CONCILIUM

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Chronic effect of bioresonance therapy on cardiovascular risk factors and physical activity pattern in the elderly: a randomized clinical trial

Efeito crônico da terapia com biorressonância sobre fatores de risco cardiovascular e padrão de atividade física em idosos: ensaio clínico randomizado

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Autoria Secundária
Fernando Otávio Pires Mattera
ORCID: https://orcid.org/ 0000-0002-7622-6861
Universidade de Marília - UNIMAR, Brasil
E-mail: fernando_mattera@hotmail.com
Bruno Moreira Candeloro
ORCID: https://orcid.org/0000-0002-3213-6629
Faculdade de Medicina de Marília - FAMEMA, Brasil
E-mail: bruno_candeloro@hotmail.com
José Alfredo Ordenes Mora
ORCID: https://orcid.org/0000-0003-3945-8388
Instituto Latino-amaericano de Reabilitação Física (ILARF), Marília – São Paulo – Brasil.
E-mail: jordenesmora@gmail.com
Elen Landgraf Guiguer
ORCID: https://orcid.org/0000-0002-9930-9694
Universidade de Marília – UNIMAR, Brasil
E-mail: elguiguer@gmail.com
Maria Elizabeth da Silva Hernandes Correa
ORCID: https://orcid.org/0000-0003-2301-714X
Associação Beneficente Hospital Unimar (ABHU), Brasil
E-mail: meshco@gmail.com
Flávia Cristina Castilho Carácio
ORCID: https://orcid.org/0000-0002-0568-1621
Universidade de Marília - UNIMAR. Centro Interdisciplinar em Diabetes (CENID) – Universidade de Marília - UNIMAR, Brasil
E-mail: fcccaracio@gmail.com
Cláudia Rucco Penteado Detregiachi
ORCID: https://orcid.org/0000-0002-8294-4237
Universidade de Marília - UNIMAR, Brasil
E-mail: claurucco@gmail.com
Eduardo Federighi Baisi Chagas
ORCID: https://orcid.org/0000-0001-6901-9082
Universidade de Marília - UNIMAR. Centro Interdisciplinar em Diabetes (CENID) – Universidade de Marília - UNIMAR, Brasil
E-mail: efbchagas@unimar.br

ABSTRACT

The aim of the study was to analyze the effect of 12 months of bioresonance therapy on physical activity behavior and cardiovascular risk factors in the elderly. A randomized, parallel, double-blind clinical trial was carried out in a sample of 20 elderly people. Bioresonance therapy was performed using QUANTEC® PRO. Data on gender, sex and morbidities were obtained. As cardiovascular risk factors, body composition, blood pressure and biochemical profile were analyzed. The behavior change stage related to physical activity was verified by the transtheoretical model and the physical activity pattern evaluated by the Baecke questionnaire. The treatment group showed a significant reduction in total cholesterol, triglycerides, blood glucose, LDL-c and non-HDL-c, and an increase in HDL-c and physical activity and physical exercise scores. The placebo group, showed a regression in the behavior stage for physical activity. Based on the results, we conclude that instrumental biocommunication therapy using QUANTEC® can make a significant contribution to the health of the elderly, particularly in increasing physical activity level, maintaining blood glucose levels and improving the lipid profile.

Keywords: Bioresonance Therapy; Cardiometabolic Risk Factors; Sedentary Behavior; Transtheoretical Model; Healthy Aging.

INTRODUCTION

Aging is related to reduced organic functions and increased diseases risk (LIU et al., 2021). In the elderly, there is an increase in the prevalence of cardiovascular diseases, their risk factors and also the presence of multiple morbidities (ABRIGNANI et al., 2020). Systemic arterial hypertension (SAH) is most predominant among the elderly and has a strong relationship with coronary artery disease and cerebrovascular accidents (MALACHIAS, 2019).

When compared to hypertension, type 2 diabetes mellitus (T2DM) has a lower prevalence, however complications associated with T2DM have a greater impact (COSTA et al., 2017). Changes in total cholesterol and fractions are strongly associated with acute myocardial infarction, peripheral arterial disease and stroke (MALTA et al., 2019). Obesity is an independent risk factor and increases the risk of SAH, T2DM and dyslipidemia (ALVES et al., 2020). In addition, lean mass loss is related to reduced mobility and autonomy in activities of daily living (NERI et al., 2020).

