Chapter 7

The Benefits of Physical Activity on Climacteric Women

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http://dx.doi.org/10.5772/intechopen.68829

Abstract

As the population ages, there is a need of developing ways to prevent or revert the deleterious effects of aging, especially in climacteric women who suffer with the problems caused by hormonal changes. Exercise is a nonmedicated intervention that can be applied on that population. The benefits of physical activity can positively change body composition, increase levels of muscular strength, balance, and functional capacity. Strength training, aerobic exercise, whole body vibration, and aquatic exercises are some of the modalities that health professionals can prescript to these individuals. Although there are many studies about these exercises, a technique called blood flow restriction is emerging as an alternative to high load exercises but with the same benefits.

Keywords: climacteric women, exercise, body composition, strength, blood flow restriction

1. Introduction

The aging process, also called senescence, is characterized by gradual and irreversible changes in an organism's structure and operation as a result of the time passing. The World Health Organization (WHO), in the end of the 1990s, adopted the term "active aging" to describe the process of the health, participation, and security opportunities. The aim of the active aging is to increase the expectation and quality of life to all the people who are aging, including the fragile, physically impaired, and the ones that require special care [1]. Data from the WHO indicate that in 2025, the life expectation in the developed countries will be 81 years; and 78 years in the ones that are in the development process [2].

The word "health," according to the WHO, refers to the physical, mental, and social well-being where the organism works optimally without any disease. Therefore, in an active aging project, the politics and programs that promote mental health and social living are just as important as the ones that improve the physical health conditions. Furthermore, the individual will be able to stay physically active and able to work [2].

During the adult life, the physiological functions of our organism decline, which is part of the senescence. The capacity of protein synthesis reduces significantly, there is a decrease of the immunological functions and changes in the body composition. Also, in elderly, the motor performance falls down expressively as a result of physiological degeneration and extrinsic factors such as environment conditions, task requirements, state of the disease, life style, or the combination of these elements. More than just biological and physiological changes, the aging process brings loss of psychological and social character, as well as elderly isolation, with the understanding that they are no longer active, or the fact that they think that are an obstacle to their families what causes sadness, low self-steam, even causing emotional diseases like depression [3].

In the middle-age, about 45 years old, the non-transmissible diseases are responsible for most part of the health complications and deaths. The researches show the risk of chronic diseases as the age advances, such as diabetes, cardiopathy, osteoarthritis, osteoporosis, and sarcopenia. However, what raises the risk of development of chronic diseases at older ages is smoking, sedentarism, inadequate diet, and hormonal alterations [1]. On the other hand, the enrolment in adequate physical activities, healthy diet, nonsmoking, not drinking alcohol, and the right use of the medicaments prescribed by the doctor may prevent diseases and the functional fall, increase the longevity and the individual's quality of life. Regarding specifically the indication of physical activity for the population over 65 years, the American College of Sports Medicine (ACSM) [4] recommends that along with aerobic exercises (moderate or intense), 8–10 strength exercises must be performed, with 8–12 repetitions for each exercise, two time a week.

The reduction of the lean mass close to 50 years is more expressive in women than men. The peak of this reduction happens on the postmenopause period, when occurs the loss of skeletal muscle, which is related to the fall on the production of ovarian hormones (especially, estrogen). The sarcopenia is a syndrome characterized by progressive and generalized reduction of the skeletal muscle mass associated with the loss of muscular strength, having as a consequence the physical impairment (reduction of muscular function and speed), fall in the quality of life and greater mortality. The European Study Group in Sarcopenia on the Elderly recommends that for the sarcopenia diagnostic the individual must have, necessarily, low lean mass associated with one of these two factors: low muscular function or strength. The preservation of the skeletal muscle mass is connected to the well-being and the disease prevention in the elderly [5].

Among the events that happen during the aging process, the reduction on the mineral bone density has a particular important role for the possible development of osteoporosis in both the genders but mostly in the female. After 40 years, the annual bone loss average is from 2 to 3% and elevates to more than 5% in the early years of climacteric [6]. The WHO defines osteoporosis as the reduction of bone mass associated with the disarrangement of the bone microarchitecture resulting in increased fragility of the bone and an elevated fracture risk [2].

