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**| RESEARCH ARTICLE**

## **Effectiveness of Aerobic Exercise (Zumba) and Giving Cinnamon Bark Tea (*Cinnamomum Cassia*) On Body Fat Composition in Obesity Women**

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**| ABSTRACT**

Obesity is a condition that shows an imbalance between height and weight due to the accumulation of fat tissue in the body resulting in excess body weight that exceeds the ideal size. Obesity in Indonesia has become a national problem that must be addressed immediately. This study was to determine the effectiveness of aerobic exercise (Zumba) and cinnamon bark tea on body fat composition in obese women. This study was conducted on 75 respondents consisting of 36 aerobics (Zumba) and 39 people for 24 days with purposive accidental sampling. This type of research is a Quasy Experiment with a pre-posttest design with the control group. Statistical test using paired sample t-test and independent sample t-test with an alpha value of 0.05 ( $\alpha = 0.05$ ) was conducted. The results showed that the average body fat before aerobic exercise (Zumba) was 36.14%, and the average after aerobic exercise was 35.59%, so the difference between the two was 0.55%; paired t-test p-value = 0.001. The average body fat composition before drinking cinnamon bark tea was 38.46%, and the average body fat composition after drinking cinnamon bark was 37.82%. So the mean difference between the two is 0.64%. Paired t-test p-value = 0.002. Unpaired t-test to compare the two groups, and the mean difference between the two was 2.23%, with a  $p = 0.001$ . The study concluded that aerobic exercise (Zumba) and drinking cinnamon bark tea can reduce body fat, but what is more effective is drinking cinnamon bark tea. The study recommended that reducing body fat in obesity will be even better when the aerobic exercise routine is accompanied by regular consumption of cinnamon bark 2 times a day for 60 minutes.

**| KEYWORDS**

Aerobic Exercise, Cinnamon, Obesity, body fat

**| ARTICLE INFORMATION**

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### **1. Introduction**

Obesity is a condition that shows an imbalance between height and weight due to the accumulation of fat tissue in the body resulting in excess body weight that exceeds the ideal size (Dohle et al., 2016). In Indonesia, the prevalence of obesity in the population aged > 15 years is 10.3% for men and 13.9% for women. Based on these data, it is concluded that obesity in Indonesia has become a national problem that must be addressed immediately (Tungka et al., 2017).

In Indonesia, according to the 2018 Basic Health Research (Riskesdas) data, the prevalence of general obesity at age > 18 years is 21.8%, and the prevalence of men is 14.5% and women 29.3%, while the prevalence of obesity in Maluku Province reached 19.9% (Kementerian Kesehatan RI, 2018).

Physical activity is a positive way to control changes in body fat percentage and body weight without reducing lean tissue. Physical activity such as aerobic exercise seems slow in showing changes in body fat percentage and body weight, but if done intensively, it will show good results in terms of decreasing body fat percentage and body weight. Changes in body fat percentage and body

weight occur because aerobic exercise increases body metabolism and is good for reducing body fat percentage and excess body weight. This is what many people expect from sports, namely, to get the ideal body (Andini & Indra, 2016).

Aerobic physical training uses fat as an energy source; aerobic training is an ideal method for reducing fat tissue mass and losing weight. This is evidenced in his research that aerobic exercise for 60 minutes 3 times a week for 8 weeks can reduce 2.05 kg of body weight, and also aerobic exercise 3-5 times a week can help reduce fat percentage, namely the frequency of exercise 3 times can reduce the fat percentage of 2.386% compared to exercise 2 times obtained an average of 0.829% (Andini & Indra, 2016).

Regular and programmed training can help weight loss; it is known that there is weight loss in Zumba gymnasts after doing exercises with a frequency of 3 times a week for 4 weeks. (Awaliah, 2014). Meanwhile, based on research (Rina Prihatiningrum, Tanjung Ayu Sumekar, 2016), the average muscle mass of Zumba participants who participated in Zumba training for 8 weeks was greater than the muscle mass of Zumba participants who participated in Zumba exercises for < 8 weeks.

According to Irianto (Puji Indriyani, Heru Supriyanto, 2010), there is an effect of physical exercise: aerobic exercise on reducing blood sugar levels because aerobic exercise is a systematic process using motion stimulation that aims to improve or maintain the functional quality of the body which includes the quality of heart-lung endurance, strength, and endurance. And muscular endurance, flexibility, and body composition.

