Effectiveness of Bay Leaves (Syzygium polyanthum) to Reduce Body Mass Index Among Pre-Menopausal Obese Adults in South Jakarta Regency

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Abstract

Perimenopause is a transition phase towards menopause which is characterized by hormonal changes, including a decrease in the production of the hormone estrogen and an increase in belly fat which can cause obesity. This study aimed to examine the effectiveness of bay leaves to reduce body mass index (BMI). The research design used was quasi-experimental with a one-group pretest and posttest-only design. The population in this study were pre-menopausal adults with obesity who were selected using purposive sampling with a total respondents 30 adults. During 14 days, they are given the 4-5 bay leaves which were previously boiled with around 250 ml water. The BMI was calculated before and after giving the intervention. Data analysis used the Wilcoxon analysis test. The results revealed that there are significantly reduced BMI compared to before and after the intervention. The content of bay leaves can accelerate weight loss in pre-menopause because it has a thermogenic effect on the body and can be used as an alternative herbal therapy that is very easy to obtain and economical which can be used by obese women in perimenopause. The health promotion to introduce bay leaves could be started as bay leaves are easy to find and grow.

Keywords: Bay Leaves, Salam, Obesity, Pre-Menopausal, Adult.

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1. INTRODUCTION

Obesity among pre-menopausal adult women is common due to unbalanced hormones and an increase the belly fat. Previous studies have highlighted the impact of obesity on gut microbiota composition, functionality, and gonadal steroid status in pre-menopausal women, indicating that obesity can eliminate differences observed among non-obese pre-menopausal women, post-menopausal women, and men (Mayneris-Perxachs et al., 2020). The association between obesity and sleep-disordered breathing has been emphasized, particularly in pre-menopausal women, suggesting a strong impact of obesity in this population (Matsumoto et al., 2020). The impact of being obese during the pre-menopausal period is important to prevent. Existing studies have explored the relationship between obesity, weight gain, and breast cancer risk among women with lower body mass index at a younger age (Renehan et al., 2020). Dietary factors have also been studied, with findings showing that higher fruit and vegetable intake is associated with a lower risk of central obesity among pre-menopausal women (Su et al., 2022). Structural equation model analysis has revealed significant differences in body fat percentage and visceral fat area between menopausal and pre/perimenopausal women, highlighting the impact of menopausal status on obesity-related factors (Darbandi et al., 2019). Studies have highlighted the paradoxical relationship between obesity and breast cancer risk in pre-menopausal women, where obesity appears to be protective in this population (García-Estévez et al., 2021). However, the integrative effects of modifiable risk factors, including obesity, on menstrual cycle irregularity and menopause, remain incompletely understood (Bae et al., 2018). Additionally, obesity has been associated with alterations in age at natural menopause, with a higher risk of early menopause observed among obese women (Zhu et al., 2018).

The role of obesity in influencing adipose tissue milieu and its association with increased mortality risk, particularly central obesity, independent of BMI, underscores the significant impact of obesity on health outcomes (Bracht et al., 2019). The association between obesity and heart failure, as well as the differential risk patterns observed in pre-menopausal and post-menopausal women, highlights the nuanced relationship between obesity and cardiovascular health (Leedy et al., 2021). Obesity has been linked to low-grade inflammation, leucocytosis, and an increased risk of venous thromboembolism, emphasizing the broader health implications of obesity (Christakoudi et al., 2023).

There is evidence that being obese among pre-menopausal age is a high risk for non-communicable diseases and mortality. While obesity may have protective effects in certain contexts, such as breast cancer risk in pre-menopausal women, it remains a critical risk factor for various health conditions and mortality outcomes. There are some herbs to reduce body weight. It revealed several studies have explored the potential of herbal remedies. There is green tea, taraxacum officinale, guarana, and Irvingia gabonensis. However, there is a lack of studies to test the effectiveness of bay leaves in reducing body weight. Bay leaves have been studied for reducing blood pressure, gut, and cholesterol but limited study on their effect on reducing body weight. This study aimed to test the effectiveness of bay leaves in reducing body weight among pre-menopausal obese adults in South Jakarta.

2. RESEARCH METHOD

The current study used a quasi-experimental design to examine the effectiveness of bay leaves to reduce body mass index. The data collection was conducted in Posyandu (Integrated Healthcare Center) Anggrek, East Cilandak, South Jakarta, Indonesia. The data has been collected in January 2024.
The sample in this study needs to meet the criteria of pre-menopause adults aged 40 to 60 years old, obese and did not consume the obesity drug. The exclusion criteria in this study include the respondents with an unwillingness to join the whole interview and receive intervention. The population of the study consists of 45 adults, but the sample in this study was 30 who were selected using purposive sampling.