Women in the postmenopause, when submitted to an exercise program based on stretching, balance, strength exercises, and impact exercises associated with hormone therapy (HT), show greater bone mineral density on the femoral neck when compared to the women that only do hormone therapy [7]. The muscle strength reduces fracture risks caused by osteoporosis because it increases the bone mineral content, the strength supported by the noncontractile tissues (tendons and ligaments), improvement in the postural function, and decrease in the risk of fall. Some studies suggest that the growth of muscle mass leads to a rise on the muscular strength, stimulating the bone remodeling through the piezoelectric effect, which is the capacity of the bone to transform mechanic signals into electrical signals [8].

2. Body composition

2.1. Lean and fat mass

The role of physical activity on body and fat mass control is extremely important. Studies demonstrated that there is a negative correlation between regular physical activities and body mass index (BMI). Since the exercise enhances energy expenditure, it plays an important part on reaching the ideal weight and body composition related to the health of elderly people. Therefore, the morbi-mortality, associated with non-transmissible chronic diseases, could be reduced with prevention, including physical activity as a change on the lifestyle to improve the aspects of body composition. Also, a reduction on the muscle mass on climacteric women results in a decrease of the basal metabolic rate, strength, and level of physical activity. However, it is already established that the reduction of these energetic needs is not followed by a decrease on the caloric ingestion, which causes a rise in the body fat mass with aging [9].

The aerobic exercise is a modality that has the power of promoting positive changes in the body composition. However, there is a need of controlling the intensity of the exercise because literature shows that when realized with a very small load, it will not modify the aspects of body composition [10]. A group of postmenopause women performed a 1-hour walking protocol three times a week for 6 months at 60% of the maximum oxygen volume (VO_{2max}) intake, whereas the other group performed walking 5 days a week for the same period but without controlling the intensity. Despite both the groups had shown reduction in fat mass and percentage, only the controlled one had decrease in the body mass.

Still regarding the effects of exercise on body composition, eight postmenopause women and seven men, aged between 61 and 77 years, caucasian, healthy and sedentary, with body mass index (BMI) with normal levels (24.8 kg/m^2) performed a 26-week resistance training protocol to upper and lower limbs and lumbar extensors, three times a week, two series of 10 repetitions for each exercise at 65–80% of one maximum repetition (1RM), totaling 45 min [11]. There were no changes on body mass; however, there was a reduction on fat percent (3.4%) and fat mass (3.1 kg) and an increase of the free-fat mass (2.0 kg), strength (14.9–49.0 kg), total energy expenditure, and basal metabolic rate.

Another aspect that can interfere on the results of exercise on the body composition is the presence or absence of a certified supervisor for the physical activity. Recently, the effects of an exercise program composed of stretching, weight bearing, resistance training for upper and lower limbs, and leisure activities in postmenopause women were evaluated where one group had the supervision of a physiotherapist and the other did not have; the exercises were performed at home. The upper and lower limbs and total body lean mass of the supervised group was increased. On the other hand, that did not happen on the other group, showing that supervision is important to obtain the desired results and also to prevent injuries [12].

The effects of a 16-week variable load resistance exercise protocol on body composition, associated with diet or not, were evaluated in 15 postmenopause women (50–69 years) who performed strength training three times a week with a load of 90% of 1RM [13]. The sample was divided according to the BMI: G1 ($n = 7$; IMC > 27 kg/m^2) and G2 ($n = 8$; IMC < 27 kg/m^2). Group 1 was submitted to the exercise protocol plus diet, whereas the other group did not have the diet controlled. The exercise-only group did not show significant changes on body composition. In comparison, the on-the-exercise + diet group showed a reduction on weight, fat mass, and fat percentage. In that perspective, although the exercise can promote a lot of benefits to climacteric women, if other aspects such as the diet are not well controlled, these benefits may not appear.

2.2. Bone mass

Positive effects of the exercise on the increase or maintenance of bone mineral density (BMD) were already observed in post menopause women with osteopenia or osteoporosis. However, the benefits depend on the type of exercise, intensity, frequency, and duration of the session [14].

Strength training can increase the mechanical stress on bone throughout the tendon promoting an osteogenic response and the piezoelectric effect, justifying the maintenance or increase of BMD. Because of that mechanism, forces of compression, tension, or torsion can generate electric signals that stimulate bone activity and deposition of minerals in stress points caused by muscle contraction. The muscle contraction can increase the BMD and, possibly, block the bone reabsorption [8, 15].

