence of osteoarticular and musculoskeletal disorders, pain assessment (Multidimensional Pain Assessment Scale and brief IAD), quality of life (EUROHIS-QOL), successful aging (Selection, optimization and compensation survey, SOC), body weight status (Body Mass Index - BMI) and physical activity level (IPAQ - adapted long version). The Ethics Committee from Feevale University approved the project. Participants signed an informed consent form in accordance with resolutions 466/2012 and 510/2016 of the National Health Council of the Ministry of Health that deals with research involving human beings.

III. Results

The distribution of the 101 elderly people participating in the activity, in relation to the physical activity level, is 66.3% (n=67) active and 33.7% (n=34) irregularly active. In the comparison between the classification of the physical activity level evaluated by the IPAQ test (subdivided between irregularly active and active) and the variable time of participation in the water aerobics project (subdivided in the period from beginner to the maximum time of 4 years and in the period of 5 to 12 years), no significant difference was found. Although there was no significant difference between the groups assessed by the Chi Square test, the results showed that the largest group of participants focused on the active classification and had participated in the project for more than 5 years.

Table 1 shows the bivariate correlations performed by the Spearman test. The physical activity level variable, assessed by the IPAQ test, shows that by increasing the level of physical activity, the elderly people in our study show an increase in quality of life and decrease in the body mass index assessed by BMI. As to the time of participation in the project, it is identified that the more years the elderly are regularly participating in this project, the lower is the use of strategies to promote successful aging, especially the elective selection strategy, as if there were a certain accommodation over the years. The solicitation strategy to face chronic pain also decreases.

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Table 1: Correlations between Successful Aging Strategies, Quality of Life, Body Mass Index and Physical Activity Level and Project Participation Time

			SOC	Elective Selection	Quality of Life	Solicitude	BMI
Spearman's Rho	Physical Activity Level	Correlation Coefficient	.008	.137	.290**	-.079	-.304**
		Sig. (2-tailed)	.934	.178	.003	.509	.002
		N	101	101	101	72	101
	Time of Participation in the Water Aerobics Project (years)	Correlation Coefficient	-.311**	-.300**	.146	-.247*	-.003
		Sig. (2-tailed)	.002	.003	.145	.036	.973
		N	101	101	101	72	101

*Note: ** Significant Correlation p≤ 0.01; * Significant Correlation p ≤ 0.05; SOC = Selection, optimization and compensation survey, BMI = Body Mass Index.*

Table 2 shows the correlation of the group of people who are irregularly active. In this group we can identify that both the increase in the perception of quality of life and the time of participation in water aerobics activities are associated with the decrease in the perception of chronic pain intensity. Longer participation in the project's activities is also associated with the disability strategy. Increased perception of quality of life and control strategy and decreased chronic pain are associated with a decrease in the number of osteoarticular diseases.

Table 2: Correlation Analysis Using Spearman's Test in the Irregularly Active Elderly Group

Variables		Rho	*p*	N
Quality of Life	Chronic Pain Perception Intensity	-.412	.016	34
Time of Participation in Regular Water Aerobics Activities	Chronic Pain Perception Intensity	-.410	.016	34
Time of Participation in Regular Water Aerobics Activities	Incapacity	.394	.046	26
Osteoarticular Diseases	Quality of Life	-.347	.044	34
Osteoarticular Diseases	Chronic Pain Perception Intensity	.520	.002	34
Osteoarticular Diseases	Control	-.416	.034	26

Note: rho = Spearman's Rho; p = Significance Level.

Table 3 shows the correlation analyzes of the group of people who remain active. In this group we can see that the increase in the perception of quality of life and the decrease in osteoarticular diseases, as in the irregularly active group, reduces the perception of chronic pain intensity. By increasing the time of participation in water aerobics activities, the use of the elective selection strategy to promote successful aging decreases, but the control strategy for pain increases. The use of the emotion strategy is also associated with a decreased perception of chronic pain. The more the solicitude strategy is used, the less the optimization and the more the compensation strategies are used. Compensation is associated with decreased medical healing. The increase in the perception of quality of life is associated with a decrease in physical damage. Just as the decrease in medication is associated with an increased optimization and decreased control.