In this study, there is one group only. The intervention was given to the case group to observe the effectiveness of the intervention given. The intervention was given a decoction of bay leaves. The bay leaves were given about 4 to 5 leaves and boiled with 240 ml water. It was given for a once-a-day dose in the morning for 14 days. Before and after the given intervention, all the respondents were measured for height and weight to calculate body mass index (BMI). Body Mass Index in this study was calculated by the formula of weight in kg divided by height in meter square (kg/m2). The IMT in this study was used in the category by the Ministry of Health Indonesia.

The Wilcoxon test analyzed the data to examine the correlation between the independent variable and the dependent variable. The analysis was done by using SPSS software for Windows. The preliminary test and normality test were done using Shapiro-Wilk. The bivariate analysis in this study to test the hypothesis was done using paired t-test and t-test dependent.

This study including instruments and tools has been approved by the Ethical Committee University of Muhammadiyah Purwokerto with reference number: KEPK/UMP/43/II/2024.

3. RESULTS AND DISCUSSION

The results in this study consist of univariate and bivariate analyses. Table 1 below describes the general characteristics of the respondents. Among all respondents in this study (n = 30), the majority of them were female (70%), working (60%), and attended from senior high school (56.7%).

Table 1. The general characteristics of the sample (n = 30).

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>9</td>
<td>30</td>
</tr>
<tr>
<td>Female</td>
<td>21</td>
<td>70</td>
</tr>
<tr>
<td>Working status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>12</td>
<td>40</td>
</tr>
<tr>
<td>Yes</td>
<td>18</td>
<td>60</td>
</tr>
<tr>
<td>Educational level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uneducated</td>
<td>1</td>
<td>3.3</td>
</tr>
<tr>
<td>Elementary</td>
<td>5</td>
<td>16.7</td>
</tr>
<tr>
<td>Junior high school</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Senior high school</td>
<td>17</td>
<td>56.7</td>
</tr>
<tr>
<td>College</td>
<td>4</td>
<td>13.3</td>
</tr>
</tbody>
</table>

In terms of the body mass index, Table 2 below shows the information about BMI. Before giving the intervention, the mean body mass index of respondents was 26.49, and the after-mean body mass index was 25.67. The standard deviation before and after giving the intervention was 0.85 and 0.83, respectively.
Table 2. The Body Mass Index before and after giving the intervention.

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>Mean</th>
<th>Std deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre</td>
<td>30</td>
<td>26.4863</td>
<td>0.84791</td>
</tr>
<tr>
<td>Post</td>
<td>30</td>
<td>25.6740</td>
<td>0.82903</td>
</tr>
</tbody>
</table>

The bivariate results analysis of this study is in Table 3. It shows that the difference between before and after intervention is significant with $p$-value of 0.000. So, in other words, the intervention is significantly effective in decreasing the body mass index.

Table 3. The result of Paired $t$-test Analysis.

<table>
<thead>
<tr>
<th>Observation</th>
<th>n</th>
<th>t</th>
<th>df</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre</td>
<td>30</td>
<td>12.907</td>
<td>29</td>
<td>0.000</td>
</tr>
<tr>
<td>Post</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Bay leaves contain Vitamin B3, Vitamin C, and flavonoids. Flavonoids have been shown to inhibit body fat accumulation by reducing the activity of fatty acid synthase (FAS) in obese mice fed a high-fat diet (Cheon et al., 2021). Additionally, flavonoids have anti-obesity properties by reducing the absorption of carbohydrates and fats, which is essential in combating obesity (Liu et al., 2019). Existing studies have also demonstrated that flavonoids can regulate lipolysis, promoting weight loss and improving metabolic conditions associated with obesity (X. Yang et al., 2022). Flavonoids have been linked to preventing weight regain after successful weight loss (Lundgren & Thaiss, 2020). It has shown efficacy in treating conditions like intestinal mucositis and reversing weight loss (Miranda et al., 2020). Flavonoids have been associated with decreased body weight, as higher flavonoid intake has been linked to reduced body weight (Marranzano et al., 2018). Flavonoids have been found to have differential effects on adipogenesis, further supporting their role in weight management (Khalilpourfarshbafi et al., 2018). Specific flavonoids like quercetin and 8‐Prenylnaringenin have shown promise in weight management. Quercetin has been reported to improve muscle mass and mitochondrial content, particularly in conditions like cancer and chemotherapy‐induced cachexia (VanderVeen et al., 2022). On the other hand, 8‐Prenylnaringenin, a hop flavonoid, has been identified as a food substance with health benefits (Tanaka et al., 2022).