A positive linear relation between BMD and the increase of load during 1 year of strength training in postmenopause women was observed [16]. Exercise programs from low to moderate impact (running, walking, steps up-and-down) are more effective for the preservation of BMD on the lumbar area and femoral neck when combined with strength training than high-impact exercises such as jumping [17].

Many meta-analyses point out that high-intensity aerobic and resistance exercises tend to be more effective for the increase of lumbar spine BMD than low-intensity walking. Nevertheless, when there is an association between low-intensity walking and a high-calcium diet is also effective on elevating BMD. Furthermore, these exercises can promote a 2% elevation on the BMD of postmenopause women, which is a very important improvement in their bone health [18, 19].

http://dx.doi.org/10.5772/intechopen.68829

Moderate aerobic exercise (50% of the maximum VO_2) seems to be safe and easy to execute in osteoporotic women and effectively increase BMD of the lumbar spine after 12 months of intervention [20]. A well-regulated bone metabolism is extremely important for the prevention and maintenance of the bone system properties. Likewise, a training program can help on the reduction of reabsorption bone biomarkers, reducing the risk of vertebral fracture up to 25%, even if the BMD does not increase significantly [21].

Besides the discrete effect of walking on the lumbar vertebrae BMD, there are other benefits related to that exercise. A 4-hour walking per week showed to be associated to a 41% less hip fracture risk compared to less than 1-hour per week [22]. In the same perspective, 40-minute brisk walking, three times a week, promoted a clinical improvement on the femoral neck BMD and a 35% reduction on the risk of fall on the elderly after 2 years of exercise [23]. **Table 1** sums up a few studies that investigated the benefits of exercise on body composition of climacteric women.

Year	**Sample**			**Exercise protocol**	**Main results**
	n	**Age (years)**	**Stage**		
1995 [10]	15	50–69	Postmenopause women	G1: strength training + diet G2: strength training 16 weeks	G1: ↓weight, ↓Percentage fat mass, ↓fat mass, ↑lean mass
1996 [11]	36	X	Postmenopause women	G1: walking, three times a week G2: walking five times a week 24 weeks	G1: ↓Weight, ↓fat mass, ↓ Percentage fat mass G2: ↓Fat mass, ↓ Percentage fat mass
2000 [24]	Eight men and seven women	61–77	Postmenopause	65–80% 1RM strength training, three times a week, 45 minutes' session 26 weeks	↓3, 4% fat mass, ↓fat mass, ↑lean mass
2016 [13]	34	60–74	Postmenopause women	G1: stretching, walking or step, upper and lower limbs strength training, leisure activities, all with supervision G2: same protocol, but without supervision Two times a week 12 months	G1: ↑arms, legs and total lean mass
1997 [23]	97	59–75	Postmenopause women with upper limb fractures	G1: walking, 40 min, three times/week G2: upper limb exercises, guided to perform exercises that improve wrists and arms function, visited each 3 month. Reassessed after 1 and 2 years.	G1: a tendency on the increase of the BMD of the femoral neck; increase on the lumbar BMD in both groups, however not statistically significant

Year	Sample			Exercise protocol	Main results
	n	Age (years)	Stage		
2001 [14]	35	53–77	Osteoporotic postmenopause women	G1: daily walking + 2 series of 15 repetitions per day of exercises for trunk and lower limb muscles and ingestion of calcium and D vitamin G2: detraining group G3: control group	No difference on the BMD of the lumbar vertebral in none of the groups; ↑ Percentage average BMD of the G1 when comparing the baseline to the 1st and 2nd year of training
2003 [7]	140	X	Osteoporotic postmenopause women	G1: hormone therapy + strength training G2: hormone therapy only	There was a positive association between the amount of weight lifted and the BMD of the femur independent from factors such as age, weight, and hormone therapy
2004 [20]	50	X	Osteoporotic postmenopause women	G1: outside walking (50% VO_{2max}, 1 h per day, 4 days a week, for 12 months G2: control group	There was no significant difference on the BMD of both groups The bone marker NTX showed a reduction on the G1

Table 1. Studies related to exercise and body composition in climacteric women.

3. Neuromuscular variables

As an important consequence caused by the many endocrine, neuroendocrine, behavioral, and metabolic changes that occur on the climacteric period, the decline of neuromuscular variables is one of the most frequent that brings important alterations to the life of this population [24]. During this chapter, the term "neuromuscular variables" will be used to make reference to all capacities that are related to neural stimulus and muscle health such as strength, agility, speed, flexibility, balance, and others.