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Table 3: Correlation Analysis Using Spearman's Test in the Active Elderly Group

Variables		rho	*p*	N
Chronic Pain Perception Intensity	Quality of Life	-.260	.034	67
Time of Participation in Regular Water Aerobics Activities	SOC	-.356	.003	67
Time of Participation in Regular Water Aerobics Activities	Elective Selection	-.406	.001	67
Time of Participation in Regular Water Aerobics Activities	Control	.322	.029	46
Chronic Pain Perception Intensity	Emotion	-.355	.016	46
Solicitude	Optimization	-.423	.034	46
Solicitude	Compensation	.352	.017	46
Medical Cure	Compensation	-.449	.002	46
Physical Damage	Quality of Life	-.311	.036	46
Medication	Optimization	-.306	.039	46
Medication	Control	.291	.050	46
Chronic Pain Perception Intensity	Osteoarticular Diseases	.393	.001	67

Note: rho = Spearman's Rho; p = Significance Level; SOC = Selection, optimization and compensation survey.

Linear regression analysis was performed in the group with an active physical activity level (n = 67), by using the stepwise method with a significance level of ≤ 0.05. Strategies for promoting successful aging (selection, optimization and compensation) was used as the dependent variable.

Table 4 shows an indirect relation (signal and intensity) between the SOC variable (dependent, explained) and the time of participation in the water aerobics and medical healing project (independent, explanatory). In this model, a 0.347 R-squared (R^2) was obtained. This determination coefficient is a measure of the efficiency of the regression equation. Indicates that 34.7% of the variations in successful aging strategies can be explained by variations in the time of participation in the project and medical healing in active people.

Table 4: Multiple Linear Regression of the SOC Variable in Active Elderly Individuals

Model	Unstandardized Coefficient		Standardized Coefficient	t	Sig.	Collinearity Statistics	
	B	Standard Error	Beta			Tolerance	VIF
(Constant)	10.635	0.860		12.368	0.000		
Time of Participation in the Water Aerobics Project (years)	-0.312	0.074	-0.522	-4.182	0.000	0.976	1.025
Medical Cure	-0.947	0.322	-0.367	-2.943	0.005	0.976	1.025

Note: VIF = Variance Inflation Factor; SOC = Selection, optimization and compensation survey.

In the same group classified as active (n=67), linear regression analysis was performed by using the stepwise method, with time of regular participation in the water aerobics project set as the dependent variable. In the analysis presented in table 5, the relation between the time of participation in the water aerobics project (dependent, explained) was indirectly related to the SOC, medical healing and solicitude variables and directly related to the control variable (independent, explanatory). In this model, a 0.459 R-squared (R^2) was obtained. This determination coefficient indicates that 45.9% of the variations in the time of participation in the water aerobics project can be explained by the variations of the other variables. In this group of active elderly people, the permanence of people in the project is partly explained by the decrease in the strategies for successful aging, medical healing and solicitude, and increased control.

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Table 5: Multiple Linear Regression of the Variable Time of Participation in the Water Aerobics Program (years) with Active Elderly Individuals

Model	Unstandardized Coefficient		Standardized Coefficient	t	Sig.	Collinearity Statistics	
	B	Standard Error	Beta			Tolerance	VIF
(Constant)	11.636	3.266		3.563	.001		
SOC	-.830	.205	-.496	-4.044	.000	.879	1.138
Medical Cure	-1.646	.528	-.381	-3.121	.003	.886	1.129
Solicitude	-.882	.332	-.312	-2.653	.011	.957	1,045
Control	1.583	.672	.279	2.354	.023	.941	1.063

Note: VIF = Variance Inflation Factor; SOC = Selection, optimization and compensation survey.

In the groups classified as Active (n=67) and Irregularly Active (n=34), a linear regression analysis was performed by applying the stepwise method, with the perception of chronic pain intensity as the dependent variable, as shown in Table 6.

