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CHRONIC EFFECT OF HYDROGYM IN PEOPLE WITH OBESITY AND CNCD POST-COVID: A PILOT STUDY

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Abstract

The objective of this study is to verify the effec of the practice of Hydrogymnastics as a regulatory factor for the treatment of obesity and post-COVID CNCDs. This is a descriptive research with a comparative approach, carried out with individuals with obesity. A 16-week Intervention program was applied, in which 40 volunteers participated, who were assigned to an Intervention Group (IG) and a Comparison Group (CG). The analysis was descriptive between pre and post test (GI= 26 and GC=14). Normality was contrasted for the total sample, and by group (G1 and G2) for each of the measured variables. In the intervention group, some variables were maintained and did not change significantly, there were improvements only in DBP and HR. In the CG there were improvements only in the HR variable, they also obtained improvements in weight, BMI, DBP and SBP, with a small effect size. The Hydrogymnastic Training Program, performed in adults with obesity, in this study showed an improvement in the response of the double product: heart rate and systolic blood pressure.

Keywords: Obesity, Integral Healthcare Practice, Pandemics

1. Introduction

Chronic Noncommunicable Diseases (NCDs) have become the main causes of death in the last two decades, which is explained by a condition that involves demographic, economic, social and epidemiological changes that are linked together, and that have resulted in low fertility , increased life expectancy and changes in healthy lifestyles(1).People's quality of life is not the exclusive cause of their monetary income, their state of health, their educational level. It also depends on aspects such as sports, leisure andrecreational activities (2). Several investigations from different areas of knowledge indicate that sport provides qualities of discipline, tolerance, respect, cooperation, among others, which result in social participation

and people's well-being (2). In this sense, the practice of physical exercise at moderate and vigorous intensities produces improvements in health, in the physiological and psychological field in general, the latter divided into emotional and cognitive aspects or called satisfaction with life (3). Improving the mental health and overall well-being of individuals (4).

The misapplication of active and healthy lifestyle habits has assumed a preponderant role with regard to non-communicable chronic diseases (NCD) and obesity in our society, causing both nationally and internationally these aspects to cause poor quality of life in long term. 5.6 million deaths per year attributed to Physical Inactivity (5) and more than 6.3 million due to the coronavirus as a result of COVID-19, with America being the continent with the most deaths (6). In addition, it is known that obesity is a risk factor for multiple non-communicable chronic diseases and kills about 41 million people a year in the world (7).

Although there is information available on safe and adequate practice in relation to the type of volume-intensity that should be prescribed for people with severe obesity (8,9), there are few tools that provide response criteria for the success of multidisciplinary intervention. In obesity (10), this adds to the existing knowledge that obesity is a risk factor for people with COVID-19 (11,12).

However, a key consideration in formulating Physical Activity guidelines is the nature of the dose-response relationship between Physical Activity and the incidence of noncommunicable diseases and obesity (13,14). One of the two non-pharmacological means to alleviate the diseases non-transmissible chronic diseases is physical exercise that, practiced regularly, reduces cardiovascular risk factors, controls blood glucose or body weight and provides a feeling of well-being (15).

Considering the latter and the economic impact of obesity and overweight (7,16), NCD (17), COVID-19 (18) and that the World Obesity Federation (WOF) estimates that by 2030, throughout the world, more than 1,000 million people will live with obesity, that is, 1 in 5 women and 1 in 7 men (7) regulator for the treatment of obesity and post-COVID NCD.

The objective of this research is to verify the effectiveness of the practice of Hydrogymnastics as a regulatory factor for the treatment of obesity and post-COVID NCD.

2. Materials and Methods

This study is characterized as a pragmatic clinical trial, wherepre-test, treatment and post-test design in a non-probability sample. A 16-week program was applied, in which 40 volunteers participated, who were assigned to an Intervention Group (people who were diagnosed with COVID) and a Comparison Group (people who were not diagnosed with COVID). The analysis was descriptive between pre and post test (GI= 26 and GC=14). The study was guided by the Declaration of Helsinki.

Data analysis was performed using the SPSS statistical software (V.22.0). The assumption of normality was verified for the total sample and for each group (G1 and G2), for each of the measured variables. Descriptive data analysis was performed using means and standard deviation. Pearson's test, for repeated samples, was used to determine the differences between pre and post test. Cohe's d-statistic test to assess effect size (ES). The significance level adopted was $p<0.05$.

