Indonesian Journal on Health Science and Medicine

Vol. 3 No. 1 (2026): July
DOI: 10.21070/ijhsm.v3i1.448

ISSN 3063-8186 (online), https://ijhsm.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

Indonesian Journal on Health Science and Medicine

Vol. 3 No. 1 (2026): July
DOI: 10.21070/ijhsm.v3i1.448

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ISSN 3063-8186 (online), https://ijhsm.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo

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Indonesian Journal on Health Science and Medicine
Vol. 3 No. 1 (2026): July
DOI: 10.21070/ijhsm.v3i1.448

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Indonesian Journal on Health Science and Medicine

Vol. 3 No. 1 (2026): July
DOI: 10.21070/ijhsm.v3i1.448

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Indonesian Journal on Health Science and Medicine

Vol. 3 No. 1 (2026): July
DOI: 10.21070/ijhsm.v3i1.448

The Influence of Slimming Products on Women's Sex Hormones, Oxidative Stress, and Immune Systems in Diwaniyah City.: Pengaruh Produk Pelangsing terhadap Hormon Seksual, Stres Oksidatif, dan Sistem Kekebalan Tubuh Wanita di Kota Diwaniyah.

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Abstract

General Background The use of fat burner supplements has increased alongside concerns about metabolic and physiological risks. **Specific Background** This study examines biochemical and hormonal responses associated with fat burner compounds, particularly focusing on oxidative stress and inflammatory markers. **Knowledge Gap** Limited research has integrated oxidative stress biomarkers with hormonal and inflammatory responses in the context of fat burner exposure. **Aims** This study aims to analyze the relationship between fat burner use, oxidative stress indicators, and hormonal changes. **Results** The findings indicate alterations in oxidative markers, inflammatory cytokines, and lipid metabolism, suggesting a complex physiological response linked to supplement use. **Novelty** The study provides a combined evaluation of oxidative stress, hormonal activity, and inflammatory biomarkers within a single analytical framework. **Implications** The results highlight potential health risks and provide a basis for further clinical and biochemical investigations into supplement-related metabolic changes.

Keywords: Oxidative Stress, Fat Burners, Biomarkers, Inflammation, Metabolic Changes

Key Findings Highlights

A1lt.ered antioxidant and oxidant balance observed in subjects
C2y.tokine activity associated with metabolic disturbance
H30.rmonal variation linked to physiological stress responses

Published date: 2026-04-19

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Introduction

These drugs are largely natural and relatively free of chemical components. Their modes of action include hunger suppression, fat blocking, and fat burning, to name a few. These substances are harmful to human health and have been related to a number of illnesses, such as cardiovascular diseases, metabolic disorders, and gastrointestinal issues[1]. Consequently, some of them increase the hormones that the thyroid gland secretes. Women should monitor their weight for a number of reasons, including ovarian cancer and early childbirth. These diet pills are extremely risky, especially for youngsters, pregnant women, and other patients who may already be at risk because of their weight[2]

Although there are many potentially fatal drugs available, they can be roughly divided into four categories. The main active component of class I appetite suppressants is sibutramine. By reestablishing hormonal balance, this type tackles the root cause of heart disease and stroke. The second group includes medications that stop the body from absorbing fat; these tablets and capsules are among the most dangerous available, and their importation has been prohibited in a number of nations. Thirdly, some blood sugar-lowering medications, such as glucophage, are being misused for weight loss. Green tea and other herbal medicines fall under the fourth group[3].

which benefits a wide range of health issues, including hypertension. Damages: They claim that anorexia treatments are among the least expensive pharmaceuticals with the most severe adverse effects. the medical professional. Ketone bodies, which come from the quick disintegration of body fat by these medications, might have an adverse effect on the kidneys due to the fact that they are toxins that are particularly toxic to the kidneys, the heart, and every other organ in the body. And most medical professionals agree that using these medications increases one's risk of paralysis, inflammatory disease, death, and even cancer (4). Every study has demonstrated that diet or diet and weight-loss medications interrupt pregnancy, which may result in birth abnormalities if the mother keeps using the medications after the pregnancy is found.. Breast cancer, gynecological problems, and infections have all been linked to it, and some mixes even include carcinogens, so it's not safe. Long-term and safer health solutions for TY exist in a large portion of the Arab world, but they are time-consuming to implement. Thus, one strategy for taming a ravenous appetite is to divide meals into smaller, more frequent "snacks," and research shows that those who skip breakfast have a greater hunger in the evening. , which usually opens the appetite. When you consume sugar, your body releases insulin, which causes your hunger to increase. Conversely, cutting less on sugar and not eating alone decreases your appetite, so your body looks to other appetite-suppressing foods, such as vegetables, cheese, milk, and items that include proteins. Fruits and vegetables are the best sources of fiber. Daytime grain consumption is encouraged for people who tend to become hungry quickly. When dietary restrictions alone are insufficient to bring about the desired weight loss, we investigate the patient's endocrine system to see whether there is a hormonal imbalance. [2.4]

