



Disordered Eating, Eating Disorders, and Body Image in Midlife and Older Women

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Abstract

Purpose of Review We review the evidence for the reported increase in disordered eating and body image disturbance occurring in women in middle age and later life. We describe the contributing factors that relate to the unique experience of eating disorders (EDs) at midlife and beyond. We review evidence for several key factors in this observation, specifically the bio-psycho-social and relational components of later life EDs. We present treatment considerations, screening tools for evaluation, and treatment recommendations for this special population suffering with EDs.

Recent Findings Eating disorder symptoms and body image preoccupation have been identified in increasing numbers of women over age 50. Reports indicate that women are seeking treatment for chronic, recurrent, or late onset EDs. However, health care providers generally have not screened for these conditions, and often pursue other medical diagnoses.

Summary Age does not immunize women from body image preoccupation, weight and shape concerns, disordered eating, and eating disorders.

Keywords Eating disorders · Midlife · Body image · Aging

Introduction

Eating disorders (EDs) and disordered eating symptoms have become normative in the aging population worldwide. Increasing evidence suggests that the assumption that EDs and weight/shape preoccupation occur only in early developmental life stages is *incorrect*. In fact, the “face of eating disorders” now appears across age, gender, ethnicity, race,

class, culture, and place [1•]. In recent years, the rate of admissions for women over age 45 to inpatient ED facilities has increased considerably, now accounting for 25% of admissions [2]. Additionally, partial, residential, and outpatient treatment programs have found that 35% of their patients are over the age of 45 [3].

Clinicians and researchers tend to describe EDs in women at midlife and beyond as manifesting in three distinct categories. Some adult women have suffered with symptoms of disordered eating throughout their lives from adolescence into later life. A portion of adult women experienced a clinical eating disorder in early life and recovered, partially or fully, with recurrence or relapse in later life. A subset of this group may have subclinical eating disorder symptoms but were undiagnosed until midlife. Finally, the smallest portion of adult EDs experience their initial onset in mid or later life, without a history of recognized symptoms [4, 5•, 6•].

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Contributing Factors to Eating Disorders at Midlife and Beyond

The peri-menopausal period presents risk for either initial onset or recurrence of an ED that may have been in remission or

subsyndromal for many years. Like the pubescent transition from childhood to adolescence, the transition from the reproductive years to menopause is now recognized as a high-risk time for symptoms to develop or redevelop. The peak onset of EDs occurs during critical or sensitive developmental periods of reproductive hormone changes [6]. Recent research suggests that the estrogen changes associated with the perimenopausal period may present a window of vulnerability [6, 7]. A variety of other factors seems to influence the onset of late life eating disorders. These will be reviewed next.

Aging-Related Emotional Factors and Stress

The anxiety and stress that accompany aging (especially in Western culture that values youthfulness) also provide fertile ground for increased symptoms of disordered eating and dysfunctional attitudes, beliefs, and behaviors. Women at risk for EDs experience physiological changes as unacceptable and seek strategies to “control” their bodies. These strategies morph into destructive and potentially life-threatening behaviors. If a prior history of EDs exists, life events for women at midlife and beyond may also serve to re-activate prior conditions.

Lifetime Dieting and Weight Suppression

Some women have spent a lifetime engaging in valuation of body size, weight, and shape and practicing weight suppression. With the increased weight gain predictable in menopausal women and the increased socio-cultural pressures promoting a thin and youthful beauty ideal, many women engage in extreme behaviors to delay the natural signs of aging. One study noted over 50% of women of “normal weight” (BMI < 25) report increased body dissatisfaction and more discontent with their bodies into their 50s, as compared to their younger years, even their 40s [8]. For a portion of aging women, the pressures of later life coupled with the cultural taboo related to mature body types may be a tipping point resulting in full manifestation of disordered eating and related extreme behaviors. The relentless pressure to sustain the idealized images of a youth obsessed media culture has resulted in the rise of disordered eating and weight preoccupation [9, 10].

Current Role Models for Aging

Historically, previous generations of aging women were role models. Today, however, older generations of women are rarely role models for women due to cultural and beauty ideals promulgated by culture, media, and possibly the \$70 billion diet industry in the USA [11]. The body as currency has become more important for women across the lifespan, coupled with the pressures to defy aging. EDs and body image disturbances have become normalized and submerged with other

more “age-appropriate” life challenges. Illness, acute medical symptoms, or dramatic life events are frequently the precipitating events that compel women to seek treatment [12, 13].

