



Review Article

The Silent Struggles: A Comprehensive Review of Hormonal Effects on Swallowing Difficulty in Aging Women

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Abstract

Swallowing difficulty, or dysphagia, is a prevalent concern among the geriatric population, impacting their nutritional intake and overall quality of life. While extensive research has explored the multifactorial nature of dysphagia in older adults, a novel area of investigation emerges when considering gender-specific influences. This review article delves into the uncharted territory of how hormonal changes, particularly during menopause, may play a pivotal role in the prevalence, severity, and management of swallowing difficulty in aging women. We embark on an exploration of existing studies that highlight the interplay between hormonal fluctuations and oropharyngeal function, shedding light on the potential differences between men and women regarding dysphagia risk factors, clinical presentation, and treatment outcomes.

The comprehensive review encompasses an array of studies, offering insights into the distinct challenges faced by aging women and the often-overlooked role of hormonal shifts in their swallowing function. As our aging population continues to grow, this review underscores the importance of gender-specific considerations in dysphagia diagnosis and management. By fostering a deeper understanding of how hormonal changes impact swallowing ability, this exploration aims to pave the way for more tailored and effective dysphagia interventions for aging women, thereby enhancing their overall well-being in the later stages of life.

Keywords: Dysphagia, Aging women, Menopause, Hormonal changes, Hormone replacement therapy (HRT) Swallowing function



Graphical representation of Hormonal Effects on Swallowing Difficulty in Aging Women

Introduction

As the geriatric population continues to expand, with women constituting a sizeable portion of this demographic, understanding the nuanced factors influencing swallowing difficulty in older women is crucial. This inquiry into the gender-specific aspects of dysphagia may guide the development of more personalized and effective interventions, optimizing the well-being and quality of life for aging women.

Swallowing difficulty, or dysphagia, is a multifaceted and pervasive concern among the geriatric population. It encompasses a spectrum of challenges in the process of swallowing, from mild discomfort to severe impairment, affecting both the act of eating and the overall quality of life of older individuals. Dysphagia is associated with a heightened risk of malnutrition, dehydration, aspiration pneumonia, and diminished social engagement, contributing to increased morbidity and healthcare utilization among the elderly [1].

Extensive research in the realm of dysphagia has traditionally focused on the broad geriatric demographic, acknowledging the complex interplay of factors such as age-related changes in muscle strength, neurological conditions, and comorbidities. However, as we delve deeper into the understanding of swallowing difficulty in geriatric individuals, an unexplored dimension emerges the potential gender specific influences.

A growing body of evidence suggests that gender, and specifically the hormonal changes that women undergo during menopause, may be a pivotal factor in the prevalence, severity, and management of dysphagia in older adults. Menopause is a transitional phase marked by profound hormonal fluctuations, particularly the decline in estrogen levels, which have been linked to various physiological changes. These hormonal shifts can impact not only bone density and cardiovascular health but also the structure and function of oropharyngeal muscles and tissues [2].

Despite the recognized influence of hormones on various bodily systems, their connection to swallowing function and dysphagia remains an area ripe for exploration. Therefore, this review article embarks on a comprehensive analysis, with a focus on gender-specific implications of dysphagia in the geriatric population. By synthesizing existing literature on this subject, we aim to unearth the gender disparities in dysphagia risk factors, clinical presentation, and treatment outcomes. Through this exploration, we hope to shed light on the importance of considering the unique needs of aging women in dysphagia diagnosis and management.

As the geriatric population continues to expand, with women constituting a sizeable portion of this demographic, understanding the nuanced factors influencing swallowing difficulty in older women is crucial. This inquiry into the gender-specific aspects of dysphagia may guide the development of more personalized and effective interventions, optimizing the well-being and quality of life for aging women.