Although the functional decline of aging is inevitable, adopting an active lifestyle and healthy eating habits can slow down this process, most of the elderly population does not reach the physical exercise recommendations for health promotion (ROSSMAN et al., 2021). Multiple factors related to the individual and the environment are identified as barriers to physical activity behavior change (BÉLANGER et al., 2017). However, behavior change depends both on the process of awareness and education throughout life, and on the desire to change habits (LIPERT et al., 2020), which can be analyzed using the transtheoretical model (RIOS, 2017).

Lately complementary and integrative therapies in medicine for diseases treatment growth has been observed (JAIN; MILLS, 2010), brazilian Unified Health System (SUS) has been stimulated and since its regulation it has presented growing acceptance by health professionals and population (TELESI JÚNIOR, 2016). The bioresonance method is considered a complementary and integrative therapy form, which through vibrational stimuli seeks to reestablish the functional and psychological balance (ERNST, 2004).

Bioresonance therapy can be performed with instrumental biocommunication equipment such as QUANTEC® (SCHNEIDER, 2014) and MORA® (HERRMANN; GALLE, 2011), which through the emission of waves by a white noise diode, simulate a biological system capable of receiving and transmitting "information", which combines analysis and balance both at an electromagnetic and informational level (MORA et al., 2019). The objective of this study was to analyze 12 months of bioresonance therapy effect with QUANTEC® on the physical activity´s behavior stage, habitual physical activity pattern, body composition, blood pressure, glycemia and lipid profile of elderly people.

METHODS

This is a randomized, parallel, double-blind clinical trial that followed the CONSORT (*Consolidated Standards of Reporting Trials*) recommendations (MOHER et al., 2010). The sample consisted of elderly subjects, aged between 60 and 79 years old, of both gender, attended at the Physical Evaluation and Sports Practice Laboratory (LAFIPE) after being attended at the specialty medical outpatient clinic (AME), both at the University of Marília, from August to September 2018 (pre-intervention) and from August to September 2019 (post-intervention). 42 patients were invited to participate, 11 declined, 8 were excluded for not meeting the inclusion criteria, and 3 were excluded for not completing the evaluation routine. Also subjects aged over 79 years, with physical disabilities or illnesses that prevented the practice of physical exercise, and who did not complete the evaluations proposed for the study, were excluded from the study.

Only those who agreed to participate in the study and signed the Free and Informed Consent Form (FICF) were included in the study. The project was approved by the Ethics and Research Committee of UNESP in Marília (Opinion nº 2.791.867/2018).

Blinding occurred for both groups (treatment and placebo). The second level of blinding occurred in the researchers who performed the assessments (pre- and post-intervention) and data tabulations. Patients were randomly assigned to the treatment and placebo groups. The input flowchart, selection, randomization and intervention are shown in figure 1.