In this analysis, the verification of the perception of pain indirectly related to quality of life in the irregularly active group and emotion in the active group. In this model, a 0.176 R-squared (R^2) of was obtained in the irregularly active group and 0.160 in the active group. This coefficient of determination indicates that 17.6% of the variations in the perception of chronic pain intensity can be explained by variations in quality of life and emotion (16%). In the group of irregularly active elderly people, the decrease in pain perception is related to the promotion of quality of life and, in the active group, emotion stands out.

Table 6: Multiple Linear Regression of the Variable Chronic Pain Perception in Irregularly Active and Active Elderly Individuals

IPAQ Classification	Model		Unstandardized Coefficient		Standardized Coefficient	t	Sig.	Collinearity Statistics	
			B	Standard Error	Beta			Tolerance	VIF
Irregularly Active	1	(Constant)	16.263	4.123		3.944	.001		
		EUROHIS	-.296	.133	-.419	-2.216	.037	1.000	1.000
Active	1	(Constant)	5.202	.575		9.052	.000		
		Emotion	.629	.218	.400	2.893	.006	1.000	1.000

Note: VIF = Variance Inflation Factor; IPAQ = Physical Activity Level.

Table 7 shows the correlation analyzes of the group of people in our sample who regularly participate in the water aerobics project for a maximum of four years. The analysis was performed by using the Spearman test with a≤0.05 significance level. In this group, the decrease in the perception of pain and the increase in the elective selection strategy are associated with an increase in the perception of quality of life. The increase in the physical activity level is also associated with the increased use of the elective selection strategy and decreased perception of chronic pain. The increase in the perception of chronic pain is also directly related to the number of osteoarticular diseases. The increase in the use of the elective selection strategy is associated with a decrease in control, just as the increase in emotion is associated with increased solicitude and physical damage. Decreased medical healing is associated with increased successful aging strategies.

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Table 7: Correlation Analysis in the Group of Elderly Individuals Participating Regularly in the Water Aerobics Project for a Maximum of 4 Years

Variables		Rho	*p*	N
Quality of Life	Chronic Pain Perception Intensity	-.361	.017	43
Quality of Life	Elective Selection	.467	.002	43
Physical Activity Level	Elective Selection	.354	.022	43
Physical Activity Level	Chronic Pain Perception Intensity	-.336	.028	43
Osteoarticular Diseases	Chronic Pain Perception Intensity	.551	.000	43
Elective Selection	Control	-.372	.043	31
Solicitude	Emotion	.420	.019	31
Medical Cure	SOC	-.537	.002	31
Medical Cure	Elective Selection	-.567	.001	31
Medical Cure	Compensation	-.464	.010	31
Physical Damage	Emotion	.367	.042	31

Note: rho = Spearman's Rho; p = Significance Level; SOC = Selection, optimization and compensation survey.

Table 8 shows the correlation analyzes of the group of people in our sample who regularly participate in the water aerobics project for at least five years. The analysis was performed by applying the Spearman test with a≤0.05 significance level. In this g roup, the decrease in the perception of pain is associated with an increase in the perception of quality of life, control, and a decrease in the number of osteoarticular diseases. The increase in the physical activity level is associated with the increased use of control. Increased solicitude is associated with increased optimization, emotion and medication.

Table 8: Correlation Analysis in the Group of Elderly Individuals Participating Regularly in the Water Aerobics Project for 5 Years or More

Variables		rho	*p*	N
Chronic Pain Perception Intensity	Quality of Life	-0,295	0,022	58
Physical Activity Level	Control	0,368	0,018	41
Chronic Pain Perception Intensity	Osteoarticular Diseases	0,361	0,005	58
Solicitude	Optimization	-0,486	0,040	41
Chronic Pain Perception Intensity	Control	-0,313	0,047	41
Solicitude	Emotion	0,475	0,002	41
Solicitude	Medication	0,327	0,037	41

Note: rho = Spearman's Rho; p = Significance Level.

Table 9 shows the linear regression analysis performed by using the stepwise method, with BMI as the dependent variable. In this analysis, the BMI was indirectly related to solicitude and physical activity level in the group with less than 4 years of participation in the project. In this model, a 0.377 R-squared (R^2) was obtained, indicating that 37.7% of the BMI variations can be explained by the variations in solicitude and physical activity level. In the group of elderly people who participate less often, the decrease in BMI is related to the increase in solicitude and physical activity level.