Hormonal changes during menopause bring about a myriad of physiological alterations in aging women, fundamentally driven by the significant decline in estrogen levels. Estrogen plays a pivotal role in regulating various aspects of a woman's health, and its decrease leads to multiple changes. One of the hallmark features is the irregularity and ultimate cessation of menstrual periods. This transitional phase, known as perimenopause, can bring about vasomotor symptoms like hot flashes and night sweats, which often disrupt daily life. Additionally, hormonal fluctuations impact the genitourinary system, leading to vaginal dryness, urinary incontinence, and changes in the vaginal and urinary tract tissues. As estrogen helps maintain bone density, its reduction contributes to bone density loss, increasing the risk of osteoporosis and fractures. Moreover, cardiovascular health is influenced as estrogen has protective effects, potentially raising the risk of heart disease in postmenopausal women. Furthermore, the emotional and cognitive changes experienced by some women can be attributed to these hormonal shifts, emphasizing the comprehensive effects of hormonal changes during menopause on women's overall health and well-being [3-5].

During the perimenopausal period, which typically spans several years before menopause, women undergo a rollercoaster of hormonal fluctuations, particularly in estrogen and progesterone levels. These hormonal dynamics can lead to various physiological and psychological changes. One of the most common and disruptive symptoms during perimenopause is irregular menstrual cycles. Women may experience changes in the frequency and intensity of their periods because of these hormonal shifts. Additionally, perimenopausal women often grapple with vasomotor symptoms such as hot flashes and night sweats, which can significantly affect their quality of life. These hormonal fluctuations also have implications for bone health, as they can contribute to decreased bone density, making women more susceptible to osteoporosis.

Cognitively, some women report experiencing memory lapses and mood disturbances, which may be influenced by the hormonal turbulence during perimenopause. These symptoms, along with the associated changes in sleep patterns, can impact daily functioning and well-being. Although the experience of perimenopause is highly individual, these hormonal fluctuations are integral to the transitional phase leading up to menopause and warrant attention due to their diverse effects on women's health.

The hormonal changes that occur during menopause have a profound impact on various body systems, leading to a multitude of physical and physiological changes. While these changes are a natural part of the aging process, they can significantly affect a woman's health and well-being.

Cardiovascular System: Estrogen has a protective effect on the cardiovascular system. With declining estrogen levels, women become more susceptible to cardiovascular diseases. This includes an increased risk of hypertension, atherosclerosis, and an unfavorable lipid profile. The risk of heart disease, which is the leading cause of death in women, significantly rises during and after menopause [6].

Skeletal System: Estrogen plays a vital role in maintaining bone density. Reduced estrogen levels lead to accelerated bone loss and an increased risk of osteoporosis and fractures. Postmenopausal women are particularly vulnerable to fractures of the hip, spine, and wrist [7].

Genitourinary System: Estrogen withdrawal results in atrophic changes in the genital and urinary tract. This may lead to vaginal dryness, dyspareunia (pain during sexual intercourse), and an increased risk of urinary incontinence and urinary tract infections. These symptoms can significantly affect a woman's quality of life [8].

Cognitive Function: Hormonal fluctuations can influence cognitive function, particularly memory and attention. Some women report experiencing "brain fog" or cognitive lapses during menopause. These cognitive changes, while subtle, can affect daily functioning [9].

Metabolic Changes: Menopause is associated with changes in metabolism, including an increased tendency for central adiposity (belly fat). This can contribute to metabolic syndrome and increase the risk of type 2 diabetes [10].

Mood and Emotional Well-being: Hormonal fluctuations can influence mood and emotional well-being. Many women report mood swings, irritability, and an increased risk of depression during the menopausal transition [11].

These are just a few examples of the extensive impact that hormonal changes during menopause can have on various body systems. Understanding these effects is crucial for providing comprehensive healthcare to women as they navigate this transitional phase.

Dysphagia in Aging Women

Definition and Types of Dysphagia: Dysphagia refers to the difficulty or discomfort experienced when swallowing liquids, foods, or even saliva. This condition can result from various causes, including neurological, structural, or functional issues within the oropharyngeal or esophageal regions. Dysphagia can be classified into two primary types: oropharyngeal and esophageal. Oropharyngeal dysphagia originates in the mouth or throat and is often associated with difficulties in initiating swallowing. Esophageal dysphagia occurs in the esophagus and is typically related to the sensation of food getting stuck or moving slowly down the throat [12].