Steroid hormones and lipophilic, low molecular weight compounds share a similar biosynthesis pathway that starts with cholesterol. These hormones are produced by the endocrine glands, which include the adrenal cortex and the testes, and are subsequently secreted into the veins. Pregnancy is brought on by the hormone progesterone. The endometrium primes the woman's immune system to accept the developing baby, soothes the uterine muscle until delivery, and helps prepare the body for transplantation. In addition to being a necessary hormone in and of itself, progesterone is involved in the manufacture of estrogen and cholesterol by the adrenal gland. This steroid hormone is produced and secreted in considerable amounts by the placenta, particularly during pregnancy, in addition to the ovary. Their concentration is at its peak during the luteal phase, when the egg is maturing. After it is ready, an improved egg is inserted into the ulce[5]r. [6].While the placenta secretes estradiol during pregnancy, the ovarian follicles are primarily responsible for its secretion throughout the menstrual cycle. generated by the glands located to the left of the adrenal glands[7]. The peripheral testes and the androgen transition. Many sexual problems, such as early or delayed puberty, irregular menstruation, menopause, forced ovulation, and gynecomastia, can be evaluated and treated with estradiol testing. [5]

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Lipid peroxidation can be defined as "oxidative deterioration of lipid peroxidation," or as "oxidative degradation of polyunsaturated fats."" Lipid peroxidation is a self-sustaining chain reaction that results in continuous damage. Lipid Peroxidation: The Enigma of Lipid Peroxide Revealed A free radical (X •), light, or metal ions are introduced to start the reaction. Lipid peroxide is measured using malondialdehyde, ethane from terminal 2-carbon fatty acids, and pentanes from terminal 5-carbon fatty acids; only malondialdehyde is produced by fatty acids with three double bonds or more (8).

At the inflammatory areas of autoimmune disorders, IL-17 is substantially up-regulated and works in concert with other cytokines like TNF to increase inflammation.It is well recognized that obesity increases the risk of inflammatory and autoimmune diseases. As a result, it's critical to comprehend the connection between IL-17 family members and obesity. The IL-17 family's interleukins are thought to be produced by Th17 cells, however there are theories that other cells may also secrete them. Studies showed that neutralizing IL-17A in obese individuals inhibited neutrophil recruitment, which was correlated with lower amounts of chemokines that rebuild neutrophils, namely CXCL1 and CXCL2.

The purpose of this study was to ascertain whether the level of IL-17 family interleukins can be a predictor of cardiovascular disease and to identify dietary factors influencing their level, given the paucity of research on the subject of low-grade inflammation [9]

Inflammatory diseases, infections, transplant rejection, autoimmune disorders, neurological disorders, and cancer are among the morbid conditions that L-34 regulates. IL-34 has generally been linked to a number of major health problems, such as cancer, infections, heart disease, and metabolic disorders. IL-34 is a "bad actor" in obesity, contributing to inflammation and fat storage rather than aiding in weight loss. So, products that reduce IL-34 expression or block its action (such as anti-inflammatory interventions or specific CSF-1R inhibitors) might theoretically assist in management obesity-related metabolic dysfunction, though this is principally in the research phase rather than standard commercial slimming products[10].

Materials and Methods

Between October 2025 and January 2026, the following populations took part in cross-sectional research: The research samples were acquired from the original AFAK Hospital laboratory in Diwaniyh city. Fifty postmenopausal women aged 47 to 63 served as study volunteers, whereas 25 controls received no therapy (just a balanced diet). The second group included 25 women who were on a variety of diet and appetite suppressant drugs. They had similar heights, builds, and ages. The experiments were carried out in the hospital's original research laboratory at AFAK.