Globalized Diet Culture

A lifetime of “speaking the language of fat” shaped by “diet culture” makes disordered eating appear normative. Women’s multi-faceted responsibilities and shifting gender roles due to modern globalization can leave many women feeling that they are in a continual state of transition. While body image dissatisfaction may have begun in early life, societal influence appears to continue to be a contributing factor in body image despair in older women, regardless of body size [9]. The result is that women may seek comfort in the rituals of disordered eating and body-related obsessions [5]. For some, these rituals will pave the way toward clinical EDs. Thus, more women are suffering into later life with disorders that continue unrecognized, untreated, and chronic.

The Rising Number of Midlife and Older Women with Disordered Eating and Eating Disorders

It remains difficult to determine accurate prevalence rates due to limited epidemiological data. The occurrence of EDs and related symptoms at midlife (40 years and older) are 1.9–5.8 per 100,000 for anorexia nervosa [14], 1.7 for bulimia nervosa [15], and 0.61–1.5% for BED [16•]. Nearly three quarters (73%) of midlife women experience weight dissatisfaction and significant levels of depressive symptoms [17]. In a large community-based sample, 62% of midlife women aged 50+ describe eating, weight, and concerns “occasionally to often” negatively affecting their lives, with weight and body shape playing a “moderate” to “most important” role in self-perception. Just over 13% reported at least one current core ED symptom [18]. Similarly, studies in the USA and Australia indicate that 11% of middle-aged women report disordered eating, such as binge eating [19].

In a population-based study of eating disorder diagnoses and risk factors, a review of 5658 women in the UK revealed that by midlife, 15.3% of women met criteria for a lifetime eating disorder. The 12-month prevalence was 3.6%. While this research revealed that a significant proportion of women will experience an eating disorder, few will seek professional health care. In fact, only 27.4% sought or received treatment for their eating disorder *at any point in their life* [20•].

Nonetheless, in the USA, increasing numbers of aging women are seeking help for their EDs [2]. Age does not immunize women from body image preoccupation, weight and shape concerns, restrictive dieting, and disordered eating [13]. As the beauty ideal has shrunk from the curvaceous full bodied images of Marilyn Monroe of the 1960s to the waif models of Twiggy and the decades since [4], women have become less

accepting of the post-menopausal weight increase that has been the standard expected physiological change of a maturing body [17, 18, 21]. A Google search of post-menopause weight gain and body image acceptance results in numerous citations for diet, exercise, and medication regimens to combat slowing metabolism, loss of muscle mass, and estrogen-driven weight accumulation. In the past, graying hair and a broadening mid-section were the expected outcome of living into one's 40s, 50s, 60s, and older. In a group of women aged 61–92, when queried about their bodies, body weight was reported as their greatest concern [22].

In addition to the pressure to resist the normal developmental changes associated with aging, the majority of older women suffering with untreated EDs experience a great deal of shame and isolation. For example, EDs are often unrecognized in older women because the majority of primary care practitioners are not trained in EDs and are unfamiliar with ED assessment tools for adults at midlife and beyond [23]. Not only are eating disorders diseases of isolation, shame, and disconnection [24, 25], but they are considered diseases of the young. Thus, aging women experience a double stigmatization of clinicians' disbelief and perception that their patients are "too old to have an eating disorder" [26•].

Key Clinical Factors Unique to Older Women with Eating Disorders

Some key factors are unique to older women compared to younger peers seeking ED treatment. Due to their long duration and habit rigidity, ED thoughts and symptoms may become ego-syntonic, minimizing their ability to recognize them as problems and report them to medical or mental health providers. To a far greater extent than our younger patients, adults with eating disorders accept their condition as integral to their identity and may not believe they can change or deserve treatment.

Many have never disclosed their eating disordered behaviors to a health care professional, despite decades of secretive ED behaviors, through pregnancies, childbirth, parenting, careers, menopause, and later life losses. Their identity is complex, juggling full lives; the meaning of the ED in later life may become a "comfort", a coping mechanism through developmental passages. However, as social roles are changing, self-objectification begins to shift. It becomes possible that women's sense of agency and critical self-reflection allows for a different view [27•].