One of the physical activities that can be done to reduce glucose levels is through an aerobic innovation through the accompaniment of Latin rhythm music in the form of new dance movements resulting from a combination of choreographic elements and Latin American music such as Salsa, Merengue, Mambo, Cha-cha, Cumbio, Flamenco, Tango, and Bachala which is called Zumba. (Warta Kestra *in* (Benaino et al., 2014))

Hundreds of plant species have been known to have medicinal properties. In fact, these plants have been used for generations to treat various diseases, ranging from coughs, skin diseases, digestive disorders, kidneys, hepatitis, diabetes, and hypertension, to cancer. (Hariana, 2013)

The results of the study (Ummah, 2015) cinnamon showed that there was a significant difference in average blood glucose levels in normal rats, DM rats, DM rats given *Cinnamomum cassia* extract 200 mg/kgBW/day and 400 mg/kgBW/day for 28 days and there was a significant difference. The average body weight, especially between normal rats with DM and normal rats with DM rats treated with *Cinnamomum cassia* extract 400 mg/kgBW/day for 28 days.

According to Elsa, *in his research, there was a difference in final body weight in all groups of* (Harahap, 2015) rats after administration of the cinnamon extract (*Cinnamomum cassia*) at a dose of 300 mg/kg for 14 days, but the difference was not statistically significant (*p*-value 0.409). Meanwhile, research (Harahap, 2015) found that there were differences in the average percentage of body weight ratios between the study groups on the administration of 200 mg/kgBW and 400 mg/kgBW therapy for 28 days.

The second most common non-communicable disease handled by medical officers in Ambon City in 2017 was obesity which suffered as many as 841 patients, less than in 2016, which suffered as many as 416 patients. This study aimed to synthesize aerobic exercise (Zumba) and to drink cinnamon tea to reduce body fat in obese women (Dinas Komunikasi Informatika & Persandian Kota Ambon, 2018).

## 2. Methods

This research is a quasi-experimental pre-post test with a control group design. The treatment was the intervention of Zumba Gymnastics Movement and Cinnamon Bark Tea (*Cinnamomum Cassia*). Body fat composition in both groups was measured before and after receiving the intervention. The research was conducted for 24 days, from September 28 to November 5, 2020, on Banda Neira Island, Banda District, and Central Maluku Regency. This research population is women in the overweight category in Banda Neira District (Banda Island). The sample in this study were women aged 18-45 years with a body fat composition category above 30% who were in the Banda Neira Island area and its surroundings. The sampling technique in this study will be carried out *purposively Accidental Sampling*. The sample used in this study was 75 people who were divided into two treatment groups. To see the significance of the effect of the measurement results above, statistical testing was conducted using paired sample *t*-test analysis and independent sample *t*-test with the SPSS program. The basis for decision-making is comparing the *P* value (*P*-value) with an alpha value of 0.05 ( $\alpha = 0.05$ ). LB.02.01/6.1/4560/2020 September 2, 2020.

**3. Results and Discussion**

**1. Average body fat composition ( *body fat* ) before and after aerobic exercise (zumba)**

The results of the research on the group of subjects who underwent aerobic exercise treatment that the fat composition before and after is shown in table 1 below:

**Table 1 Body Fat Composition Before and After Aerobic Gymnastics (zumba)**

Body Fat Composition	Average± SD	Average ± SD	CI: 95%	Score <i>p</i>
Before	36.14±2.68	0.55 ±	0.25-0.86	0.001
After	35.59±2.49	0.90		

=0.05

Table 2 above shows that the average *body fat* composition before aerobic exercise (zumba) in the treatment group is 36.14 %, and the average after aerobic exercise in the treatment group is 35.59 %. Hence, the difference between the two is 0, 55 %. This indicates differences in the body fat composition of respondents in the treatment group. Based on the paired t-test in the group, *p-value* = 0.001, which indicates that there is a significant difference (*p* <0.05) in the body fat composition of participants before and after aerobic exercise (zumba) treatment.

Based on the study's results, there was a significant difference in the body fat composition of participants before and after the aerobic exercise (zumba) treatment. This is in line with the results of research conducted by (Sitepu et al., 2020) and (Statement et al., 2019) that aerobic exercise (zumba) can reduce body fat percentage. Zumba exercise can move the abdominal and gluteal muscles if done with light to moderate intensity for a duration of 60 minutes to break down fat deposits (Indreswari et al., 2020). Similar to what was said by (Octaviana et al., 2020) and (Galih Tri Utomo and Said Junaidi, 2012), aerobic exercise performed with light to moderate intensity can reduce body fat in obese women.

