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ABSTRACT

This review examines the enduring sex and gender disparities within biomedical research, clinical care, and health policy that impact how medical conditions are studied, diagnosed, and treated in women. Across the literature, the underrepresentation of women in clinical studies has fostered a limited understanding of sex-specific disease mechanisms and differences in treatment responses, while gaps in gynecological care have contributed to delayed diagnoses and reduced access to preventive services. These challenges are particularly apparent in conditions such as cardiovascular disease, endometriosis, breast cancer, and Alzheimer's disease, where differences in disease risk and progression remain insufficiently understood. Furthermore, research indicates that these experiences vary significantly across racial and ethnic groups, revealing that the aggregation of diverse populations potentially obscures critical subgroup disparities. Ultimately, this paper explores how biological, clinical, and social factors intersect to shape women's health and advocates for representative, equitable healthcare practices that recognize sex-informed clinical considerations and structural health barriers.

INTRODUCTION

For much of modern medicine, women were excluded from many clinical studies and received less attention in biomedical research despite substantial differences in how diseases

develop and present across the sexes. As a result, male physiology served as a universal baseline, leaving medicine ill-equipped to address sex-specific health needs. Although federal policies such as the NIH Revitalization Act of 1993 sought to correct this imbalance, the effects of this historical neglect remain embedded in research priorities, diagnostic practices, and medical education today. These shortcomings can have significant consequences, particularly when symptoms considered atypical in women are manifestations of disease that present differently from established male-centered patterns, potentially affecting both diagnosis and treatment response. Beyond biology, female patients do not experience healthcare in a uniform manner, with intersecting factors such as race, ethnicity, socioeconomic circumstances, and access to care deeply influencing clinical interactions and trust. Understanding these pervasive inequities requires moving beyond a generalized view of women's health and considering whether current research and healthcare practices adequately account for the diverse needs of women.

DISCUSSION

Sex and gender disparities remain pervasive across biomedical research, clinical care, and health policy. Despite policies such as the NIH Revitalization Act of 1993 mandating the inclusion of women in federally funded research, women continue to be underrepresented in clinical trials, resulting in male-centered diagnostic criteria and treatment guidelines (U.S. Department of Health and Human Services, 2025). These discrepancies are most prevalent in mental and neurological conditions, autoimmune disorders, and cardiovascular disease, where differences in disease presentation and biological responses are often overlooked. Because dosing and toxicity data have historically been drawn primarily from male subjects, women often experience higher rates of misdiagnosis, delayed treatment, and adverse health outcomes (Zucker

et al., 2020). For example, cardiovascular disease in women is frequently underrecognized because symptoms such as fatigue, nausea, and shortness of breath may not always align with traditional male-centric diagnostic criteria, contributing to delayed diagnoses and worse outcomes (Miller et al., 2011). These disparities cannot be understood through gender alone, as social determinants including race, socioeconomic status, insurance access, and gender identity all further define healthcare experiences. Additionally, biological factors such as hormonal transitions during puberty, pregnancy, the postpartum period, and menopause may influence vulnerability to certain conditions and present important opportunities for intervention (Greendale et al., 2012). Pregnancy-related neuroplasticity, for instance, can produce lasting changes in gray matter volume in the brain, while perimenopausal cognitive changes are associated with the regulatory effects of estrogen on neurotransmitter systems (Paternina-Die et al., 2024). Addressing these gaps requires a shift toward a translational science framework that integrates sex and gender as fundamental variables rather than as secondary considerations. This approach involves a multi-pronged strategy that includes increased accountability through sex-disaggregated reporting, improved medical education on the complexities behind sex-specific diseases, and analytical frameworks that account for the cumulative effects of the biological and social determinants of health. By prioritizing these structural changes, the medical community can move toward a more representative healthcare system where women's health conditions are appropriately recognized and treated.

Recent findings reveal that many young women in the United States face significant barriers to routine gynecological care, leading to reduced opportunities for early prevention and treatment. In a 2025 study published in *Women's Health Reports*, "Barriers to Routine Gynecological Care in Young Adult Females in the United States", Clark et al. examined barriers

and accessibility of well-woman examinations among women aged 18 to 30, arguing that financial, practical, procedural, and provider-related factors contribute to delayed care and infrequent check-ups. Survey results showed that 24% of women were never screened, 30% delayed screening for more than one year, and only 46% received on-time exams (Clark et al., 2025). Furthermore, lack of health insurance and provider-related factors, including patient discomfort during examinations, were among the barriers most strongly associated with delayed care. Adjusted logistic regression analyses indicated that women without health insurance had three times higher odds of delayed well-woman examinations (odds ratio [OR] = 3.07), while procedural barriers (OR = 1.22; 22% increased odds) and provider-related barriers (OR = 1.54; 50% increased odds) were significantly associated with delayed screening (Clark et al., 2025). These results suggest that improving access to affordable health insurance and strengthening provider training may enable more comfortable patient-provider interactions and increase screening rates among women. Overall, the study highlights how social and structural barriers continue to restrict access to routine wellness services and emphasizes the need for targeted interventions that improve healthcare access for women.