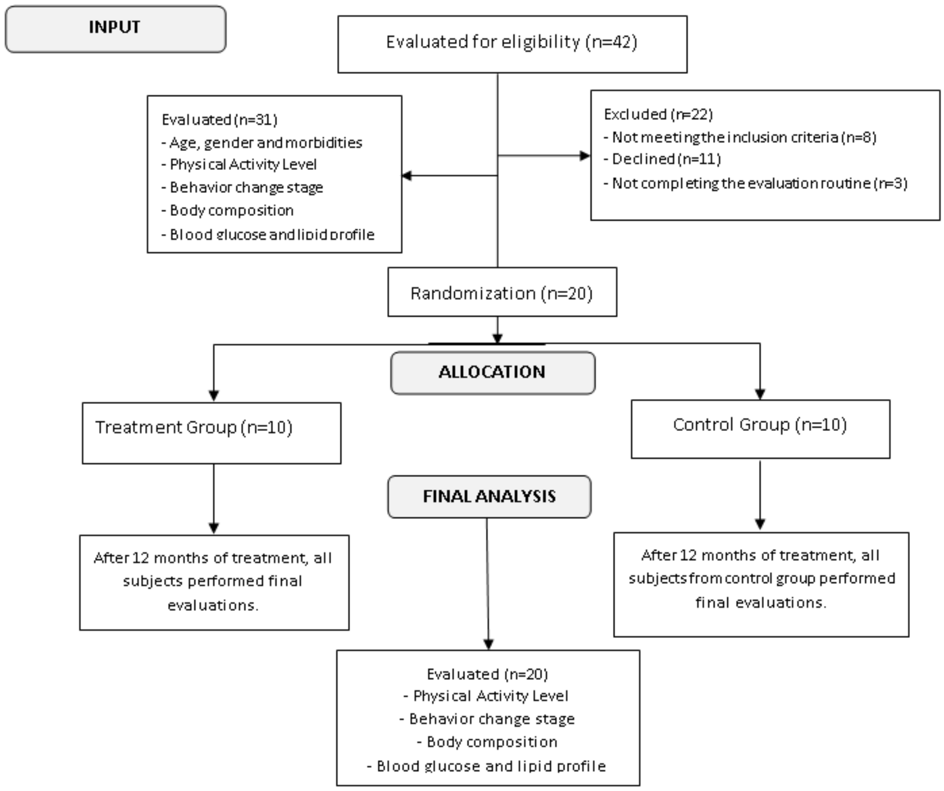

Figure 1 - Study sample input, selection, randomization and intervention flowchart.

Through interviews and access to the medical records, data on age, gender and morbidities were obtained. As cardiovascular risk factors, body composition, blood pressure and biochemical profile were analyzed. For body composition, body mass index (BMI), waist circumference (WC), fat percentage and neck circumference were considered. The percentage of fat was obtained through bioimpedance. Resting heart rate (HR), systolic blood pressure (SBP) and diastolic blood pressure (DBP) were measured (BARROSO et al., 2020). For the biochemical variables, measurements of fasting blood glucose, total cholesterol, triglycerides, HDL-c were performed, and LDL-c and non-HDL-c were calculated (FALUDI et al., 2017).

The behavior change stage related to habitual physical activity (HPA) was analyzed using the Transtheoretical model, which classifies behavior into five stages of change as follows: Precontemplation: does not consider the possibility of changing, nor is it concerned with the question; Contemplation: admits the problem, is ambivalent and considers adopting changes in the next 6 months; Preparation: initiate some changes, plan, create conditions for change, review past attempts and indicate what change may occur in the next 30 days; Action:

implements environmental and behavioral changes, invests time and energy in implementing the change, but this behavior takes less than 6 months; Maintenance: process of continuity of work initiated with action, to maintain gains and prevent relapse with behavior for at least 6 months (RIOS, 2017).

The pattern of physical activity was assessed using the Baecke questionnaire (BAECKE; BUREMA; FRIJTERS, 1982). It consists of 16 questions that provide three scores of physical activities in the last 12 months, characterized by: Occupational Activities (OPA); Leisure Activities and Physical Exercise (LAE); and Leisure and Locomotion Activities except physical exercise (LLA). The sum of the three components (OPA, LAE and LLA) results Total Physical Activity Score (TPAS) (MAZO et al., 2012).

Bioresonance treatment was carried out with the QUANTEC® PRO. After the patients received explanations about the objectives of the study and the general characteristics of the therapy through QUANTEC®, the participants were invited to read and transcribe the Healing Sheets (a sentence that expresses the desire and intention to carry out the treatment).

The therapeutic intervention focused on behavior change related to habitual physical activity. Thus, a standard Healing Sheets was adopted as described below:

"Every day I become more physically active, exercising consciously and safely. I'm thankful for my ability to perform physical activity and a balanced and healthy diet, thank you very much".

Only patients from treatment group had their data added to QUANTEC®. The patient's data added into QUANTEC® was: full name, age, date of birth, gender, two photos (one of the entire body and one of the face according to the manufacturer's recommendations) and standard Healing Sheets.

After adding the data, the first 20-cycle scan was performed in the morphic fields and then an automatically 10-cycle scan. The therapeutic potencies used were those established by QUANTEC® and, therefore, individualized.

When the treatment duration automatically established by QUANTEC® ended or when it detected the need for modifications, the suggested therapeutic adjustments were made during the intervention period.

When the therapeutic procedure ended, a new planning was carried out, but without performing a new scan. The therapy was maintained for 12 months, ending only after the final evaluation (post-intervention). The control (placebo) and treatment groups did not receive any type of therapy, physical or nutritional guidance during the intervention period. After the intervention period proposed for the study, the control group (placebo) received a similar conduct to the treatment group for 12 months, but without monitoring the study variables.