Concentration of Serum Estradiol and Progesterone by Kit Measurement [11,12]
ELFA-based vDAS instruments for measuring total steroid hormone concentrations in human blood samples.

Measurement of Serum MDA
Lipid peroxidation was measured using the thiobarbituric acid reactive substances approach and the MDA level. The interaction of thiobarbituric acid with MDA yields a color that was measured spectrophotometrically. [13]

Measurement of total anti-oxidant(T-AOC)
Based on the procedure developed by Antioxidant reducing agents reduced ferric ion in the reaction mixture, creating ferrous-tripyridyltriazine, a complex that can be measured colorimetrically as a proxy for T-AOC . [14]

Measurement the level of IL-17 in the Serum of the Blood ELISA Kit.

This kit uses sandwich enzyme immunoassay as its test principle. A microtiter plate pre-coated with an interleukin 17 (IL-17) specific antibody is included in this kit. After adding standards or samples to the proper microtiter plate wells, an interleukin 17 (IL-17)-specific biotin-conjugated antibody is added. Each microplate well is then filled with avidin coupled to horseradish peroxidase (HRP) and allowed to incubate. Only the wells containing interleukin 17 (IL-17), biotin-conjugated antibody, and enzyme-conjugated avidin will change color following the addition of the TMB substrate solution. A sulfuric acid solution was added to halt the enzyme-substrate reaction, and the color shift was measured spectrophotometrically at 450 nm ± 10 nm. The optical density (OD) of the samples is then compared to the standard curve to determine the concentration of interleukin 17 (IL17).

Measurement the level of IL-34 in the Serum of the Blood ELISA Kit.

The processes described in the kit's instructions were followed, and the measurement approach is based on the same principle described in the prior measurement.

Result and Discussion

The effect of Slimmers on the steroid hormone

Androgens are essential for male reproductive function and activation of secondary sex characteristics. Antioxidative defense systems regulate free radical overproduction. Antioxidant enzymes such as catalase are important for these defence mechanisms [14] . Changes in steroid hormones, oxidant/antioxidant biomarkers, and mineral metabolism in non-pregnant, lactating, or pregnant one-humped sheep pre-synchronized with controlled internal drug release were the focus of the current study. Additionally, the researchers examined the impact of steroid hormones as well as markers of oxidative stress and antioxidant status [14] .

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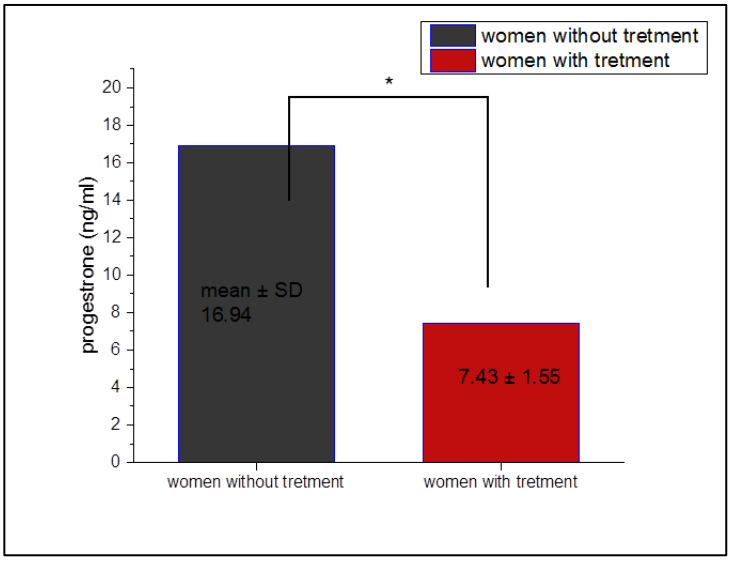
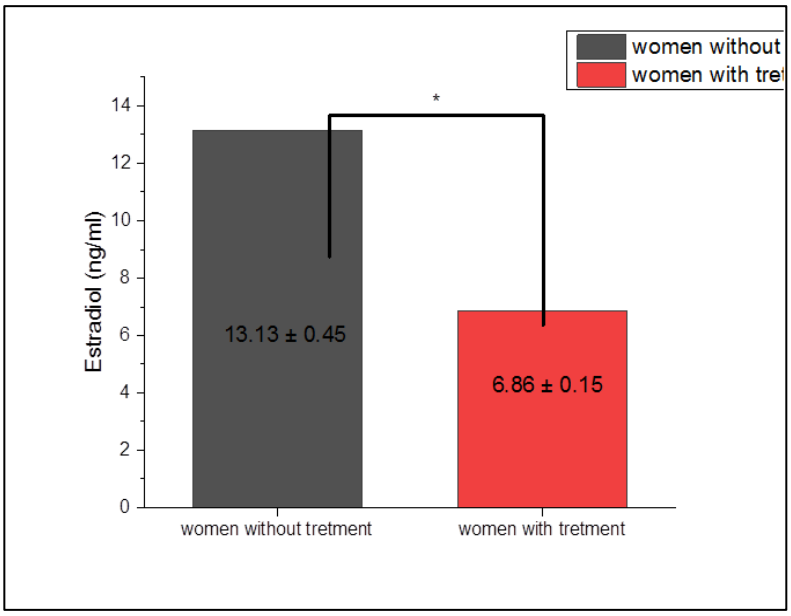
Figures (1) and (2) show that treatment with different types of Slimmers for time periods causes a decrease in steroid hormone in females when compared to the women without slimmer group. The goal of weight loss and agility is the individual's total will and desire to adhere to a diet based on meal planning and maintenance, as well as the possible drawbacks of not employing the proper diet system while converting food to steroid hormones, acetyl-CoA, and cholesterol. Step two is a diet plan that permits you to eat everything (excluding the high-calorie stuff) in moderation. Exercise, even if it's only walking, done in conjunction with a diet is crucial to the latter's effectiveness [15,16] .



