Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 5s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Effects of Hormone Therapy on Body Composition and Metabolic Parameters in Postmenopausal Women with Obesity: A Pharmacological Approach

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Cite this paper as: José Luis Sánchez-Paredes, Juan Carlos Talavera Inofuente, Macarena Valladares-Vega, (2025) Effects of Hormone Therapy on Body Composition and Metabolic Parameters in Postmenopausal Women with Obesity: A Pharmacological Approach. *Journal of Neonatal Surgery*, 14 (5s), 685-689.

ABSTRACT

Menopause is associated with hormonal changes that can influence body composition and metabolic parameters, increasing the risk of obesity and cardiovascular disease. This study analyzes the impact of hormone therapy (HT) on body composition and metabolic parameters of postmenopausal women with obesity. A review was conducted of recent studies that evaluated the efficacy of HT in reducing fat mass, visceral fat, and improving lipid and glycemic profiles. The results suggest that HT, especially that administered orally, may have positive effects on body fat redistribution and improvement of metabolic parameters, although more research is required to establish definitive clinical recommendations.

Keywords: *menopause, hormone therapy, obesity, body composition, metabolic parameters*

1. INTRODUCTION

Menopause marks the end of a woman's reproductive life and is characterized by a significant decrease in the production of sex hormones, especially estrogen and progesterone. These hormonal changes not only cause vasomotor symptoms and mood disturbances, but also influence the body composition and metabolism of postmenopausal women.

During menopause, it is common to observe an increase in total fat mass and a redistribution of body fat, with a tendency to accumulate in the abdominal region. This pattern of visceral fat accumulation is associated with an increased risk of developing insulin resistance, dyslipidemias, high blood pressure, and altogether, metabolic syndrome, thus increasing the likelihood of cardiovascular disease and type 2 diabetes.

Hormone therapy (HT) has been widely used to relieve menopausal symptoms and improve the quality of life of women at this stage. In addition to its effects on vasomotor symptoms, HT could play a crucial role in modulating body composition and metabolic parameters. It has been observed that the administration of estrogen can influence the distribution of body fat, reducing the accumulation of visceral fat and improving insulin sensitivity.

The route of administration of HT is a determining factor in its metabolic effects. For example, orally administered HT is subject to a hepatic first step, which may influence lipid profile and coagulation, while the transdermal route may have a different impact on these parameters.

Importantly, while HT may offer benefits in body composition and metabolic parameters, its use is not without risks. Studies have indicated that combined HT can increase the risk of cardiovascular events and certain types of cancer, which has led to a reevaluation of its indications and the recommendation to use the minimum effective dose for the shortest possible time.

In summary, menopause induces significant changes in body composition and metabolism, increasing the risk of obesity and associated diseases. HT emerges as a potential intervention to mitigate these adverse effects, but its implementation must be carefully evaluated, considering the individual benefits and risks, as well as the specific characteristics of each patient.

2. THEORETICAL FRAMEWORK

Menopause is a physiological stage in a woman's life that is characterized by the permanent cessation of menstruation and a significant decrease in the production of sex hormones, mainly estrogen and progesterone. These hormonal changes are associated with various alterations in body composition and metabolic parameters, increasing the risk of developing obesity and metabolic diseases.

Changes in Body Composition During Menopause

During the menopausal transition, it is common to observe an increase in total fat mass and a redistribution of body fat, with a tendency to accumulate in the abdominal region. This pattern of visceral fat accumulation is associated with an increased risk of developing insulin resistance, dyslipidemias, high blood pressure, and, altogether, metabolic syndrome, thus increasing the likelihood of cardiovascular disease and type 2 diabetes (Blanco et al., 2020).

Hormone Therapy and its Impact on Body Composition

Hormone therapy (HT) has been widely used to relieve menopausal symptoms and improve the quality of life of women at this stage. In addition to its effects on vasomotor symptoms, HT could play a crucial role in modulating body composition and metabolic parameters. It has been observed that estrogen administration can influence the distribution of body fat, reducing visceral fat accumulation and improving insulin sensitivity (González-Mendoza & Rincón-Pérez, 2021).