Qualitative variables are described by absolute (N) and relative (%) frequency distribution. To analyze the association between qualitative variables, Fisher's exact test was performed. Quantitative variables were described by mean and standard deviation (SD). To analyze the effect of the intervention on the ordinal qualitative variables, Friedman's non-parametric test was performed. The normality distribution was verified by the Shapiro-Wilk test. The variation (effect) between the pre- and post-intervention moments was calculated by the delta variation (post – pre). To compare the effect of the intervention between groups, the t Student test for independent samples was performed. To compare the mean within the group between pre- and post-intervention period, the Student's t test for paired samples was performed. The significance level adopted was 5% and the data were analyzed using the SPSS software (version 24.0).

RESULTS

Table 1 presents data on sample characteristics related to gender and morbidity distribution. There was no significant difference in gender distribution and morbidities between the groups, which indicates that the randomized groups have similar characteristics. Regarding age, no significant difference was observed between the groups either. The placebo group had a age mean of 69±7 years and the treatment group 67±4 years, but with no significant difference between groups (p=0.387).

Table 1: Absolute (N) and relative (%) frequency distribution of gender and morbidities between the study groups at the pre-intervention time.

Variable	Category		Group		Total (n=20)	p-valor
			Placebo (n=10)	Treatment (n=10)		
Gender	Female	N (%)	7 (70.0)	8 (80.0)	15 (75.0)	0.615
	Male	N (%)	3 (30.0)	2 (20.0)	5 (25.0)	
SAH	Absent	N (%)	5 (50.0)	6 (60.0)	11 (55.0)	0.661
	Present	N (%)	5 (50.0)	4 (40.0)	9 (45.0)	
T2DM	Absent	N (%)	7 (70.0)	7 (70.0)	14 (70.0)	1.000
	Present	N (%)	3 (30.0)	3 (30.0)	6 (30.0)	
Dyslipidemia	Absent	N (%)	8 (80.0)	8 (80.0)	16 (80.0)	1.000
	Present	N (%)	2 (20.0)	2 (20.0)	4 (20.0)	
Osteoarthritis	Absent	N (%)	6 (60.0)	8 (80.0)	14 (70.0)	0.342
	Present	N (%)	4 (40.0)	2 (20.0)	6 (30.0)	

Note: p-value for association calculated by Fisher's exact test. Systemic arterial hypertension (SAH). Type 2 diabetes mellitus (T2DM).

In table 2, it was observed that the placebo group had a regression related to the behavior change stage for physical activity practice, with an increase in the percentage of subjects in the pre-contemplation, contemplation and preparation stages. Although in the treatment group the p-value does not indicate statistical significance, there were patients who evolved to the maintenance stage and most of them still maintain some level of physical activity, which indicates the maintenance of physical activity (PA) behavior in the treatment group.

Table 2: Absolute (N) and relative (%) frequency distribution of behavior change stage related to activity for treatment and placebo groups between pre- and post-intervention period.

Behavior change stage related to Physical Activity	Placebo				Treatment			
	Pre		Post		Pre		Post	
	N	%	N	%	N	%	N	%
Precontemplation			1	10.0			1	10.0
Contemplation			3	30.0	1	10.0		
Preparation			3	30.0			1	10.0
Action	7	70.0	1	10.0	8	80.0	2	20.0
Maintenance	3	30.0	2	20.0	1	10.0	6	60.0
p-valor (within group)	0.005*				0.059			

Note: * indicates significant difference between pre- and post-intervention periods within the group by Friedman's non-parametric test.

Table 3 shows that the treatment group presented a significant increase in Leisure Activities and Physical Exercise (LAE) score and in the Baecke questionnaire total score, indicating an increase in the physical activity pattern. When considering the comparison between groups, a significant difference was observed, with a reduction in the overall physical activity score in the placebo and an increase in the treatment group.

Table 3: Comparison of the mean and standard deviation (SD) of physical activity (PA) by the Baecke score (total), Occupational Activities (OPA), Leisure Activities and Physical Exercise (LAE) and Leisure and Locomotion Activities except physical exercise (LLA) for the groups in the pre- and post-intervention moments.