Figure(1) Level of progesterone in serum of with and without treatment women
The value mean ± SD * difference is significant at the 0.05 level



Figure(2) Level of E2 in serum of with and without treatment women
The value mean ± SD * difference is significant at the 0.05 level

The effect of slimmers on oxidative stress (MDA and total antioxidant)

Lipid peroxidation is a sequence of oxidative lipid degradation reactions. It is the process through which Damage to cells is caused when free radicals "steal" electrons from cellular membrane lipids. The mechanism behind this effect is a chain reaction involving free radicals. Involvement is most prevalent in polyunsaturated fatty acids because of the presence of several double bonds connected by methylene bridges (-CH2-) containing reactive hydrogen atoms. Like every other radical reaction, this one begins with an initial spark, then spreads, and finally dies out. The oxidation of lipids results in the formation of lipid peroxides and other oxidation products[17].

Figure(3) shows the increase in MDA in women with treatment by different types of slimmers over the same period of time when compared inside the placebo group. Membrane cell failure is induced by lipid peroxide, which is a major sign of oxidative damage caused by reactive oxygen species. As lipid peroxide levels rise, so do MDA concentrations [18]. Researchers found that a rise in MDA levels by difference Increased oxidative stress may come from the creation of reactive oxygen species (ROS) during the metabolism of slimming aids, which may include oxide,