There is a direct relation between muscle mass loss and strength decrease in women with more than 40 years. It is estimated that the muscle strength has a 15% fall on the period between 60 and 79 years, and 30% from the eighth life decade, with the lower limbs being more affected than the upper limbs [25, 26].

The diminution of muscle strength as a result of changes in the composition of the subtypes of muscle fiber, oxidative stress, variations of the growing hormone (GH), IGF-1, insulin, among others, also leads to a reduction in other important physical capacities that depends on the strength [27]. Body balance, walking speed, stepping up-and-down, recovery after a stability loss and standing up from the chair are some examples of variables that, with the fall in strength, end up being negatively affected.

The Brazilian Society of Sports Medicine [28] published an official statement regarding physical activity and women's health pointing that there is an inverse relation between exercising regularly and the main causes of death in menopause women. Thus, performing physical exercises regularly is the most effective way of avoiding strength loss, or try to regain part of the strength that was lost, similarly all the other capacities that depends on strength [26].

There are many types of exercise that promote benefits for the neuromuscular variables of climacteric women. Strength training, in general, is the most well-studied and used to achieve that goal. To prescribe correctly the most adequate training, few factors are to be taken into consideration such as the number of repetitions, load, series, resting interval, seminal frequency and others. The American College of Sports Medicine [4] states that to have effective results with the strength training, the load should be bigger than 65% of one maximum repetition (1RM), three series with 8–12 repetitions for the main muscle groups of the upper and lower limbs should be performed, at least three times a week. Nonetheless, those training variables can be manipulated in many ways, allowing the creation of a lot of training programs.

It is also well-known that training with higher intensities promote bigger changes. When comparing a training protocol that followed all the statements of the ACSM, which means exercises that involved the main muscle groups from upper and lower body where one group trained at 40% and the other at 80% of 1RM, it was observed that despite the fact that both showed increase of strength and transverse muscle section, the high intensity group had significantly more gains. In addition, it is important to highlight that in this specific study, emphasis was given to exercises that activated muscles that had origin or insertion on the spine and femur aiming to ally the strength gain with the piezoelectric effect and, consequently, improve the bone mass, which can be an interesting way to potentialize the benefit of the resistance exercise [29].

Although muscle strength happens to be a variable relatively easy to increase or, at least, maintain, it must be highlighted that if the individual stops practicing the physical activity, the detraining also happens fast. To illustrate that 15 postmenopause women practiced strength exercises for upper and lower limbs for 8 weeks with a load of 80% of 1RM and that was effective to increase strength of the trained muscle groups. To analyze the detraining process, those women stopped training and re-evaluated after 8 weeks. The average of strength loss was 4.5% after detraining. Yet, it is important to say that there was no difference between the strength before the training and after detraining [30]. Hence, the strength training is effective to climacteric women, but its benefits are easily lost in cases of abandoning the exercise program, pointing out the importance of developing strategies that increase the adherence of these women to the training.

A group of researchers from the Idaho State University, United States, developed a training program called POWIR (Prevent Osteoporosis with Impact + Resistance) with the initial goal of bone improvement but was modified to improve strength and function also. The basis of this program is composed of a progressive training that uses dumbbells, barbells, and weighted vests as ways of applying resistance focusing on exercises for the lower limbs, hips, chest, and back [31]. This protocol was initially created to healthy climacteric women; however, it was also applied in postmenopause women who had breast cancer.

In this specific population, 106 women who went through breast cancer treatment were separated in two groups where one performed the POWIR protocol and the other an exercise program consisted only of stretching and flexibility, called FLEX. The intervention lasted for 1 year and in addition to the exercises already pointed, both groups performed home exercises one time per week. The POWIR was able to improve aspects such as muscle strength, walking speed, stand up from the chair, among others, showing to be an efficient and safe option for climacteric women, including the ones who had diseases like cancer [31].

Water exercises are another type of physical activity that can improve neuromuscular variables of climacteric women and the changes may be similar to other exercises that are commonly used on the daily practice of physiotherapists and personal trainers, such as elastic bands. A water exercises protocol with the same number of repetitions, rest interval, series, week frequency, duration (35–60 min) and for the same muscle groups of an elastic band protocol promote the similar benefits for climacteric women [32].