PA	Group	Pre		Post		Delta (post-pre)		p-valor
		Mean	SD	Mean	SD	Mean	SD	
OPA	Placebo	2.64	0.35	2.71	0.45	0.08	0.49	0.150
	Treatment	2.49	0.41	2.94	0.80	0.45	0.62	
LAE	Placebo	1.88	0.94	1.95	0.81	0.08	0.87	0.171
	Treatment	2.55	1.05	3.17*	0.88	0.63	0.85	
LLA	Placebo	2.35	0.71	2.18	0.86	-0.18	0.62	0.312
	Treatment	2.90	0.50	3.05	0.61	0.15	0.77	
Baecke (total)	Placebo	6.87	1.70	6.84	1.64	-0.02	1.16	0.028‡
	Treatment	7.94	1.24	9.16*	1.61	1.23	1.18	

Note: * indicates significant difference from the pre-moment within the group by Student's t-test for paired samples for p-value ≤ 0.05. ‡ indicates significant difference between groups for delta by Student's t test for independent samples for p-value ≤ 0.05.

Table 4 shows the comparisons between the pre- and post-intervention period of the hemodynamic, body composition and biochemical variables of the placebo and treatment groups. No significant variations were observed in hemodynamic and body composition measurements in either group. However, significant differences were observed for the delta variation of all biochemical variables, with significant reductions for glycemia, total cholesterol, triglycerides, LDL-c and non-HDL-c, as well as increases for HDL-c in the treatment group. On the other hand, the control group (placebo) presented an increase in glycemia, total cholesterol, triglycerides, LDL-c and non-HDL-c.

Table 4: Comparison of the mean and standard deviation (SD) of hemodynamic parameters, body composition and metabolic for the groups in the pre- and post-intervention moments.

Variables	Group	Pre		Post		Delta (post-pre)		p-valor
		Mean	SD	Mean	SD	Mean	SD	
HR (bpm)	Placebo	83.5	17.3	84.1	14.1	0.6	9.6	0.711
	Treatment	70.3	4.4	69.4	8.5	-0.9	8.1	
SBP (mmHg)	Placebo	134.1	14.1	133.1	11.2	-1.0	8.5	0.195
	Treatment	129.7	15.3	121.6	8.4	-8.1	14.3	
DBP (mmHg)	Placebo	81	8.6	83	6.9	2.0	9.7	0.244
	Treatment	81.4	11.4	77.5	6.5	-3.9	12.1	
WC (cm)	Placebo	108.6	15.3	106.2	14.0	-2.4	5.3	0.493
	Treatment	95.7	11.0	94.9	9.6	-0.9	4.6	
BMI (kg/m2)	Placebo	32.2	7.6	30.9	5.9	-1.2	2.6	0.675
	Treatment	26.7	4.5	25.9	4.0	-0.8	2.4	
NC (cm)	Placebo	39.3	4.4	38.7	3.9	-0.6	1.6	0.793
	Treatment	36.8	4.0	36.4	3.4	-0.4	1.7	
Fat %	Placebo	38.9	9.2	37.9	7.5	-1.0	3.6	0.688
	Treatment	33.3	7.1	33.2	6.9	-0.1	6.7	
Glycemia (mg/dL)	Placebo	86.1	7.7	88.9*	8.3	2.9	3.5	0.002ǂ
	Treatment	126.7	55.2	116.9	43.1	-9.8	22.3	
Colesterol (mg/dL)	Placebo	210.5	56.6	216.6*	56.1	6.1	8.8	0.003ǂ
	Treatment	219	60.8	203.9*	47.7	-15.1	17.3	
Triglyceride (mg/dL)	Placebo	116.1	20.4	127.0*	25.0	10.9	10.4	0.001ǂ
	Treatment	134.5	33.6	121.9*	21.8	-12.4	14.3	
HDL-c (mg/dL)	Placebo	44.8	13.0	42.9	11.4	-1.9	4.5	0.005ǂ
	Treatment	41.3	11.9	45.6*	10.7	4.3	4.0	
Non-HDL-c (mg/dL)	Placebo	165.7	60.5	173.7*	60.3	8.0	11.1	0.001ǂ
	Treatment	177.7	67.4	158.2*	51.7	-19.4	20.3	
LDL-c (mg/dL)	Placebo	142.5	58.1	150.4*	58.0	8.0	11.1	0.002ǂ
	Treatment	150.8	63.8	131.3*	49.2	-19.4	20.3	

Note: * indicates significant difference from the pre-point within the group by Student's t-test for paired samples for p-value ≤ 0.05. ‡ indicates significant difference between groups for delta by Student's t test for independent samples for p-value ≤ 0.05. ł indicates significant difference between groups for delta by the non-parametric Mann-Whiteny test for independent samples for p-value ≤ 0.05; Resting heart rate (HR); systolic blood pressure (SBP); diastolic blood pressure (DBP); waist circumference (WC); and neck circumference (NC).