Vitamin B3 may have potential benefits for overall health, including its impact on cholesterol levels and cellular metabolism (Sallabi et al., 2021). Vitamin B3 has been reported to lower total cholesterol, bad cholesterol (such as LDL), triglycerides, and lipoprotein levels in the blood, which are factors often associated with obesity. Moreover, vitamin B3 has been linked to potential protective effects against conditions that can lead to weight gain, such as inflammation‐related degeneration in retinal ganglion cells (Chen et al., 2022). Vitamin B3 may inhibit apoptosis and promote autophagy of islet β cells under high glucose stress, which could have implications for metabolic health (Yu et al., 2023). Additionally, vitamin B3 is an important co-factor for cellular processes, including fatty acid metabolism and energy metabolism, which are crucial for overall health (Tinnevelt et al., 2020).

Vitamin C has been associated with reducing systemic inflammation by inhibiting pathways related to inflammation, such as CRP and TNF alpha, which can help protect against free radicals and decrease lipid peroxidation, potentially aiding in weight management (Totan et al., 2019). Vitamin C has been found to scavenge free radicals and suppress lipid peroxidation, which can lead to decreased vitamin C levels in obese individuals due to increased body fat and oxidative stress (Y. Yang et al., 2023). Vitamin C may inhibit metabolic changes induced by certain stressors like high‐fat diets, with studies showing that high doses of vitamin C can induce weight loss safely in obese individuals (Yuan et al., 2021). Vitamin C has also been linked to inhibiting visceral adipocyte hypertrophy and lowering blood glucose levels in...
high-fat-diet-induced obese mice, suggesting a potential role in combating obesity-related metabolic issues (Park et al., 2018). Vitamin C intake has been associated with promoting weight loss and reducing serum leptin levels, improving lipid profiles, and decreasing inflammatory biomarkers in obese individuals (Manuha, 2019).

There are other benefits of bay leaves. Syzygium polyanthum, commonly known as bay leaves, has been extensively researched for its potential health benefits. Studies have demonstrated its antioxidant, antidiabetic, and anti-inflammatory properties, with active compounds like flavonoids playing a key role in its therapeutic potential (Hadiyanti et al., 2023; Ismail & Ahmad, 2019). Research suggests that Syzygium polyanthum may help manage conditions such as hypercholesterolemia and diabetes mellitus (Muhammad et al., 2022). The plant is rich in antioxidants and antidiabetic agents, offering various health advantages (Halim & Maryani, 2022). Moreover, Syzygium polyanthum has shown promise in lowering blood glucose levels, possibly through its active compounds (Panambunan et al., 2019). Studies have also investigated its effects on histological changes in the kidney, indicating broader impacts on physiological functions (Muhammad et al., 2022).

The plant has been studied for its vasorelaxant effects, suggesting a potential role in managing blood pressure (Hassan et al., 2022). Syzygium polyanthum has been associated with anti-inflammatory properties, which could be beneficial for conditions like rheumatoid arthritis (Sulayha & Kustiawan, 2022). The traditional uses of Syzygium polyanthum in Indonesian and Malaysian cultures have been supported by scientific research, confirming its medicinal properties. From reducing cholesterol levels to improving insulin sensitivity and providing antioxidant effects, Syzygium polyanthum emerges as a versatile natural remedy with a range of potential health benefits.

However, there is a lack of existing studies evaluating the effectiveness of bay leaves in reducing body weight. To evaluate the potential impact of Syzygium polyanthum on body weight reduction, it is crucial to consider its documented health benefits. While the references provided focus on various aspects of Syzygium polyanthum, such as its antihypertensive, antidiabetic, and antioxidant properties, there is limited direct evidence on its specific effect on body weight reduction. The plant's active compounds, including gallic acid and other phenolics, have been associated with positive effects on metabolic health, which could indirectly influence body weight (Ismail et al., 2020; Ismail & Ahmad, 2019).

Research has indicated the potential of Syzygium polyanthum in managing conditions like diabetes and hypertension, which are often associated with weight management (Kustanti & Widyarani, 2023; Muhammad et al., 2022). The plant's capacity to lower blood glucose levels and enhance insulin sensitivity may contribute to overall metabolic regulation, potentially impacting body weight (Widodo, 2023). It is antioxidant properties and effects on inflammatory pathways could support overall health and potentially influence weight management (Rahim et al., 2021; Widyawati et al., 2021).

Bay leaves contain of Vitamin B3, Vitamin C, steroid, and flavonoid. Further research is necessary to gain a better understanding of the mechanisms of action and potential risks associated with herbal treatments for body weight reduction. This study found the fact that giving bay leaves for 14 days could reduce body weight. Future studies could add more details laboratory research to test the effectiveness of bay leaves in reducing body weight, especially among pre-menopausal obese adults.

4. CONCLUSION

Bay leaves effectively reduce body weight after 14 days of intervention. Bay leaves contain Vitamin B3, Vitamin C, and flavonoids. The content of bay leaves can accelerate weight loss in premenopausal because it has a thermogenic effect. Bay leaves can be one herbal
prevention alternative to prevent the risk of obesity. This study is limited to certain time and place and cannot be generalized to other time and place. Future studies can include more respondents and longer intervention time.

REFERENCES