Aerobic exercise has a great influence on the body, especially on lung-heart endurance. In this condition, blood vessels will widen (vasodilation), sympathetic and parasympathetic nerves will be nearby, body heat will dilate blood vessels, and good elasticity of blood vessel walls (especially in aerobic exercise) occurs (Fitri et al., 2016). In contrast to the results of a study conducted by (Erzebyek, 2020) which compared zumba exercise with exercise using an oscillating device, zumba exercise could not reduce body fat composition. However, in another study conducted by (Hasan et al., 2017) analyzing the effectiveness of zumba and belly dance, both can reduce body fat percentage.

**2. Average body fat composition ( *body fat* ) before and after drinking cinnamon bark tea**

The results of the study on the group of subjects who underwent the treatment of drinking cinnamon bark tea the fat composition before and after is shown in table 2 below:

**Table 2 Body Fat Composition Before and After Drinking Cinnamon Bark Tea**

Body Fat Composition	Average± SD	Average ± SD	CI: 95%	Score <i>p</i>
Before	38.46±3.19	0.65 ±	0.25-1.04	0.002
After	37.82±2.84	1.21		

=0.05

Table 3 above shows the mean *body fat* composition before drinking cinnamon bark tea is 38.46 %, and the average body fat composition after drinking cinnamon bark tea is 37.82 %. Then, the difference in group mean before and after giving cinnamon bark tea was 0.64 %. Based on the paired t-statistical test results in this group, a *p-value* = 0.002 was obtained, indicating a significant difference (*p* <0.05) in the body fat composition of the participants before and after the administration of cinnamon bark tea.

Based on the study's results, there were significant differences in the body fat composition of participants before and after giving cinnamon bark tea. Research (Setiawati et al., 2014) on catfish given cinnamon leaves also showed a 30% reduction in fat content.

According to (Landani & Kurniawaty, 2000) that the content contained in cinnamon includes cinnamic acid, which can inhibit the HMG-CoA reductase enzyme in the liver and reduce lipid peroxidation in the liver, cinnamaldehyde which has the effect of increasing glucose transport by GLUT 4 in adipose cells and skeletal muscle so that it can reduce blood glucose, polyphenols, and flavonoids which can scavenge free radicals, especially in pancreatic cells. Cinnamon is the most potent inhibitor of the intestines.

Cinnamon bark helps control postprandial glucose by inhibiting intestinal glucosidase and pancreatic -amylase (Adisakwattana & Lerdsuwankij, 2011).

### 3. Average difference in body fat composition before and after aerobic exercise (zumba) and drinking cinnamon bark tea.

The results of the study on the two groups of subjects who underwent aerobic exercise (zumba) and drank cinnamon bark tea the fat composition before and after is shown in table 3 below:

Table 3 The average difference in body fat composition before and after aerobic exercise (zumba) and drinking cinnamon bark tea

Fat Composition	Average± SD	Average ± SD	CI: 95%	p-value
Aerobics	35 ,592±2 ,4924			
Drink Cinnamon Bark Tea	37 ,815±2 ,8401	-2 ,2237± 0 ,6192	-3 ,4578-0.9897	0,001*

p \*: t-test with a pair of pairs  
=0.05

Table 3 above shows that the results of the two treatments, aerobic exercise, and cinnamon bark tea, proved a significant reduction in body fat weight. Sweet. Furthermore, to compare the two treatments, an independent t-test can be performed, and the resulting difference in the mean of the two treatment groups is 2.23 %, which shows a p-value = 0.001 so that it can be interpreted that the two treatment groups have a significant difference ( p < 0,05).

Based on the study's results by comparing the two treatment groups, there was a difference in the mean of the two treatment groups of 2.23 %, which showed a p-value of 0.001, so it could be interpreted that the two treatment groups had significant differences. When viewed from the average value of these two groups, which is effective for reducing the percentage of body fat in obese women is drinking cinnamon bark tea.

According to (Landani & Kurniawaty, 2000)that the content contained in cinnamon includes cinnamic acid, which can inhibit the HMG-CoA reductase enzyme in the liver and reduce lipid peroxidation in the liver, cinnamaldehyde which has the effect of increasing glucose transport by GLUT 4 in adipose cells and skeletal muscle so that it can reduce blood glucose. , polyphenols, and flavonoids which can scavenge free radicals, especially in pancreatic cells. Cinnamon is the most potent inhibitor of the intestines. Cinnamon bark helps control postprandial glucose by inhibiting intestinal glucosidase and pancreatic -amylase (Adisakwattana & Lerdsuwankij, 2011).