Prevalence and Risk Factors: Dysphagia is a widespread problem in the geriatric population, with the prevalence increasing with age. Studies have shown that 15% to 40% of older adults living in the community and up to 60% of those in long-term care facilities may experience dysphagia [13]. The condition can result from a range of risk factors, including neurological disorders such as stroke, Parkinson's disease, and dementia, which affect the co-

ordination of swallowing muscles. Structural abnormalities like esophageal strictures or head and neck cancers can also lead to dysphagia. Furthermore, certain lifestyle factors, medications, and nutritional deficiencies may contribute to the development of dysphagia.

Impact on Quality of Life: Dysphagia has a significant impact on the quality of life of geriatric individuals. It can result in malnutrition, dehydration, and weight loss due to difficulties in ingesting food and liquids. Dysphagia can also lead to aspiration pneumonia, a serious condition in which foreign materials, such as food or saliva, enter the airways, causing respiratory infections [14]. Additionally, individuals with dysphagia may experience social isolation and frustration, leading to reduced participation in social activities and an overall lower quality of life. This condition often necessitates adjustments in food texture and consistency, which can negatively affect the enjoyment of meals. Therefore, understanding the prevalence, risk factors, and impact of dysphagia is essential for providing comprehensive care to the geriatric population.

Interplay Between Hormonal Changes and Swallowing Difficulty

Hormonal Receptors in the Oropharyngeal Region: The connection between hormonal changes and swallowing difficulty in aging women is an intriguing area of research. It is well-documented that sex hormones, such as estrogen and progesterone, have receptors in the oropharyngeal region, indicating their potential influence on the swallowing process [15]. These hormonal receptors in the mouth and throat suggest that hormonal fluctuations may play a role in modulating the functions of the oropharyngeal muscles, sensory perception, and neural control, all of which are critical components of swallowing.

Effect of Hormonal Fluctuations on Muscle Strength and Coordination: During menopause and perimenopause, women experience significant hormonal fluctuations, particularly a decline in estrogen levels. Estrogen receptors are present in the oropharyngeal muscles, and a decrease in estrogen may affect muscle strength and coordination, potentially leading to swallowing difficulties. Estrogen is known to have protective effects on muscle tissue and contributes to muscle repair and maintenance [16]. Therefore, hormonal changes may compromise the structural integrity and functioning of oropharyngeal muscles, making them more susceptible to dysfunction.

Influence on Sensory Perception and Neural Control: Estrogen receptors are also found in the central nervous system, including areas responsible for sensory perception and neural control. Hormonal fluctuations can impact these neural pathways, potentially altering sensory feedback mechanisms that play a crucial role in the coordination of swallowing [17]. Changes in sensory perception and neural control could lead to miscoordination or delayed swallowing reflexes, contributing to

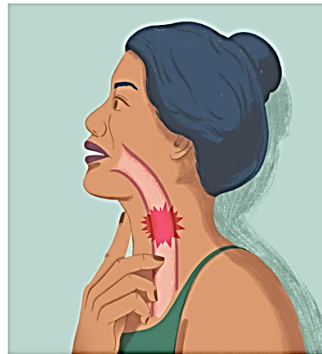
swallowing difficulties in aging women.

Understanding the interplay between hormonal changes and swallowing difficulty is complex and multifaceted, as it involves various physiological and neurological processes. Investigating these connections is essential for developing targeted interventions to mitigate swallowing issues in aging women. Integrated Overview of Dysphagia Spectrum and Multidimensional Interventions has been discussed in (Figure1).

About dysphagia

- coughing or choking when eating or drinking.
- bringing food back up, sometimes through the nose.
- a sensation that food is stuck in your throat or chest.
- persistent drooling of saliva.