DISCUSSION

The sample diseases frequency distribution was similar to the prevalence observed in other studies and the differences are due to known factors, which suggests that the observed results can be reproduced in the elderly population, considering physical condition and mobility profile.

The low prevalence of SAH in the sample may be related to the absence of smoking and excessive alcohol consumption (MALTA et al., 2022). The high distribution of DM frequency observed in the sample may be related to a higher risk of overweight and obesity in the elderly (ASSOCIAÇÃO BRASILEIRA PARA O ESTUDO DA OBESIDADE E DA SÍNDROME METABÓLICA, 2016; REIS et al., 2022), as well as sedentary behavior (BULL et al., 2020; SÁNCHEZ-MARTÍNEZ et al., 2023).

Considering the estimated values of total cholesterol and fractions of the Brazilian population, the overall prevalence of dyslipidemia in Brazil can range from 24 to 41% (MALTA et al., 2019). However, the low dyslipidemia prevalence in the sample may be related to the dyslipidemia classification based solely on the quantitative values of total cholesterol and fractions (FALUDI et al., 2017). On the other hand, the prevalence of osteoarthritis was 30%, very similar to the estimate of 33% of the Brazilian adult population, although increasing age represents a risk factor (COIMBRA; PLAPLER; CAMPOS, 2019).

From the cardiovascular health perspective, the intervention main effect was on the lipid profile and blood glucose. Cardiovascular disease (CVD) remains the leading cause of death worldwide, and aging is linked to an increased risk of CVD. In the elderly, CVD is one of the main causes of disability, functional decline, loss of independence and reduced life quality. Therefore, early and effective measures to prevent CVD are the main global health priorities in the elderly (MURPHY; COONEY; MCEVOY, 2023).

Changes in total cholesterol, LDL-c and non-HDL-c cholesterol have a significant effect on CVD risk. However, the risk reduction is dependent on baseline values and age mainly, other factors such as of physical activity level , gender, smoking and body mass index are also factors with a significant influence on the cardiovascular risk modification associated with lipid profile (HSU et al., 2021). As for age, high serum levels of LDL-C in middle age are a strong risk factor for later cardiovascular events. However, in older populations, LDL-C levels are no longer predictive of cardiovascular mortality or may even appear to be protective (ROZING; WESTENDORP, 2023).

Chronic exposure to hyperglycemia is a significant risk factor for CVD. Advanced glycation end products (AGEs) result from multiple sugar-dependent reactions interacting with proteins and their receptors, generating endothelial dysfunction and CVD (ROBLES-RIVERA et al., 2023). On the other hand, physical exercise has been identified as a first-line therapy for patients with type 2 diabetes (T2DM), because, regardless exercise, intensity and duration, increased physical activity levels can promote better glycemic control in short and long term (SYEDA et al., 2023).

The significant effects on the lipid profile and glycemia of the treatment group undoubtedly contribute to the cardiovascular risk reduction, however it is not possible to verify whether the observed effects are related only to the bioresonance therapy through QUANTEC®, to the physical activity level increase or both. Increased physical activity levels are linked to a reduced risk of hip fractures and the risk of developing more than twenty non-communicable chronic diseases, including diabetes, cardiovascular disease, chronic respiratory disease and cancer risk, as well as slowing down cognitive decline (NIKITAS et al., 2022).

Although physical activity level (PAL) represents a risk behavior modifier, most elderly people remain insufficiently active. Most studies that proposed exercise intervention models to promote sustainable increase in PAL and reduce sedentary behavior in the elderly achieved limited success, particularly in the long term (STOCKWELL et al., 2019). Although interventions using behavior change techniques show promising results, limiting factors such as time, financial resources and the need for specialized professionals can limit their effectiveness from a population perspective (CHEN et al., 2022).

On the other hand, integrative and complementary therapies such as bioresonance through instrumental biocommunication with QUANTEC®, which allows simultaneous and distant treatment of a large number of patients, could contribute to reduce the population sedentary behavior without the need for highly skilled trained professionals or at a high financial cost. In addition, considering that the bioresonance method by instrumental biocommunication uses the physical principle of induction through electromagnetic radiation produced by magnetic fields, treatment can take place remotely (SCHNEIDER, 2014).