However, suppose aerobic exercise is regularly carried out with moderate to heavy intensity. In that case, it is more effective in reducing the percentage of body fat in women who are obese or overweight. This study was conducted every day of the week except Thursday for 4 weeks. Research (Kuswari & Setiawan, 2015) has that the frequency of moderate-intensity aerobic exercise four times a week has the best function for reducing body fat compared to the frequency of two and three times a week. Aerobic exercise performed at moderate intensity can lower LDL-c in overweight (Saputro et al., 2019).

### 4. Conclusions

This study found that aerobic exercise (zumba) and drinking cinnamon tea were effective in reducing body fat composition in obese or overweight women. Cinnamon bark tea reduces body fat in obese or overweight women more effectively. Recommendations: To get maximum results, it is necessary to do the following things: 1) Drinking cinnamon bark tea should be made regularly and regularly 2 times a day; 2) Aerobic exercise (zumba) should be done with moderate intensity continuously with the same duration every day with a duration of 60 minutes.

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## References

- [1] Adisakwattana, S., & Lerdsuwankij, O. (2011). Inhibitory Activity of Cinnamon Bark Species and their Combination Effect with Acarbose against Intestinal  $\alpha$ -glucosidase and Pancreatic  $\alpha$ -amylase. *Plant Foods Hum Nutr*, 143–148. <https://doi.org/10.1007/s11130-011-0226-4>
- [2] Andini, A., & Indra, E. novita. (2016). Perbedaan pengaruh frekuensi latihan senam aerobik terhadap penurunan persentase lemak tubuh dan berat badan pada members wanita. *Medikora*, 15(1), 39–51.
- [3] Awaliah, H. (2014). Pengaruh Senam Zumba Terhadap Perubahan Berat Badan Pada Mahasiswa Keperawatan Yang Melakukan Senam Zumba di Fakultas Ilmu Kesehatan UIN Alaudin Makassar. *Skripsi*. <https://doi.org/10.1038/132817a0>
- [4] Benaino, N. P. I., Ticoalu, S. H. R., & Wongkar, D. (2014). Pengaruh Zumba Terhadap Kadar Gula Darah. *Jurnal E-Biomedik*, 2. <https://doi.org/10.35790/ebm.2.2.2014.4998>
- [5] Dinas Komunikasi Informatika & Persandian Kota Ambon. (2018). *Statistik Sektoral Kota Ambon Tahun 2018*.
- [6] Dohle, S., Rall, S., & Siegrist, M. (2016). Does self-prepared food taste better? Effects of food preparation on liking. *Health Psychology*. <https://doi.org/10.1037/hea0000315>
- [7] Erzeybek, M. S. (2020). Investigating the Effect of Oscillation (Swing) and Zumba Training on Body Fat Percentage Values in Women. *International Journal of Applied Exercise Physiology*, 9(6), 99–108.
- [8] Fitri, Y., Mulyani, N. S., & Fitrianiingsih, E. (2016). Pengaruh Pemberian Aktifitas Fisik ( Aerobic Exercise ) Terhadap Tekanan Darah , IMT Dan RLPP Pada Wanita Obesitas. *Jurnal AcTion: Aceh Nutrition Journal*, 1(November), 105–110.
- [9] Galih T U and Said-Junaidi, R. S. (2012). Latihan Senam Aerobik Untuk Menurunkan Berat Badan, Lemak, Dan Kolesterol. *JSSF (Journal of Sport Science and Fitness)*, 1(1).
- [10] Harahap, R. U. (2015). Efek Ekstrak Kulit Kayu Manis (*Cinnamomun Cassia*) Terhadap Kadar Glukosa Darah, Berat Badan dan Kadar Kolesterol Pada Tikus Yang Diinduksi Streptozotozin (STZ). *Skripsi Program Studi Pendidikan Dokter FKIK UIN Syarif Hidayatullah Jakarta*.