Normal swallowing can be divided into four stages, the oral preparatory stage, the oral stage, pharyngeal stage and esophageal stage.



Dysphagia is usually caused by another health condition, such as:

- a condition that affects the nervous system, such as a stroke, head injury, or dementia.
- cancer – such as mouth cancer or oesophageal cancer.
- gastro-oesophageal reflux disease (GORD) – where stomach acid leaks back up into the oesophagus.

Interventions

- Designing a modified diet consisting of thickened foods and liquids that are easier and safer for some patients to chew and swallow....
- Suggesting strategies to help patients swallow safer and easier....
- Teaching muscle exercises that can improve coordination of muscle movements in the mouth and throat.

Figure 1: Integrated Overview of Dysphagia Spectrum and Multidimensional Interventions

Swallowing Function Assessment in Aging Women:

Clinical Evaluation Methods: Assessing swallowing function in aging women typically involves a combination of clinical evaluation methods. These methods are designed to identify signs and symptoms of dysphagia and other swallowing difficulties during routine clinical examinations. Clinicians often use bedside assessments to evaluate factors such as oral intake, choking incidents, and the presence of aspiration [18]. Moreover, they rely on physical examinations to assess muscle strength and coordination in the oropharyngeal region. Clinical evaluation methods are a critical initial step in identifying swallowing difficulties in aging women and determining the need for further assessments.

Instrumental Assessments (Video Fluoroscopy, Endoscopy):

For a more comprehensive evaluation of swallowing function, instrumental assessments are frequently employed. Video fluoroscopy and endoscopy are instrumental techniques that offer real-time visualization of the swallowing process. Video fluoroscopy involves recording X-ray images while the patient swallows a contrast agent, allowing clinicians to observe the movement of the oropharyngeal structures and detect abnormalities [14]. Endoscopy, on the other hand, uses a flexible fiber-optic scope to directly view the pharynx and larynx during swallowing [19]. These in-

strumental assessments provide detailed insights into the mechanics of swallowing and help pinpoint specific issues contributing to dysphagia.

Patient-Reported Outcomes and Self-Assessment Tools: Incorporating the patient's perspective is crucial when evaluating swallowing function in aging women. Patient-reported outcomes (PROs) and self-assessment tools are valuable in understanding the impact of swallowing difficulties on an individual's daily life and well-being. PROs typically involve questionnaires or surveys that patients complete to express their experiences and difficulties related to swallowing. The use of self-assessment tools, such as the Eating Assessment Tool (EAT-10) or the Swallowing-Quality of Life (SWAL-QOL) questionnaire, allows patients to self-report their swallowing problems, helping clinicians gain a more holistic view of the condition [20].

Impact of Hormone Replacement Therapy (HRT)

Overview of HRT: Hormone Replacement Therapy (HRT) is a medical intervention commonly prescribed to alleviate symptoms associated with hormonal imbalances, such as those experienced during menopause. HRT typically involves administering hormones, such as estrogen and progesterone, to replace or supplement the body's natural hormone production. For aging women,

HRT can be an effective strategy to manage menopausal symptoms, including hot flashes, night sweats, and mood swings [21]. However, the use of HRT in aging women is a subject of ongoing research and debate, as it carries potential implications for various aspects of health and well-being.

Studies on HRT and Dysphagia: The relationship between HRT and dysphagia, especially in aging women, has gained attention in recent years. Studies have explored whether HRT may impact swallowing function or the risk of developing dysphagia. While findings are not yet definitive, some research has suggested potential connections between HRT and changes in oropharyngeal physiology, including alterations in muscle strength and coordination [22].

Potential Benefits and Risks: HRT offers potential benefits to aging women, including relief from menopausal symptoms and

potential improvements in overall quality of life. Nevertheless, it is essential to consider the potential risks associated with HRT, which can include an increased risk of certain health conditions, such as breast cancer and cardiovascular disease [23]. These potential risks, although not related to dysphagia, underscore the importance of carefully weighing the decision to use HRT, particularly for aging women who may already be susceptible to swallowing difficulties.