Routes of Administration of Hormone Therapy

The route of administration of HT is a determining factor in its metabolic effects. For example, orally administered HT is subject to a hepatic first step, which may influence lipid profile and coagulation, while the transdermal route could have a different impact on these parameters (González-Mendoza & Rincón-Pérez, 2021).

Scientific Evidence on the Effects of Hormone Therapy

Several studies have investigated the effects of HT on body composition and metabolic parameters in postmenopausal women. For example, González-Mendoza and Rincón-Pérez (2021) evaluated the impact of oral and parenteral HT on the body composition of menopausal women. They found that oral HT was associated with a significant decrease in visceral fat, while parenteral HT showed no changes in body composition. These findings suggest that the route of HT administration may influence its effects on body composition.

Below is a table summarizing the main findings of this study:

Parameter	TH Oral	TH Parenteral
Visceral fat	↓	No change
Total fat mass	↓	No change
Muscle mass	No change	No change

Note: ↓ indicates a significant decrease.

Considerations on Hormone Therapy and Metabolic Risk

Importantly, while HT may offer benefits in body composition and metabolic parameters, its use is not without risks. Studies have indicated that combined HT can increase the risk of cardiovascular events and certain types of cancer, which has led to a reevaluation of its indications and the recommendation to use the minimum effective dose for the shortest possible time (Blanco et al., 2020).

Conclusion

Menopause induces significant changes in body composition and metabolism, increasing the risk of obesity and associated diseases. HT emerges as a potential intervention to mitigate these adverse effects, but its implementation must be carefully evaluated, considering the individual benefits and risks, as well as the specific characteristics of each patient.

Methodology

To evaluate the effects of hormone therapy (HT) on body composition and metabolic parameters in postmenopausal women with obesity, a study based on a systematic review of the literature was conducted. The selection criteria, the data source, the analysis procedure and the variables studied are detailed below.

Study Design

A systematic review **was carried out** following the recommendations of the PRISMA methodology (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) to ensure the quality and validity of data collection (Moher et al., 2020).

Inclusion and Exclusion Criteria

The following criteria were established for the selection of studies:

Inclusion Criteria	Exclusion Criteria
Studies published between 2019 and 2024	Studies with populations under 45 years of age
Articles in English and Spanish	Studies with a sample of less than 30 participants
Studies that evaluated the effects of HT on body composition and metabolic parameters	Research with hormone therapy in men
Controlled clinical trials, observational studies, and systematic reviews	Studies in women without obesity (BMI < 30 kg/m²)

(Source: Moher et al., 2020)

Data Sources and Search Strategy

Indexed scientific databases were consulted in the last 5 years, including:

- **PubMed**
- **Scopus**
- **Web of Science**
- **SciELO**

The keywords used in the search were: *"menopause"*, *"hormone therapy"*, *"obesity"*, *"body composition"*, *"metabolic parameters"*, using Boolean operators (AND, OR) to optimize the search (Blanco et al., 2020).

Data Extraction

The data were extracted and organized in a table for comparative analysis:

Variable	Type of Measurement	Instrument Used
Body Mass Index (BMI)	kg/m²	Bioimpedance Scale
Visceral Fat	cm²	Nuclear Magnetic Resonance
Lean Dough	kg	DEXA Absorptiometry
Lipid Profile	mg/dL	Blood tests
Insulin Sensitivity	HOMA-IR	Fasting glucose test

(Source: González-Mendoza & Rincón-Pérez, 2021)

Data Analysis

The data collected were analyzed by:

- **Descriptive analysis** (mean, standard deviation)
- **Mean comparison tests** (Student's t for paired samples)
- **Multivariate regression analysis** to assess the association between HT and metabolic parameters ($p<0.05$ as a significance level) (González-Mendoza & Rincón-Pérez, 2021).

Ethical Considerations

International bioethics standards were respected, ensuring that the included studies had the approval of an ethics committee and informed consent from the participants (Moher et al., 2020).

3. RESULTS

Below are the findings of several studies that analyzed the impact of hormone therapy (HT) on body composition and metabolic parameters in postmenopausal women with obesity.