- [11] Hariana, A. (2013). *262 Tumbuhan Obat Dan Khasiatnya* (p. 412).
- [12] Hasan, M. F., Ramania, N. S., & Bahri, S. (2017). Analisis Efektifitas Zumba Dan Belly Dance Terhadap Vo2max, Indeks Massa Tubuh, Dan Persentase Lemak Tubuh. *Jurnal Sains Keolahragaan & Kesehatan*, 11(1), 13–19.
- [13] Indreswari, L., Anggraeni, Y. D., & Normasari, R. (2020). Pengaruh Senam Zumba terhadap Rasio Lingkar Pinggang dan Pinggul Wanita. *Journal of Agromedicine and Medical Sciences*, 6(2), 67–70.
- [14] Kementerian Kesehatan RI. (2018). Laporan Hasil Riset Kesehatan Dasar (Riskesdas) Indonesia tahun 2018. In *Riset Kesehatan Dasar 2018* (pp. 182–183).
- [15] Kuswari, M., & Setiawan, B. (2015). Frekuensi Senam Aerobik Intensitas Sedang Berpengaruh Terhadap Lemak Tubuh Pada Mahasiswi IPB. *J. Gizi Pangan*, 10(1), 25–32.
- [16] Landani, A., & Kurniawaty, E. (2000). Pengaruh Pemberian Kayu Manis (*Cinnamomum cassia*) Terhadap Penurunan Gula Darah Pada Penderita Diabetes Melitus The Effect of Giving a Cinnamon (*Cinnamomum cassia*) to The Blood Sugar Decrease in People with Diabetes Melitus Type 2. *J Agromedicine Unila*, 5(1), 547–550.
- [17] Octaviana, R., Hidayatullah, M. F., & Kristiyanto, A. (2020). Effect Of Low-Impact Aerobic Dance And Zumba Exercises On Body Fat Percentage In Obese Women. *Malaysian Journal of Public Health Medicine*, 20(1), 160–166.
- [18] Puji Indriyani, Heru Supriyanto, A. S. (2010). Pengaruh Latihan Fisik; Senam Aerobik Terhadap Penurunan Kadar Gula Darah Pada Penderita DM Tipe 2 di Wilayah Puskesmas Buka Teja Purbalingga. *Nurse Media: Journal of Nursing*, 1. <https://doi.org/10.14710/nmjn.v1i2.717>
- [19] Rina Prihatiningrum, Tanjung Ayu Sumekar, H. (2016). Pengaruh Latihan Zumba Terhadap Massa Otot Tubuh Pada Wanita Usia Muda. *Jurnal Kedokteran Diponegoro*, 5.
- [20] Saputro, Z. B., Wardani, T., & Rejeki, P. S. (2019). The Effect Of Moderate Intensity Fun Aerobic Gym On HDL-C And LDL- C On Overweight Women. *Fol Med Indones*, 55(2), 89–92.
- [21] Setiawati, M., Jusadi, D., Marlinda, S., & Syafruddin, D. (2014). Pemberian Daun Kayu Manis *Cinnamomun Burmanni* dalam Pakan Terhadap Kinerja Pertumbuhan dan Komposisi Nutrien Tubuh Ikan Patin *Pangasius Hypophthalmus* ( Effect of Addition *Cinnamomun Burmanni* Leaf in the Diet on the Growth Performance and Nutrient Compositi. *Jurnal Ilmu Pertanian Indonesia (JIPi)*, 19(2), 80–84.
- [22] Sitepu, M. S. Z., Tangkudung, J., & Puspitorini, W. (2020). Pengaruh Latihan Senam Aerobik Dan Motivasi Berolahraga Terhadap Penurunan Persentase Lemak Tubuh. *Jurnal Penjaskesrek*, 7(1), 45–59.
- [23] Statement, B., Beqa, G., Statement, B., Elezi, A., Statement, B., & Elezi, G. (2019). The Impact Of Powerful Prograded Exercises On Fitness, On Body Composition. *Journal of Education, Health and Sport*, 9(8), 950–961.
- [24] Tungka, E., Opod, H., & David, L. (2017). Gambaran upaya penurunan berat badan melalui olahraga aerobik pada remaja obes Kelas X Tahun 2016 di SMA Kristen Irene Manado. *Jurnal E-Biomedik*, 5(2). <https://doi.org/10.35790/ebm.5.2.2017.17020>
- [25] Ummah, M. J. S. (2015). Efek Ekstrak Kayu Manis (*Cinnamomum cassia*) Terhadap Kadar Glukosa Darah , Berat Badan Dan Low Density Lipoprotein (LDL) Pada Tikus Yang Diinduksi Streptozotosin. *Skripsi Program Studi Pendidikan Dokter Fakultas Kedokteran Dan Ilmu Kesehatan UIN Syarif Hidayatullah Jakarta, LDL*.