3. Results and Discussion

Anthropometric characteristics and the values of the participants' health indicators are shown in Table 1. In the Covid group (IG), no statistically significant differences were found between pre and post test, with the exception of DBP and HR, with a Small ES found in them.

Table 1. Comparison between pre and post measures in the Intervention Group (IG).

	Pre-Test		Post-Test		p-value *	d Cohen	Effect Size
Variables	Mean	SD	Mean	SD			
WEIGHT (kg)	108,89	18,24	108,52	18,21	0,187	-0,02	Trivial
BMI (kg/m2)	40,10	5,99	39,97	6,00	0,190	-0,02	Trivial
PGC (%)	47,84	6,05	47,50	6,39	0,099	-0,06	Trivial
BMR (kcal)	1584,92	175,69	1588,04	178,49	0,556	0,02	Trivial
SBP (mmHg)	122,85	9,14	123,32	10,15	0,699	0,05	Trivial
DBP (mmHg)	83,54	8,72	80,38	6,15	*0,027	-0,36	Small
FC (w/m)	77,77	9,21	74,62	9,04	*0,048	-0,34	Small
CC (cm)	107,32	12,50	106,89	12,71	0,407	-0,03	Trivial
QC (cm)	126,81	12,94	125,44	14,89	0,171	-0,11	Trivial

** Differences between pretest and posttest*

Table 2 shows the comparison between pre- and post-test measurements in the Comparison Group. Intervention participants only reported significant improvements in HR, but a small effect size was reported for weight, BMI and DBP variables, which shows an improvement in these variables, even finding long TE in DBP.

Table 2. Comparison between pre and post measures in the Comparison Group (CG).

	Pre-Test		Post-Test		p-value *	d Cohen	Effect Size
Variables	Mean	SD	Mean	SD			
WEIGHT (kg)	112,71	28,01	108,89	18,24	0,604	0,21	Small
BMI (kg/m2)	41,64	8,24	40,10	5,99	0,811	0,26	Small
PGC (%)	48,81	5,48	47,84	6,05	0,097	0,16	Trivial
BMR (kcal)	1594,64	226,07	1584,92	175,69	0,193	0,06	Trivial
SBP (mmHg)	130,64	11,88	122,85	9,14	0,118	0,85	Largo
DBP (mmHg)	85,29	8,37	83,54	8,72	0,755	0,20	Small
FC (w/m)	74,36	12,61	77,77	9,21	*0,012	0,37	Small
CC (cm)	108,95	15,86	107,32	12,50	0,226	0,13	Trivial
QC (cm)	127,39	15,18	126,81	12,94	0,566	0,04	Trivial

** Differences between pretest and posttest*

This research aims to verify the effectiveness of the practice of Hydrogymnastics as a regulatory factor for the treatment of obesity and post-COVID NCD. The results reveal that there is an improvement in both groups regarding the hemodynamic response of blood pressure and heart rate. Another important difference associated with the significant drop in SBP in the CG, which reveals an improvement in the double product only in this group. Data similar to those found by Seo et al (19) and Faundez et al (3) after 12 and 16 weeks of training.

With regard to the decrease in the remaining parameters, these did not show significant differences, although they did show a downward trend in the various variables, which could be explained by the time elapsed in the assessment, which the acute effect of the exercise would not improve, in comparison with other investigations in people with obesity (8,9,20,21).

As for the type of exercise performed and the duration of the programs, the type of exercise and the effects on other chronic diseases and obesity, some studies take longer than others(20), other studies use different methodologies such as Yoga (19) or interval training of high intensity (22), however, all these studies report improvements without pharmacological methods.

The strengths of this study is that it is a pioneering study in this type of population, it provides results to develop strategies in future confinements with this type of people and post-confinement. However, it has some limitations that must be recognized, such as the sample size.

Finally, the development of new studies is suggested, to determine in a more detailed way the effects of hydrogymnastics in the improvement of variables related to obesity and NCD, both in people who had COVID and in those who did not.

4. Conclusion

It is concluded that the water aerobics training program improves the response of the double product (heart rate x systolic blood pressure), only people with obesity and NCD only in the CG, however, the IG also presented improvements in their HR. The reduction of PG%,

CC and HC indicate improvements also in body composition parameters and finally, that it is an adequate program to lower blood pressure, but to cause significant changes it should last for more weeks as exposed by the critical literature. To find significant reductions, the program should last longer or at least closer to 16 weeks considering the same type of training.

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