Table 9: Multiple Linear Regression of BMI in the Group with Shorter Participation Time in the Water Aerobics Project

Time of Participation in the Water Aerobics Project	Model	Unstandardized Coefficient		Standardized Coefficient	t	Sig.	Collinearity Statistics	
		B	Standard Error	Beta			Tolerance	VIF
Participation of 4 Years or Less in the Water Aerobics Project	(Constant)	37.455	1.929		19.414	.000		
	Solicitude	-1.495	.478	-.483	-3.127	.004	.967	1.034
	IPAQ	-.017	.005	-.478	-3.094	.005	.967	1.034

Note: VIF = Variance Inflation Factor

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Table 10 shows the linear regression analysis by using the stepwise method, in the group of active elderly people who participate in the water aerobics project for 4 years or less (n=31) with the strategies for promoting successful aging (SOC) as the dependent variable. In this analysis, SOC was indirectly related to medical healing and solicitude. In this model, a 0.606 R-squared (R2) was obtained, indicating that 60.6% of the SOC variations can be explained by variations in medical healing and solicitude. In this active group, which participates for a shorter time in the water aerobics project, SOC strategies are related to a reduction in the medical healing and solicitude strategies.

Table 10: Multiple Linear Regression of SOC in the Group of Active Individuals with 4 Years or Less of Participation in the Water Aerobics Project

Model	Unstandardized Coefficient		Standardized Coefficient	t	Sig.	Collinearity Statistics	
	B	Standard Error	Beta			Tolerance	VIF
(Constant)	13.281	1.182		11.237	.000		
Medical Cure	-1.860	.368	-.859	-5.058	.000	.805	1.243
Emotion	-.674	.233	-.492	-2.899	.010	.805	1.243

Note: VIF = Variance Inflation Factor; SOC = Selection, optimization and compensation survey.

Table 11 shows the linear regression analysis by using the stepwise method, in irregularly active (n=27) and active (n=36) groups of people with more than 5 years of participation in the water aerobics project. The dependent variable was perception of chronic pain intensity. In this analysis, chronic pain was directly checked for the variables osteoarticular disorders in the irregularly active group and emotion in the active group. In this model, 0.383 and 0.379 R-squared (R^2) were obtained, respectively. Indicating that 38.3% and 37.9% of the variations in the chronic pain intensity can be explained by the variation in the number of chronic diseases in the irregularly active group and by the emotion in the active group.

Table 11: Multiple Linear Regression of Chronic Pain Intensity in Irregularly Active and Active Groups with More than 5 Years of Participation in the Water Aerobics Project

Classification IPAQ	Model	Unstandardized Coefficient		Standardized Coefficient	t	Sig.	Collinearity Statistics	
		B	Standard Error	Beta			Tolerance	VIF
Irregularly Active	(Constant)	5,699	0,515		11,059	0,000		
	Osteoarticular Diseases	1,210	0,426	0,619	2,843	0,014	1,000	1,000
Active	(Constant)	4,194	0,725		5,782	0,000		
	Emotion	1,093	0,286	0,616	3,829	0,001	1,000	1,000

Note: VIF = Variance Inflation Factor; IPAQ = Physical Activity Level.

Table 12 shows the linear regression analysis by using the stepwise method, in the group of irregularly active elderly people (n=27) with more than 5 years of participation in the water aerobics project and active people (n=31) with 4 years or less, with BMI as the dependent variable. In this analysis, the BMI was indirectly related to the medication and optimization variables in the irregularly active group (R^2=0.766) and solicitude (R^2=0.325) in the active group. These results indicate that 76.6% and 32.5% of the decrease in BMI, respectively, can be explained by the increase in medication and optimization in the irregularly active group that has participated in the project for more than 5 years and solicitude in the active group that has participated for 4 years or less.