Nevertheless, even with the same exercises, some differences still appear when comparing water exercises and elastic bands. The water exercises were more efficient on improving the performance on the 60-second squats (65%) and abdominal crunch (28%), whereas the elastic bands were better to increase flexibility (44.19%) and performance on the knee push-up (29.13%). Still, it is important to highlight that both protocols promoted benefits in all neuromuscular variables [32]. When the protocol is well designed with heating, stretching, strength exercises, and cool down, there is no doubt that the benefits will appear, and both water exercises and strength training with elastic bands are effective to climacteric women.

In fact, to promote a muscle strength gain, it is necessary that the muscle contracts and so activate mechanisms that promote protein synthesis. In more intense exercises such as strength training or water exercises, it is very easy to observe how the contraction needed to win a load stimulates muscle hypertrophy and strength gains. On the other hand, lighter activities such as whole body vibration training (WBVT) sessions also stimulate muscle contraction [33]. The most important mechanism activated is that the vibration has the capacity of stimulating sensorial receptors that lead to a reflect activation of the motor units, similar to what happens on the tonic reflex [34].

Hormone therapy (HT) on climacteric women is an important treatment indicated to reduce the symptoms (such as, heat waves, night sweats, vaginal dryness, changes in sleep, among others) caused by decrease of hormones, mainly estrogen [35, 36]. Studies confirmed the positive effects of this therapy on the quality of life and strength in postmenopausal women [37, 38]. Associated with HT, physical exercise can bring benefits to women's health after menopause, reduce fat mass and the risk of coronary diseases; increase strength, resistance, and flexibility [39–41]. Besides that, weight-bearing, strength, and balance exercises associated with HT are able to help in osteoporosis prevention and treatment in a 1-year period, aiming to increase BMD and, consequently, reducing the number of lumbar and femur neck fractures [16].

It is undeniable that the strength training is the type of exercise mostly used to promote strength gains. In this perspective, to see if the WBVT is also capable of promoting those gains, the results of both types of exercise must be compared. Three times a week WBVT and strength training, for 6 months, were able to increase significantly the isometric (15.10% and 16.49%, respectively) and isotonic (16.47% and 10.59%) strength, those differences being nonsignificant when comparing both types of training [34]. Thus, WBVT can promote a strength increase similar to the strength training. Some studies that analyzed the effects of many types of exercise on the neuromuscular variables are listed on **Table 2**.

Year	Sample			Exercise protocol	Main results
	n	Age (years)	Stage		
2000 [29]	25	41–60	Postmenopause women	G1: strength training at 80% of 1RM G2: strength training at 40% of 1RM G3: control group	G1 and G2: ↑muscle strength, ↑transverse muscle section G1: showed significant greater increases
2002 [30]	15	49–62	Postmenopause women	G1: strength training at 80% of 1RM G2: control group	G1: increased strength after 8 weeks, but that improvement was lost after 8 weeks of detraining
2012 [31]	106	≥50	Postmenopause women survivors of breast cancer G2: FLEX Both interventions lasted 1 year	G1: POWIR	G1: ↑ muscle strength, ↑walking speed, ↑stand up from the chair
2009 [32]	46	54.7 ± 2.0	Postmenopause women	G1: water exercises G2: strength training with elastic bands	Both groups: ↑60-second squats, ↑abdominal crunch, ↑flexibility, ↑knee push-up
2004 [34]	70	58–74	Postmenopause women	G1: whole body vibration (24 weeks) G2: strength training (24 weeks) G3: control group	G1 and G2: ↑isometric and isotonic strength

Table 2. Studies related to exercise and neuromuscular variables in climacteric women.

4. Blood flow restriction—an alternative to high loads

As previously said, to obtain maximum benefits from exercise, for example the strength training, it is indicated that higher loads must be used, which will promote a bigger response of the organism and, consequently, greater benefits [42]. Nevertheless, loads bigger than 65% of 1RM as stated by the ACSM [4] many times are not tolerated by the elderly, individuals with some disease that turns harder performing exercises, such as chronic obstructive pulmonary disease and osteoporosis, among other populations. In this perspective, a Japanese scientist called Yoshaki Sato thought about a method that consisted of low-load exercises associated with some device that could reduce the blood flow, for example pneumatic cuffs, elastic bands, and sphygmomanometers (**Figure 1**), to the muscle that is being used [43]. Initially, the method was called "vascular occlusion", but nowadays, the terms "Kaatsu training" and "blood flow restriction" (BFR) are the most widely used.