They experience the same medical sequelae as younger patients, but may find the impact on their health dramatic and sudden. Indeed, for some, their rigid, extreme efforts for weight control, over-exercise and related practices, may result in other conditions that are more willingly presented to their physician. Physical impairments of

chronic EDs are intertwined with menopausal symptoms. Chronic restrictive diets can result in weight cycling, abuse of laxatives, and binge eating, followed by compensatory purge behaviors, resulting in weight gain, gastrointestinal, and cardiovascular symptoms. Menopausal weight changes may contribute to seeking weight loss surgery with the ED diagnosed during the pre-surgical psychological evaluation.

In later life, post-menopausal osteopenia or osteoporosis, hearing loss, dental issues, and over-use injuries are symptoms that prompt women to seek medical assistance. Medical procedures such as a colonoscopy may trigger a spike in ED symptoms with the dietary fasting and intrusive preparations.

Older women often fail to recognize their behaviors and symptoms as related to disordered eating, and thus do not consider their health conditions the result of chronic efforts at weight suppression, over-exercise, or other ED symptoms. Subsequently, they may be subject to extensive and costly medical testing to evaluate presenting complaints. These medical conditions are accepted as the result of living in the twenty-first century, in a culture obsessed with unrealistic age-defying standards that leave little room for models of healthy aging [13, 21]. Without adequate knowledge of ED history, medical recommendations may include extreme weight loss measures, such as medications, surgery, or restrictive diets. These treatments may further contribute to reactivation or relapse of ED behaviors. Treatment recommendations are ill-informed when problems are assessed without consideration of EDs, body image disturbance, and related conditions. Empathy and a non-judgmental approach by health care providers may improve the opportunity for more effective assessment and treatment [28].

In a comprehensive review of literature using multiple databases from 1984 to 2017, the evidence outlined an increasing number of middle-aged women suffering from EDs. While clinical characteristics and health risks were much the same as in younger women, some distinct differences were identified. For example, the impact of menopause and age-related anxiety were variables that directly related to EDs. Increased depression and physical comorbidities were also common. The review concludes that "physicians should bear in mind the increased risk of EDs in peri-menopausal women, when changes in physical appearance can be drastic, unexpected and undesirable" [29••].

Recent studies have examined the constructs of weight suppression (WS) and weight elevation (WE) in aging women as important predictors of onset or recurrence of an eating disorder diagnosis in later life. Study findings suggest that experiencing a higher adult weight than one did previously (the case for many women post-menopause) may put one at risk for increased eating pathology [30]. Findings support the

notion of a phenotypic group at increased risk for ED onset at midlife.

Another recognized co-morbidity of later life onset or chronic eating disorders are mood disorders such as major depressive disorder (MDD), anxiety, and substance use disorders (SUD). It has been suggested that long-term EDs are associated with increased mood disorders and SUDs. Those who had fully recovered from EDs at 22-year follow-up were twice as likely to not be diagnosed with MDD in the past year and five times more likely to not be diagnosed with SUDs in the past year [31]. This suggests that long-term recovery from EDs is associated with the absence of these common comorbidities. The inverse suggests that chronic MDD and SUDs may be additional factors that are recognizable in aging women with EDs.

One other key factor to consider regarding EDs in older women is that research and clinical experience indicate that the predominance of adult EDs fall into BED, OSFED, and sub-threshold disordered eating [29, 32, 33]. Yet, research, clinical programs, and discussions about eating disorders in females tend to focus disproportionately on AN and BN, limiting the awareness and sensitivity to the broad range of presentations in adult women with EDs.

This growing recognition that older women experience EDs and body image disturbance across the lifespan demands age-specific research [13, 16]. Given that the diagnoses most common in later life are under-recognized, the literature remains limited in its research of symptoms, effective assessment, and recommendations for treatment. To date, the treatments that are utilized in younger populations are uniformly applied to aging women. The effectiveness may be limited due to the unique needs of this older population.

Factors Influencing the Pursuit of Treatment in Older Women

Adult women experience multiple obstacles related to timely access to treatment. First, they may not self-identify or be identified by their health care providers as having an ED, due to the bias that these illnesses occur in young people. Also, the lack of recognition of the range of diagnoses (BED, OSFED, subclinical EDs) impedes discussion and referral for help. Due to their multiple responsibilities and roles in their families, workplace, extended families, and communities, many women over-function and have little time for themselves. They tend to take care of others, so the concept that they may need help is foreign.