The physiological mechanism associated with biofield therapies is unclear, but one of the hypotheses is related to the light emitted by living organisms, called biophoton emission (BE) (KENT, 2020). However, it has been observed that thought can also emit electromagnetic waves and influence the structure of water, even from a distance (RADIN et al., 2006). Based on the same assumption, instrumental biocommunication through QUANTEC® is based both on the ability of the living organism to emit and receive influences from electromagnetic fields, and on the equipment ability to capture, process and forward this bioinformation (MORA et al., 2019).

The QUANTEC® ability to acutely influence physiological responses of systolic blood pressure, glycemia and triglycerides was observed in a previous study (MORA et al., 2018). However, in the present study, the chronic effect was verified only in the biochemical variables, with no significant effect on blood pressure and body composition, among the biochemical variables, reductions in total cholesterol, triglycerides, LDL-c and non-HDL-c were observed, as well as an increase in HDL-c, which represent an important cardiovascular risk reduction. A significant glycemia reduction was also verified when compared to the control group, a relevant fact given the prevalence of T2DM in the sample.

Currently, there are few studies in the literature about QUANTEC® as an intervention and to the best of our knowledge, we have not identified any studies that have evaluated the effect of bioresonance therapy using QUANTEC® on physical activity behavior. Among the studies that used QUANTEC®, the main investigated variables are related to subjective perception variables.

When evaluating the effect of Feng Shui therapy through QUANTEC® for four months in a double-blind intervention study, a significant effect was verified in the improvement of sleep quality and general well-being (KRYŽANOWSKI, 2021). In another study using QUANTEC®, when assessing the effect of therapy for three and six months, a positive effect was observed in increasing calmness and disposition, as well as in reducing exhaustion. However, the lack of blinding in this study raises doubts about the degree of influence of psychological aspects (SCHNEIDER, 2014).

Although few studies have used QUANTEC®, others instrumental biocommunication equipments for bioresonance therapy such as MORA® and Delta Professional® have been used to assess the effect on different health indicators. In a study with MORA® equipment, a significant reduction in the side effects of radiotherapy, chemotherapy and surgery was observed in patients with cancer compared to the control group (KIRSEVER; KIZILTAN; YILMAZ, 2022).

In other studies using MORA®, favorable results were verified for patients suffering from neurological-orthopedic-internal spectrum diseases, allergies, pain and infections (HERRMANN; GALLE, 2011), as well as in the smoking treatment (PIHTILI et al., 2014) and depression (MURESAN et al., 2021). However, both the study by Herrmann and Galle (HERRMANN; GALLE, 2011) and by Muresan et al. (MURESAN et al., 2021) they were retrospective and unblinded studies, which may reduce the evidence degree. On the other hand, in the prospective, controlled and double-blind study by Puhtili et al. (PIHTILI et al., 2014) a significant effect was verified in the treatment of smoking in patients who received bioresonance therapy through the MORA® equipment.

In an intervention study using the Delta Professional® equipment in patients with hypothyroidism, a significant effect was observed on the value of the free fraction of thyroxine, thyroid-stimulating hormone (TSH), LDL-c, total cholesterol and triglycerides in the treatment group (KIRYANOVA; VOROKHOBINA; MAKHRAMOV, 2016). Kiryanova; Vorokhobina; Makhramov (2017) also observed a significant effect of bioresonance therapy on glycated hemoglobin, fasting blood glucose and glucose tolerance test (OGTT) in patients with T2DM.

An important limitation in studies with this type of therapy is the lack of blinding of the treatment and placebo groups, since the psychological effect of the treatment expectation can represent an important confounding factor (SCHULZ; GRIMES, 2002). As for the research team, blinding prevents behavior changes related to intervention and patient evaluations (KARANICOLAS; FARROKHYAR; BHANDARI, 2010).

Even at minimal doses, increased activity levels is related to reduced risk of CVD deaths (KRAUS et al., 2019). Thus, considering that in the present study, treated patients showed an increase in physical activity level (PAL) associated with the general score and physical exercise of the Baecke questionnaire and that in the control group, a reduction in PAL was observed with an increase in sedentary behavior, we can suggest that bioresonance therapy using QUANTEC® has a significant effect on changing behavior related to lifestyle.

CONCLUSION

Although the mechanisms associated with the instrumental biocommunication therapy effects with QUANTEC® still need to be studied, the results observed in the present study suggest that this therapeutic modality can significantly contribute to the elderly health, in particular increasing the physical activity level, maintenance of glycemia and lipid profile improvement.

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