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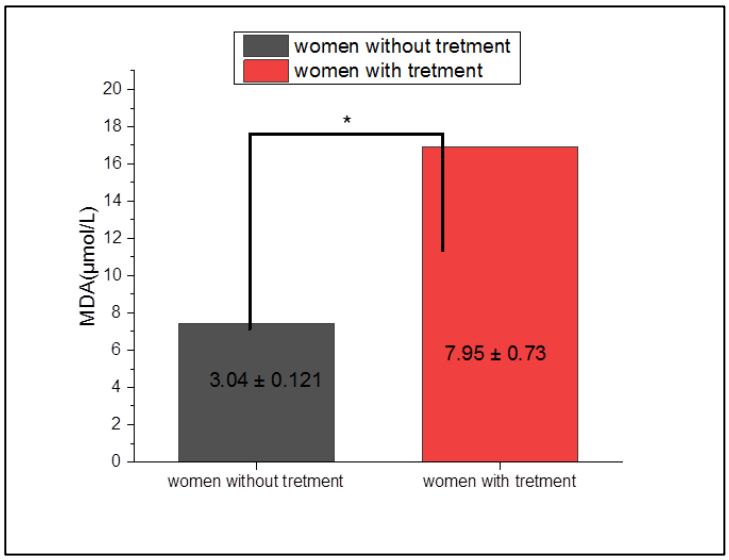
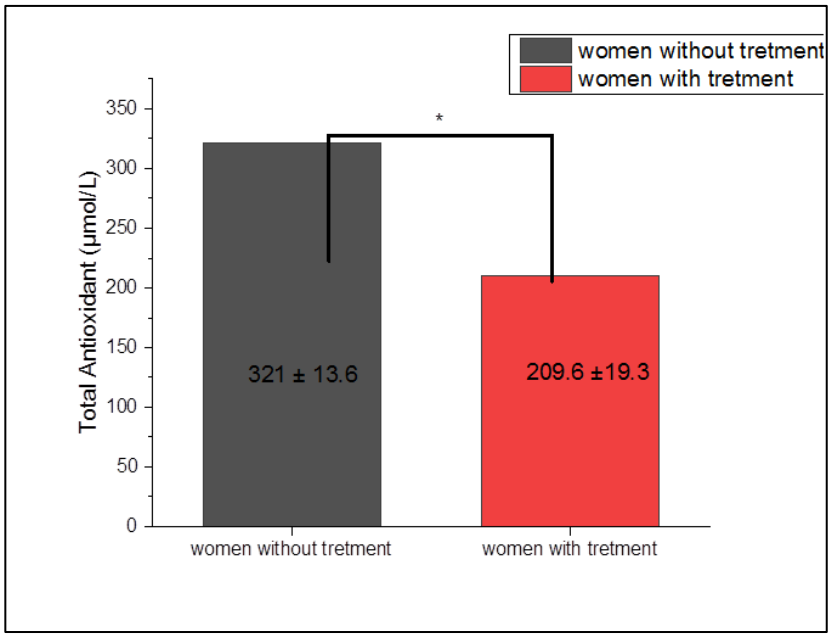
hydroxyl, and H2O2. Increased amounts of MDA were seen at sites of lipid peroxide production when ROS acted on fat· [19]. Figure(4) shows decrease in total antioxidant in women with treatment when compared with women without treatment group due this decrease to The impact of fat burners and other slimming products on total antioxidant levels is little understood. One study indicated that better redox equilibrium and reduced body weight may result from eating more foods high in antioxidants [20]. Another study looked at the impact of alpha-lipoic acid supplementation on obese people and showed that although it could raise LDL's atherogenicity if taken on its own, this effect was nullified when exercise was added[21]. Keep in mind that fat burners might be harmful and inefficient. There is no proof that fat-burning medicines or supplements work, and many of them are useless or even hazardous. The substances in some fat burners are questionable at best and potentially poisonous at worst. Diet and exercise, rather than dietary supplements, are often suggested as the primary means of weight reduction [22].



Figure(3) Level of MDA in serum of with and without treatment women
The value mean ± SD * difference is significant at the 0.05 level



Figure(4) Level of Total-antioxidant in serum of with and without treatment women
The value mean ± SD * difference is significant at the 0.05 level