Shame is one of the most powerful deterrents to getting help for women of all ages with EDs. Adult women are usually deeply embarrassed about having “a teenager’s problem,” and, therefore, more ambivalent about whether they “deserve” or will benefit from treatment [4, 34]. Exhausted by the effects

of the eating disorder, this shame and embarrassment can paralyze them and obstruct entry to care.

The Deadline Decade

Adult women, however, also have some unique factors motivating them to consider help. The “deadline decade,” the years between 35 and 45, marks the peak of the biopsychosocial developmental process [13, 25] when women are taking stock of their lives and clarifying their future goals. With their biological clocks ticking, this time of determining fertility goals, relationship status, parenting, and work/career tasks propel adult women to a crossroads of “now or never”. Most describe puberty or youth as the onset of their eating disorder and consuming weight/body preoccupation. They never imagined that as they approached midlife or the “halfway point,” that their ED would still be a detrimental part of their lives.

Parenting as Motivation for Treatment

Having children of their own may put women face to face with their ED, forcing them to feed their children and pay closer attention to feeding themselves. This experience can trigger more ED symptoms but may also stimulate a strong desire to avoid handing down this problem [4, 13]. When their children enter puberty, some begin to display body image disturbance and symptoms of disordered eating. Many women find this a tipping point, triggering a surge in seeking treatment with the awareness: “I can’t give what I don’t have”. This insight can drive midlife women towards treatment and recovery with renewed motivation. They are determined that the cycle of EDs will not be passed to the next generation.

Adult Identities and Survival

A key characteristic of this population is their lifetime embodiment of the struggle to survive, in spite of their extreme symptoms. The innate wisdom in this population is gathered from decades of life experience in relationships with partners, family, parenting, workplace, professional, and community endeavors. Unlike the young population with EDs, older women often have multi-faceted identities apart from their eating disorder and/or body image disturbance. They may be marrying or divorcing, living in an empty nest, retiring from work, and grand parenting [4]. In facing the challenges to self-care and issues of loss, adult women may question whether to invest in costly residential ED treatment versus plan for retirement and the financial needs of young adult children’s education and housing.

Medical Considerations

The resultant medical complications of chronic EDs also impact willingness and motivation for treatment. Relationships with family members and trusted health care providers may be more influential for older women when seeking treatment and complying with recommendations. This experience may differ from younger and more acutely ill women.

The cumulative health impact of having an ED often becomes evident in later life, following years of “not being sick enough” but nonetheless suffering. As with eating disorders in young patients, every vital organ system of the body is impacted in adult women. Examples include electrolyte imbalances that can lead to arrhythmias and cardiac dysfunction; neuro-endocrine irregularities, including depleted fat stores that lead to intensified estrogen decline, menstrual dysregulation, and increased menopausal symptoms; decreased bone mineral density that increases the risk for osteopenia and osteoporosis; and metabolic dysregulation resulting from weight cycling and chronic restrictive malnourishment [4, 13].

One of the health risks unique to older adults is more rapid cognitive impairment due to dieting and rapid weight decline. Cognitive impairment can further tax an individual with AN because they may already be experiencing problems with visceral, cognitive, and affective information processing due to an insular dysfunction [35]. In summary, research findings suggest that an increasing rate of weight loss from midlife to late life is a marker for mild cognitive impairment and may help identify persons at increased risk [36, 37]. Dieting is especially a risk factor for elderly patients [37, 38], as the mortality rate increases with lower weight as people age [39]. For older adults, a higher BMI is associated with longevity [40].

Developmental Factors

Developmental factors are critical considerations when treating older women with EDs. It can be helpful and less pathologizing to reframe EDs as difficulties emerging in the context of biopsychosocial challenges at midlife and beyond, e.g., in response to environmental stressors and hormonal and physical changes that led to increased body dissatisfaction. Life transitions and role changes at midlife can include the burden a woman experiences as caregiver. This “sandwich phenomenon” that involves balancing the caregiving needs of aging parents and pubertal children can intensify stress during this developmental period. The following contribute to the biopsychosocial and relational storm in the lives of women at midlife: the balance of managing home and work, the pressure to meet idealized images of “Superwoman”, the loss of identity and the

“empty nest”, grief/loss of loved ones, potential divorce, relationship infidelity, and relational status changes [4].