There are still many unanswered questions regarding how the BFR is capable of promoting benefits on strength, functionality, muscle activation, and others, similar to the traditional high

Figure 1. (A) Walking with blood flow restriction, (B) strength training with blood flow restriction, and (C) pneumatic cuff used to promote the blood flow restriction.

load exercise, even being performed with very low loads. However, studies that investigated the BFR mechanisms affirm that the explanation lies on a bigger metabolite concentration, stimulation of anaerobic growth factors, greater fast twitch fibers recruitment, increase on GH secretion, VGF1, fall on miostatine and rise on mTOR levels, greater nitric oxide synthesis, along with other factors that were not yet discovered [44–46].

Most part of the studies with BFR combine this technique with the strength training and in apparently healthy individuals; however, some researchers already have been investigating how the BFR can be used in special populations and associated with other types of exercise [47–52]. In the next session, some studies that used this technique in climacteric women and/or with non-transmissible chronic diseases will be presented.

4.1. Applying the blood flow restriction

The osteoporosis, which is a bone-metabolic disorder characterized by a reduction of the bone mineral density (BMD) with deterioration of the bone micro architecture, leading to an increase of the bone fragility and fracture risk [53], affects climacteric women, and this is a population that needs to practice exercises to improve not only the bone, but also the neuromuscular aspects. Because of that, strength training with blood flow restriction is being used in osteoporotic women due to the fact that it can promote benefits without the need of elevated loads [47].

A low load (30% of 1RM) with BFR and a high load (80% of 1RM) strength training program were applied for 3 months and two times a week in women with osteoporosis (62.60 ± 4.33 years) to compare the alterations on strength levels [47]. Both protocols consisted of four series until concentric failure, but while the BFR group had a 30 seconds' rest between series, the high load group had 2 minutes. The two types of exercises were capable of increasing strength comparing the pre-test in the 6 and 12 weeks, and the gains were similar for both groups, showing that even with low load, the BFR promotes strength gains on the same magnitude of high loads.

http://dx.doi.org/10.5772/intechopen.68829

There is few literature regarding the use of BFR in water exercises probably because of the problems that can appear on building a restriction equipment that could be easily used on water. Even with those difficulties, two studies were developed by a group of researchers from the Federal University of Paraíba, Brazil, associating water exercises for BFR [48, 49]. Menopaused women (n = 28) were separated in control group, water exercises and water exercises with BFR. For 8 weeks, the experimental groups performed a 45 minutes' exercise protocol for lower limbs in a pool with controlled temperature, being on with and without BFR. The exercise combined with BFR increased lower limbs maximum strength, which did not happen on the other experimental group. Also, both groups improved functional performance [48]. In contrast, neither of the protocols were capable of changing aspects of the body composition, probably because the exercise volume was too low to promote such changes [49].

Elastic band exercises are another type of exercise whose effects associated with BFR were investigated. Similar to the traditional strength training, low-load elastic band exercises with BFR for upper limbs for 2 months, three times a week, showed an increase on the strength similar to the high intensity group. In addition, a tendency for improving the total bone mass was also found [50].

Even though the mechanisms of BFR on the improvement of the muscle health are not completely well known, some studies were already able to partially explain that [44, 45]. Regarding the bone mass, few are the studies explaining the physiological mechanisms caused by BFR. However, since it is a low-load exercise, the improvements do not come from mechanical stimulus or piezoelectric effect but from metabolic and hormonal factors [51, 52]. The low-load strength training with BFR was capable of increasing the bone alkaline phosphatase levels in elderly men after 6 weeks of exercise, correspondingly to the high load group (21% and 23%, respectively) [51]. Besides that, there is the hypothesis that an increase on the intramedullary pressure and interstitial fluid flow within the bone promoted by the BFR leads to favorable responses for bone formation and remodulation [52].

5. Conclusions

With the aging of the world's population, it turns even more necessary that new studies be developed with the goal of finding exercise types that benefits this population group, aiming not only the treatment of non-transmissible chronic disease but also its prevention. The positive effects of exercise in climacteric women were already proved in a lot of studies, and it is essential that the health professionals responsible for the prescription of such exercises (physiotherapists, personal trainers, occupational therapists) have the necessary knowledge to prescribe correctly in a way that brings maximum improvements on body composition, functional performance, strength, balance, and others. On the other hand, new ways of exercise, just like blood flow restriction, are promissory exercise modalities for that the public still needs more studies regarding the ideal prescription to apply this technique on climacteric women.

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