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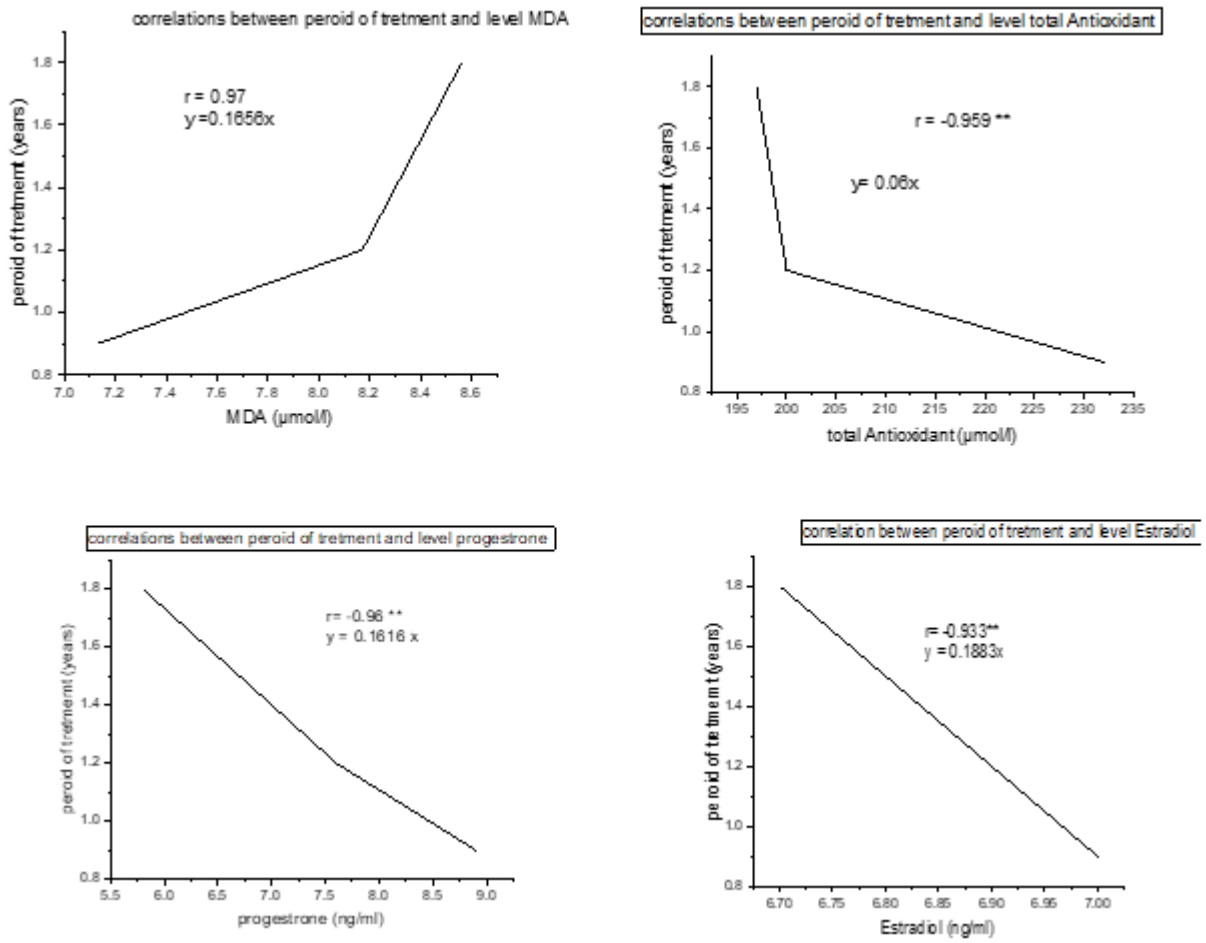

Figure (5) show correlation between period of treatment and level both of progesterone , Estradiol , MDA and total-antioxidant
** correlation is significant at the 0.01 level * correlation is significant at the 0.05 level

The effect of slimmers on the level of IL-17 and IL-34.
The current study's findings demonstrated that, in comparison to the first group G1, the second group's levels of IL-17 and IL-34 significantly increased (P≤0.05) after oral administration of an enhanced dose of slimming product.. Figures(6,7)