Screening for Eating Disorders in Women at Midlife and beyond

In light of the fact that 15.3% of women at midlife struggle with lifetime occurrence of eating disorders [20••], it is crucial that medical providers are educated and prepared to assess for EDs and related conditions.

Routine screening for EDs in older women is essential because it can hasten diagnosis and intervention. The screen for disordered eating (SDE) has been noted to increase accuracy with greater potential for generalizability, compared to previous screens (SCOFF, EDS-PC) [41]. It is particularly efficacious when screening an aging population and captures the full range of DSM-5 EDs. Previous screening tools are noted to inaccurately report patients with EDs; the SDE was developed as a more accurate measure of AN, BN, and BED. Given the increased rate of BED and OSFED in the older population, it is recommended we consider this promising new screening tool.

Table 1 outlines questions originally developed by Maguen et al. [41] in their work with veterans that can aid the clinician in screening for EDs in adult women.

Additionally, Table 2 includes questions designed specifically for adult women that could be included in standard medical interviews and assessments to introduce the importance of weight and eating issues across the lifespan [13, 42].

Most of the older women we have treated report that their medical care provider has never asked questions pertaining to their ED and body image difficulties. We strongly encourage these screening tools be considered and a detailed health, body image and disordered eating history be included in the History and Physical patient assessment.

Table 1 Screening questions from screen for disordered eating (SDE)

1. Do you often feel the desire to eat when you are emotionally upset or stressed?
2. Do you often feel that you cannot control what or how much you eat?^a
3. Do you sometimes make yourself throw up (vomit) to control your weight?
4. Are you often preoccupied with a desire to be thinner?
5. Do you believe yourself to be fat when others say you are thin?

With a cutoff of 2, the SDE was most accurate in discriminating AED (any eating disorder) cases from non-cases. In addition, sensitivity and specificity with a cutoff of 2 had the best tradeoff; the SDE correctly classified 90.5% AED cases as positive and correctly classified 57.5% of non-cases of AED as negative

^a Maguen S, Hebenstreit C, Li Y, Dinh J, Donalson R, Dalton S, Rubin E, Masheb R. Screen for disordered eating: improving the accuracy of eating disorder screening in primary care. *General Hospital Psychiatry*. 2018;50:20–25. <https://doi.org/10.1016/j.genhosppsy.2017.09.004>

Table 2 Medical interview assessment questions

1. Has your weight fluctuated during your adult years?
2. Are you trying to “manage” your weight? If so, how?
3. What did you eat yesterday?
4. How much do you think or worry about weight, shape, and food?

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Treatment Recommendations for Midlife and Aging Women with Eating Disorders

While research findings support the use of a modified cognitive behavioral therapy or specialist supportive clinical management approach with adults struggling with severe and enduring AN [43], there is a dearth of research on developmentally informed best practices for women at midlife and beyond [27•].

Given the fact that midlife and older women predominantly experience EDs that fall into BED, OSFED, and sub-threshold disordered eating [29••, 32, 33], there may be usefulness in first offering them CBT-E which is asserted to have transdiagnostic effectiveness [44]. This treatment can also target perfectionism, low self-esteem, and interpersonal difficulties amplified by midlife challenges.

Interpersonal psychotherapy (IPT), shown to be effective for BN and BED [45–47] may also be helpful to midlife and older women commonly dealing with developmental stressors related to changes in role and relationships with partners, parents, and young adult/adult children. IPT also effectively targets depression, a common comorbid illness experienced by adult women with EDs [48].

With its focus on interpersonal dimensions, IPT improves relational functioning which in turn decreases the use of unhealthy eating behaviors as coping mechanisms. Although progress may be slower when compared to CBT, research suggests that IPT may be a useful, cost-effective alternative to CBT for the full spectrum of ED diagnoses [49].