Effects of Oral and Parenteral Hormone Therapy on Body Composition

A study conducted by González-Mendoza and Rincón-Pérez (2021) evaluated 86 women between the ages of 45 and 55 with FSH levels above 20 IU/ml and a history of hysterectomy. Participants received HT for six months, either orally (44 patients) or parenterally (42 patients). Bioelectrical impedance was used to measure body composition before and after treatment.

The results showed that orally administered HT was associated with a significant decrease in visceral fat ($p < 0.05$). In contrast, parenteral HT did not show significant modifications in body composition.

Table 1. Changes in Body Composition by HT Route of Administration

Parameter	Oral HT (n = 44)	Parenteral HT (n = 42)
Visceral fat	Significant decrease ($p < 0.05$)	No significant changes
Total fat mass	Significant decrease ($p < 0.05$)	No significant changes
Lean dough	No significant changes	No significant changes

Source: González-Mendoza and Rincón-Pérez (2021).

Impact of Hormone Therapy on Metabolic Parameters

Although the aforementioned study focused mainly on body composition, other studies have explored the effect of HT on metabolic parameters. For example, Blanco et al. (2020) analyzed a cohort of menopausal women and found that HT was associated with improvements in lipid profile, including a reduction in total and LDL cholesterol levels, as well as an increase in HDL.

Table 2. Changes in Metabolic Parameters Associated with HT

Parameter	Change Observed with HT
Total cholesterol	Significant decrease
LDL (bad cholesterol)	Significant decrease
HDL (good cholesterol)	Significant increase
Triglycerides	No significant changes

Source: Blanco et al. (2020).

Considerations on the Route of Administration of Hormone Therapy

The route of administration of HT appears to influence its effects on body composition and metabolic parameters. Oral HT, passing through the liver, may have a more pronounced impact on lipid metabolism, while parenteral HT may have a more neutral effect in this regard.

Conclusions of the Reviewed Studies

The studies reviewed suggest that HT, especially when administered orally, may have beneficial effects on body composition and certain metabolic parameters in postmenopausal women with obesity. However, it is essential to consider individual factors and possible associated risks when initiating HT.

4. CONCLUSIONS

The findings of this review indicate that hormone therapy (HT) has a significant impact on body composition and metabolic parameters in postmenopausal women with obesity. Specifically, orally administered HT has shown beneficial effects in reducing visceral fat and improving certain metabolic markers, such as total and LDL cholesterol levels (Blanco et al., 2020). However, not all studies agree on their findings, suggesting that the effectiveness of HT may depend on individual factors,

such as dose, route of administration, and duration of treatment (González-Mendoza & Rincón-Pérez, 2021).

One of the main findings is the influence of the route of administration on the effects of HT. Oral HT was observed to have a greater impact on body composition and lipid metabolism due to its hepatic metabolism, while parenteral HT seems to have a more neutral effect on these aspects (Blanco et al., 2020). This highlights the importance of considering the route of administration when selecting an appropriate treatment for each patient.

In addition, the relationship between HT and body fat redistribution is a key point in the management of metabolic risk in postmenopausal women. The accumulation of visceral fat is a determining factor in the onset of metabolic syndrome, insulin resistance and cardiovascular disease. HT's ability to mitigate these effects suggests its potential use as a complementary strategy in the prevention of metabolic diseases in this population (Blanco et al., 2020; González-Mendoza & Rincón-Pérez, 2021).

However, the use of HT is not without risks. Previous studies have warned of the possible association between HT and an increased risk of cardiovascular events and certain types of cancer, especially when used in specific combinations or in high doses for prolonged periods (Papadakis et al., 2022). Therefore, current recommendations emphasize the use of the minimum effective dose for the shortest possible time to maximize benefits and minimize risks (Blanco et al., 2020).

In conclusion, HT represents a promising pharmacological strategy to improve body composition and metabolic parameters in postmenopausal women with obesity. However, their use should be carefully evaluated based on the individual factors of each patient. Further studies with larger numbers of participants and long-term follow-up are recommended to confirm these findings and optimize treatment regimens in this population.

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