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Table 12: Multiple Linear Regression of BMI in Irregularly Active Groups with More Than 5 Years and Active Groups with Less Than 4 Years of Participation in the Water Aerobics Project

Classificat. IPAQ	Time of Participation in the Water Aerobics Project	Model	Unstandardized Coefficient		SC	t	Sig.	Collinearity Statistics	
			B	Standard Error	Beta			Tolerance	VIF
Irregularly Active	5 Years or More	Constante	56.148	4.129		13.600	.000		
		Medication	-5.622	0.922	-.971	-6.099	.000	.768	1.301
		Optimization	-3.608	0.853	-.673	-4.230	.001	.768	1.301
Active	4 Years or Less	Constante	32.830	1.469		22.343	.000		
		Solicitude	-1.403	.477	-.570	-2.942	.009	1.000	1.000

Note: VIF = Variance Inflation Factor; SC = Standardized Coefficient; IPAQ = Physical Activity Level.

IV. Discussion

The context of this discussion involves the analysis of the relation between the physical activity level and time of participation of elderly people in a water aerobics project with successful aging, quality of life, musculoskeletal and osteoarticular disorders, chronic pain and body mass index as variables. The number of elderly people participating in water aerobics activities is higher in the active group who has participated in the activity for more than 5 years. Similar results were found in the study by Ferretti et al. (2019), with a predominance of active and very active elderly, representing 50% and 57.1% respectively, and a low classification of sedentary people (7.8%).

In regard to the physical activity level, in this study, the association with better quality of life and lower body mass index (BMI) stands out. A study by Toscano and Oliveira (2009) similarly concluded that the quality of life of elderly people who have a higher level of physical activity is better than those with a lower level of physical activity. In this scenario, higher levels of physical activity seem to intervene positively in the quality of life of the elderly.

Regarding BMI, in the study by Brito, Menezes and Olinda (2015), nutritional status was the only variable that did not show a statistically significant association with functional disability in both genders, despite the high prevalence of elderly people who presented inadequate nutritional status, either due to low weight or overweight/obesity. The highest prevalence of functional disability verified in this study was observed among elderly people who did not practice any physical activities, with inadequate nutritional status, who reported four or more diseases and who rated their health as poor.

As to the time of participation in water aerobics activities, the results showed a significant correlation in relation to the elective selection strategy and in relation to the solicitude in the presence of chronic pain, evidencing certain accommodation in relation to their successful aging strategy. At the same time, they reveal autonomy, security and confidence in relation to their abilities, even in the face of situations such as the presence of chronic pain. Thus, demonstrating satisfaction in the affection and concern relationships with family members and close people. The great innovation in the context of successful aging, in Gonçalves's (2015) perspective, is the belief that aging is compatible with a healthy and full life, from a physical and mental point of view. Prevention plays a key role in this process. According to lifestyle, the aging process is different from person to person. Thus, an active lifestyle implies the performance of activities and the development of social networks, which may benefit health.

With the results of this study, it was possible to identify, in the irregularly active group, a better perception of quality of life and a longer time of participation in water aerobics activities associated with a lower intensity of pain perception. Likewise, better quality of life and control attitudes are associated with a lower prevalence of osteoarticular and musculoskeletal disorders. In regard to quality of life, the correlation analysis carried out in the study by Ferretti et al. (2018) demonstrated similar results, noting that the greater the quantity of disease and intensity of pain, the lower the quality of life score is.

Another relevant aspect found in this study reveals that the longer time of participation in the project is associated with disabilities, evidencing the fragility of the group in the sense of carrying out more intense activities. However, they are physically active and in sufficiently good health to practice water aerobics, considering their skills and limitations. Conversely, the study points out a significant correlation as to the time of participation in the water aerobics project with a decrease in the perception of chronic pain and better perception of quality of life.

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In a way, these findings resonate with the findings of the study by Santos et al. (2015). The results showed that being physically active during leisure time is significantly associated with a lower prevalence of chronic pain. The practice of physical activities by the elderly, especially at leisure, provides opportunities for a more active, healthy and independent life, thus contributing to maintaining autonomy and improving quality of life.