Women with AN, who often experience increased isolation from their partners, along with poor communication and sexual functioning, may also find UCAN (Uniting Couple’s in the Treatment of AN) a cognitive-behavioral couple’s therapy (CBCT) approach helpful [50]. CBCT helps to decrease avoidance, and to improve communication and emotional tolerance, creating a more positive relationship and approach to the ED. [51] Although the research to date has not been transdiagnostic, further research and adaptations of this model may be useful for the full range of EDs. Research has revealed that the most common factor women with AN associate with

recovery is a supportive partner. They have specifically noted that a supportive relationship with a close other is the “driving force” in their recovery [52]. The latter finding also supports the potential promise of group and multifamily therapy treatments,

The mutual connections and universality (i.e., feeling others understand a women’s developmental stressors and how the ED helps her cope with them) characterizing group-based approaches can increase women’s self-empathy and empowerment [53–57]. Group therapy provides vital support following years of isolation, an environment that promotes shared experiences, and a mutual understanding of later life health and bodily changes [13, 25]. Group interventions for women in midlife have shown sustained improvements on disordered eating and body image [58]. Issues of aging, grief, and loss are of unique relevance to these women [13, 25].

When talking with adult women patients and their family members and providers, we encourage a relational reframing of EDs as diseases of chronic disconnection and isolation [24]. This reframing is informed by relational-cultural theory (RCT) [59, 60] and views the ED as disconnecting the adult woman from her authentic sense of self (i.e., genuine thoughts, feelings, and needs), and from others. ED symptoms can foster a sense of uniqueness, mastery, and control. In large part, they regulate emotion and maintain emotional safety. Gradually, the relationship with the eating disorder replaces and competes with all other relationships—with the patient’s inner feelings, her awareness of her body, her loved ones and social contacts, and even with those professionals treating her [61]. RCT offers growth-fostering relationships based in connection and mutuality, challenging this degree of disconnection. The more traditional medical model of treatment provides a top-down “power over” framework, within which the treaters direct the care. RCT, however, is a feminist framework promoting a “power with” collaboration as the client and clinician move through the treatment experience with mutual empathy as the primary therapeutic tool [59, 60].

Psychoeducation is a critical component of RCT and of treatment for adult women and is an example of “power with vs power over”. By giving the adult woman information to guide her decisions about her behavior and symptom reduction, she can become a more effective collaborator in her care. Psychoeducation serves as a guide to the recovery process, helping women to challenge their self-defeating, distorted cognitions and their perfectionism, and teaching about the biopsychosocial and developmental nature of EDs. The relational reframing of EDs fosters a strengths-based treatment approach that encourages reconnection with self and others [13].

Midlife and older women who finally enter treatment for EDs deserve a clinical approach that respects their many

strengths and the wisdom they have acquired from life experience despite having a serious and potentially life-threatening disorder.

Implications and Call to Action

To address this critical problem of EDs affecting the health and well-being of contemporary women at midlife and beyond, we need:

- *Real data on this problem to better define the range of severity and types of EDs women experience at and beyond midlife*
- *Training of mental health and medical professionals to screen, identify, and appropriately treat and refer midlife women with disordered eating.*
- *An approach to the concerns about obesity tailored to individual risk, instead of inflammatory tactics that contribute to disordered eating and body dissatisfaction.*
- *An awareness of how the war on obesity, cultural expectations for women and appearance, and attitudes toward older women, resonate and affect our ability to recognize and address these issues in adult women.*
- *Treatment options that meet the needs of adult women. Outpatient options, specialized groups and convenient treatments are critical. Psychoeducation and treatment should be available to partners and spouses.*
- *Support and education for eating disordered women in their role as mothers to create healthy home environments and role models for their children.*
- *Comprehensive, longitudinal research to track the most effective outreach and treatment programs for adults and identify best practices to promote treatment and recovery.*
- *Optimism that we can improve the quality of a woman's life no matter how long she has suffered or how old she is.*
- *Emphasis on EDs and related nutritional and body image problems as a major public health issue resulting in a shared and genuine commitment to prevention and access to care [41].*

Conclusions

Considerable evidence of increased disordered eating symptoms and body image preoccupation in women in middle age and later life are noted. Despite a reported rise in women seeking treatment at all levels of care in this population, to date, no specifically dedicated treatment programs are available for women with EDs in later life. Research on best practices for women with EDs at midlife and beyond is very limited. Health care providers are often unaware of these conditions and are inadequately trained in how to screen, access,

and deliver developmentally informed treatment for older women.

Compliance with Ethical Standards

Conflict of Interest Karen L. Samuels, Margo M. Maine, and Mary Tantillo each declare no potential conflicts of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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