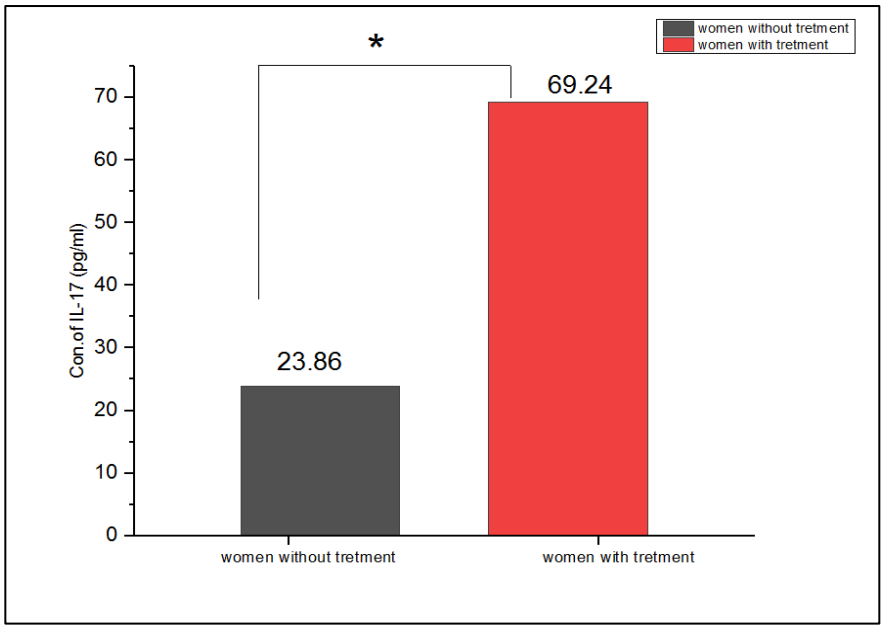

Figure 6 .Effect Slimming products (treatment)in the Level of IL-17

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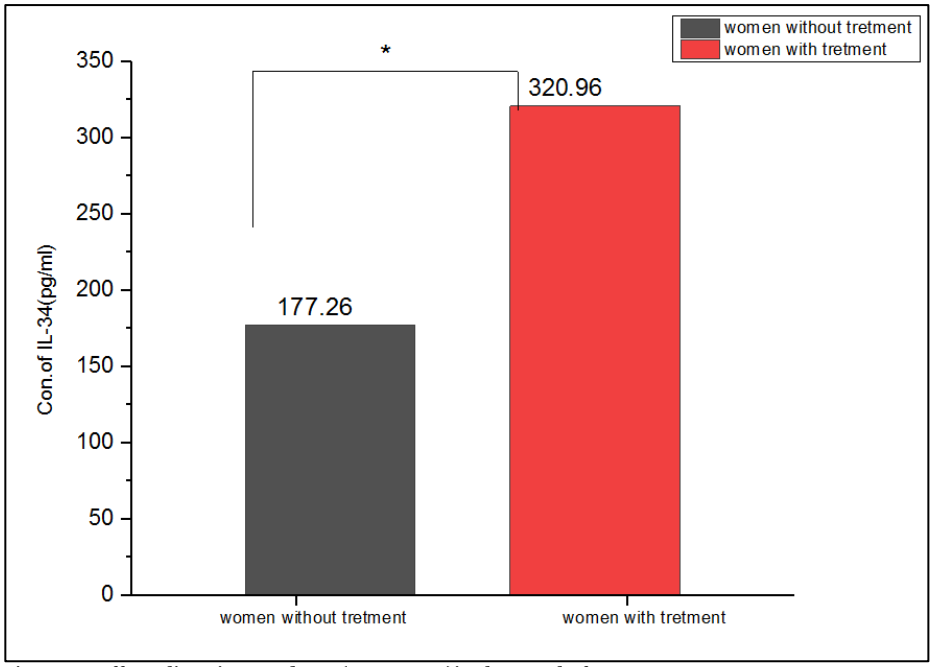

Figure 7 .Effect Slimming products (treatment)in the Level of IL-34

Interleukin 17 is a recently identified cytokine that has a significant function in inflammatory disorders. It causes immune cell infiltration and is responsible for acute and chronic liver diseases, as well as liver damage, which leads to hepatitis (inflammation and fibrosis) [23]. Treatment stimulated oxidative stress by increasing the free radicals in this group. Many studies have demonstrated that increased oxidative stress and free radicals cause the release of cytokines from immune cells into the bloodstream.

IL-34 has been regarded as a significant and fascinating issue since its discovery, particularly for research pertaining to its impact on the immune response. Furthermore, intracellular pathways that contribute to the development of numerous diseases, including cancer diseases, are activated by IL-34 and its receptors. The second group in the current study showed a rise in IL-34, indicating the emergence of an inflammatory state as a result of an increase in oxidative stress brought on by slimming products .Oxidative stress is regarded as a crucial component for the release of inflammatory cytokines since these cytokines play a significant part in inflammatory signals and immunological responses in the body. Research shows that this interleukin plays a dual role in the development and interference of the disease, as well as in attracting T lymphocytes through polarization abnormalities in macrophage groups [24]. Furthermore, the cause for the increase in the amount of IL-34 may be related to increased expression, since many studies have verified that IL-34 expression increases in mRNA and protein levels in the setting of numerous diseases, including immunological disorders and infections [25].

Conclusions:

Despite the role that slimming products play in rapid weight loss, these products are not without risks that can lead to several diseases. This was demonstrated in the current study, which observed hormonal changes, increased oxidative stress, and elevated immune cytokines. These are serious indicators that warn of several diseases, such as heart disease, liver cirrhosis, and gastrointestinal inflammation. Therefore, the consumption of such products should be limited, and a balanced diet and exercise should be the safest way to lose weight.

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ISSN 3063-8186 (online), https://ijhsm.umsida.ac.id, published by Universitas Muhammadiyah Sidoarjo