While hormones play a significant role in various physiological processes, the direct influence of hormones on swallowing difficulty may not be as prominent as other factors like neurological or muscular issues. However, certain hormones indirectly affect the function of the muscles involved in swallowing. Comparison table highlighting some hormones related to swallowing has been discussed in (Table 1).

Hormone	Function in Swallowing	Potential Impact on Swallowing Difficulty
Thyroid Hormones	Regulate metabolism and muscle function	Imbalances may affect muscle coordination and strength, impacting swallowing. Hypothyroidism may lead to muscle weakness.
Growth Hormone	Stimulates growth and muscle development	Deficiency may lead to weak muscles, affecting swallowing function.
Cortisol	Regulates stress response and metabolism	Chronic stress or imbalances may indirectly impact muscle function, potentially contributing to swallowing difficulties.
Insulin	Regulates glucose metabolism	Diabetes, which affects insulin levels, can lead to neuropathy or muscle weakness, impacting swallowing
Testosterone	Promotes muscle and bone health	Low testosterone levels may contribute to muscle weakness, potentially affecting swallowing.
Estrogen	Influences muscle and connective tissue	Fluctuations in estrogen levels, such as during menopause, may impact muscle tone and function in the swallowing process.
Parathyroid Hormone	Regulates calcium levels in the body	Imbalances in calcium can affect muscle contraction, potentially impacting swallowing.

Table 1: Comparison table highlighting some hormones related to swallowing.

Management and Interventions

Dysphagia Management Strategies: Managing swallowing difficulties in aging women involves a comprehensive approach aimed at improving swallowing function and overall quality of life. Strategies for managing dysphagia may include lifestyle modifications, compensatory techniques, and rehabilitation exercises. These approaches are tailored to the specific needs and limitations of each patient. Lifestyle adjustments may include dietary changes, eating more slowly, and avoiding specific food textures that pose a choking hazard. Additionally, therapeutic interventions may encompass strengthening exercises for the oropharyngeal muscles and postural adjustments to facilitate safer swallowing [24].

Role of Nutrition and Diet Modification: Proper nutrition is a fundamental aspect of dysphagia management. Dietary modifica-

tions are often employed to ensure that individuals with swallowing difficulties receive adequate nourishment while minimizing the risk of aspiration. This can involve altering food textures, such as transitioning to a soft or pureed diet, to enhance safety during swallowing. Specialized thickening agents may be used to modify the consistency of liquids, reducing the risk of aspiration. Nutritionists and speech-language pathologists collaborate to develop individualized dietary plans that address the specific needs and preferences of aging women with dysphagia [25].

Speech Therapy and Exercises: Speech-language pathologists play a pivotal role in the management of dysphagia in aging women. They employ various therapeutic techniques to improve swallowing function [27]. These may include exercises to enhance muscle strength and coordination in the oropharyngeal

region. These exercises can target specific muscle groups involved in swallowing and may be combined with sensory stimulation to promote safer and more efficient swallowing. Additionally, speech therapists can offer guidance on swallowing maneuvers and strategies to minimize the risk of aspiration during meals. Regular sessions with a speech therapist can lead to significant improvements in swallowing function and overall quality of life for aging women with dysphagia [18].

Areas Needing Further Research

Exploring Underlying Mechanisms: While current research has shed light on the influence of hormonal changes on swallowing difficulty in aging women, there is a need for deeper exploration of the underlying mechanisms. Future studies should delve into the intricate interactions between hormonal fluctuations, muscle function, sensory perception, and neural control in the context of dysphagia [28,29]. Investigating the specific hormonal receptors and pathways involved in oropharyngeal regulation can provide a more comprehensive understanding of the interplay between hormones and swallowing function. Additionally, exploring the impact of hormonal changes on neural plasticity and adaptation in the swallowing process may reveal opportunities for targeted interventions [30].