However, it is important to refer to the study carried out by Castro et al. (2010), which aimed to investigate the effects of an exercise program on elderly women with complaints of pain and with osteoporosis/ osteopenia in terms of functional autonomy. The highest percentage was in the condition of severe pain (37.09%) and another large percentage was composed of moderate and moderate to high levels. The minimization of pain for all participants extended to the condition of non-pain after the program for almost 14% of the elderly women, while the group with low and moderate pain increased. Most of the elderly women who felt severe pain changed to the situation of moderate pain. Therefore, the benefits of physical activity programs in preventing and improving pain are evident in that study.

In this context, the study by Oliveira et al. (2018) analyzed the effect of sedentary behavior on the practice of physical activity in elderly people who attend gyms. The study revealed that as the sedentary behavior increases, the performance of vigorous physical activities decreases and moderate activities increase. This occurrence has a certain association with the findings of this study, since sedentary behavior negatively affects the performance of vigorous activities in the elderly and positively the performance of moderate activities. In view of this evidence, it is clear that exercise is not an elixir for healthy living, but a regular regimen of physical activity has been shown to decrease morbidity and increase the quality of life enjoyed by the elderly population (Taylor, 2015). However, participation in physical activities and exercise plays an important role in preventing the progress of diseases and prolonging years of independent life (Powers & Howley, 2014).

The analysis carried out in the group of regularly active elderly people reveals a significant correlation between perception of chronic pain intensity with better responses in relation to quality of life, lower prevalence of osteoarticular and musculoskeletal disorders and lower levels of anxiety, stress and depression that make up the attitude of emotion in the face of pain. Similar information was expressed by the elderly people interviewed in the study by Cardoso et al. (2008), characterized as very active and with pathologies, who considered their health to be good without hindering the practice of physical activity.

The results obtained in relation to the time of participation of regularly active elderly people reveal statistically significant correlations with successful aging strategies, specifically in relation to elective selection. The analysis in the active group still reveals that the compensation and optimization functions show a significant correlation with the variables that make up the attitudes towards the presence of chronic pain, with regard to solicitude and medication, demonstrating autonomy and independence in the way that the elderly people who practice water aerobics deal with adverse situations. Regarding this observation, the involvement in physical activities constitutes an important element in the physical and social well being of the elderly. In the study by Dellaroza et al. (2013), the pain complaint that bothered the elderly the most demonstrated an association with a greater degree of dependence in the activities of basic and instrumental daily life and in the alteration of mobility. Another relevant result found in the study by Lemos et al. (2019) demonstrates a negative influence of chronic pain on the quality of life of the elderly population and on the functionality and autonomy of these individuals. Thus, it is essential to ratify the inclusion of physical activities in the daily lives of the elderly in the context of improving quality of life, considering that aging is a natural, universal, irreversible phenomenon and does not occur simultaneously and equally in human beings (Borges et al., 2017).

Another relevant aspect evidenced in the group of active elderly people reveals a significant association of the level of physical activity with the variables that permeate successful aging, as well as the attitudes of medical healing, solicitude, emotion and control. These characteristics prove the relation of the time of participation in the water aerobics activity in the ambit of the pain condition, revealing the hopelessness in the medical healing and in an opposite way, expressing self-sufficiency in the ability to deal with the limitations and the discomfort of the injuries resulting from a chronic condition. Thus, so that aging can be used and lived in the best possible way, Montovani et al. (2006), ensures that the regular practice of physical activities provides greater independence, autonomy and better health condition, increasing the sense of general well being.

V. Conclusion

Based on the objectives of this study, it is clear that the sense of participation in physical activities has been strengthening as one of the principles that aim to promote the improvement of the quality of life and physical functionality of the elderly population, reflecting on the multiple aspects that constitute biopsychosocial aging. Furthermore, this participation is linked to different factors, including older age and health condition with a certain fragility, since many of the participants in this study do not meet the regularly active classification, with regard to the physical activity level.

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However, it is necessary to advance knowledge in this field, considering the characteristics of the aging process, old age and longevity, seeking innovation and quality in the scope of public practices and research, considering the growth of this population in Brazil and worldwide, as a phenomenon worthy of attention, study and investigation.

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