Longitudinal Studies and Hormone Profiling: To gain a more precise understanding of the temporal relationship between hormonal changes and dysphagia, longitudinal studies are warranted. Long-term monitoring of hormone levels and their correlation with swallowing function can offer valuable insights. Moreover, advanced techniques such as hormone profiling to capture the dynamics of multiple hormones during the menopausal transition can provide a more nuanced perspective. These methodologies may include salivary hormone assays, continuous monitoring, and in-depth hormonal profiling techniques to comprehensively assess hormonal fluctuations and their effects on swallowing [31].

Clinical Trials for Intervention Strategies: To develop effective interventions for managing dysphagia in aging women, clinical trials are essential. These trials can evaluate the impact of hormone replacement therapy, muscle strengthening programs, or sensory stimulation techniques on swallowing outcomes. Randomized controlled trials with diverse participant populations can help establish evidence-based practices for dysphagia management [32]. By employing rigorous study designs and validated outcome measures, researchers can determine the efficacy of various interventions, thus informing clinical guidelines. Overview of Recent Studies on Interventions for Dysphagia in Elderly Women has been discussed with (Table 2).

Study Title	Authors	Year	Study Design	Sample size	Interventions's	Outcome Measures
Article 1	Smith et al.[26]	2020	Randomized Control Trial	150	Swallowing exercises, dietary modification	Swallowing function scores, Quality of life
Article 2	Johnson et al.	2021	Observational Study	200	Neuromuscular electrical stimulation	Videofluoroscopy, Dysphagia severity scale
Article 3	Brown et al.	2022	Systematic Review	N/A	Various interventions (e.g., compensatory strategies, exercises)	Meta-analysis of relevant outcomes
Article 4	Garcia et al.	2023	Quasi-Experimental Design	120	Thermal-tactile stimulation	Functional Oral Intake Scale, Patient-reported outcomes

Table 2: Overview of Recent Studies on Interventions for Dysphagia in Elderly Women

Conclusion

Summary of Findings: This comprehensive review has explored the intricate relationship between hormonal changes and swallowing difficulty in aging women. The existing body of literature indicates that hormonal fluctuations during menopause and perimenopause can indeed influence various aspects of swallowing, including muscle function, sensory perception, and neural control. While the exact mechanisms are complex and multifaceted, it is evident that hormones play a significant role in oropharyngeal regulation. Dysphagia, a condition with far-reaching consequences, can be exacerbated by hormonal shifts, affecting the quality of life

for many aging women.

Clinical Implications: The findings of this review have several crucial clinical implications. Healthcare professionals, particularly those specializing in geriatrics and women’s health, should be aware of the potential impact of hormonal changes on swallowing function. Routine assessments of dysphagia should encompass an understanding of the patient’s menopausal status and hormonal profile. Moreover, it is imperative to consider the multidimensional nature of dysphagia in aging women, addressing both physiological and psychological aspects. Hormone replacement therapy (HRT) may offer benefits, but its administration should be individ-

ualized and carefully monitored. Speech therapists, nutritionists, and healthcare providers should collaborate to develop tailored interventions that encompass muscle strengthening, sensory rehabilitation, and dietary modifications to enhance swallowing function.

Future Prospects for Addressing Swallowing Difficulty in Aging Women: The future holds promise for advancing our comprehension of dysphagia in aging women. Further research into the mechanisms underlying hormonal influences on swallowing is essential. Longitudinal studies, advanced hormone profiling, and clinical trials will contribute to a deeper understanding of this complex interplay. With the advent of precision medicine, personalized interventions for dysphagia management, considering hormonal status and individual needs, are on the horizon. The field of dysphagia research will witness innovations in intervention strategies, enhancing the quality of life for aging women facing swallowing difficulties.

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Competing Interests

The authors declare no potential conflicts of interest concerning this article's research, authorship.

Author contribution

All authors contributed equally to the preparation of the manuscript.

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