Nearly 10% of reproductive-age women are affected by endometriosis, yet they often experience a delay in diagnosis by seven to twelve years following the onset of symptoms (As-Sanie et al., 2019). The condition is characterized by the growth of tissue similar to the uterine lining outside the uterus, causing chronic pelvic pain, painful menstruation, infertility, and other debilitating symptoms. In their 2019 article published in the *American Journal of Obstetrics and Gynecology*, “Assessing Research Gaps and Unmet Needs in Endometriosis”, As-Sanie et al. attribute these diagnostic delays to the societal normalization of women’s pain and the stigma surrounding menstrual health. The authors report that nearly 75% of patients

initially receive a misdiagnosis and make an average of seven visits to a primary care provider before being referred to a specialist (As-Sanie et al., 2019). The study also highlights that endometriosis remains underfunded and under-researched despite its high economic burden, amounting to an estimated $69.4 billion annually in excess health expenditures in the United States, with direct medical costs of about $12,118 per patient per year (As-Sanie et al., 2019). These findings illustrate how clinical gender bias and the lack of noninvasive diagnostic tools directly impede timely care. To address these issues, the authors advocate for patient-centered, interdisciplinary treatment, increased research funding, improved provider education, and greater public health awareness (As-Sanie et al., 2019). Bridging these research, clinical, and educational gaps is essential to improving long-term quality of life and health equity for women affected by endometriosis.

These disparities also vary across racial and ethnic populations, underscoring the importance of examining women's health experiences within specific communities. Over the past decade, research examining the mistreatment of Black women in medical settings has increased significantly. Recent studies suggest that health disparities persist for Black women not solely due to negligence but also because of systemic inequities that shape their experiences within the healthcare system. In their 2022 NIH study, "'We're Not Taken Seriously': Describing the Experiences of Perceived Discrimination in Medical Settings for Black Women", authors Washington and Randall examine how systemic bias and intersectionality influence the healthcare experiences of Black women, particularly in the context of cervical cancer prevention. The authors argue that barriers commonly associated with women's health, including limited access and inadequate health education, are further intensified for Black women by the intersecting effects of race and gender (Washington & Randall, 2022). This unique position

creates a “feedback loop” in which perceived discrimination contributes to medical mistrust, leading many women to adopt heightened self-advocacy and vigilance when navigating clinical settings. The study revealed that 94% of participants reported receiving poorer quality of service due to race or gender, while 92% felt that their concerns were dismissed or ignored by providers, resulting in a high average discrimination score of 22.6 out of 30 (Washington & Randall, 2022). Despite these findings, 75% of participants remained current on cervical cancer screenings, and 89.6% had visited a healthcare provider within the year (Washington & Randall, 2022). These results indicate that participants are not avoiding healthcare altogether, but are instead adopting “vigilant coping” strategies, such as extensively preparing for appointments and actively advocating for themselves during clinical encounters (Washington & Randall, 2022). To address these disparities, the authors emphasize the need for systemic reforms, including interventions to reduce provider bias and foster patient-provider trust. Collectively, this research underscores the importance of improving the quality of medical encounters themselves, ensuring that Black women’s experiences and concerns are consistently recognized within the healthcare system rather than requiring self-advocacy alone to overcome these barriers.

Studies of breast cancer in Asian women often aggregate a highly diverse population into a single homogeneous group, overlooking important differences in ethnicity, language, socioeconomic status, and healthcare access. A 2022 study published in the *International Journal of Environmental Research and Public Health* argues that combining all Asian populations into one category hides significant disparities in breast cancer risk, screening, and health outcomes. The authors note that Asian women have lower mammography screening rates than other racial groups, with 72% of Asian women in California reporting screening compared to 81% of non-Hispanic White women and 83% of African American women (Fane et al., 2022).

However, among Korean women, only 52% reported receiving a mammogram within the past two years (Fane et al., 2022). Breast cancer may also present up to 20 years earlier in Asian women compared with non-Hispanic White women, with diagnoses often occurring around ages 40 to 50 and 60 to 70, respectively (Fane et al., 2022). Asian women also tend to have denser breast tissue, which is associated with a greater incidence of breast cancer and additional challenges for detection (Fane et al., 2022). Some Asian ethnic groups experience longer delays between surgery and radiation therapy, lower utilization of hypofractionated radiation and hormone therapy, and higher treatment costs, which may contribute to poorer outcomes (Fane et al., 2022). While the study highlights an understudied population and provides compelling evidence of disparities across breast cancer care, further research is needed to understand the underlying causes of these differences. In particular, future research should analyze specific Asian ethnic groups separately to better identify unique risks, treatment barriers, and healthcare needs. These findings demonstrate the need for disaggregated breast cancer research alongside comprehensive and culturally sensitive strategies to address health disparities in this population.

There exist persistent gaps in women's health research and clinical care, revealing how deeply societal and structural inequalities continue to impact health outcomes. Thus, it becomes increasingly important to integrate a more inclusive, evidence-based approach to healthcare. The 2024 article, "Women and the Risk of Alzheimer's Disease", highlights the historical underrepresentation of women in biomedical research, resulting in a significant lack of knowledge surrounding sex-specific disease mechanisms, risk factors, and treatment responses, which can contribute to diagnostic delays, less effective treatments, and poorer health outcomes in conditions that disproportionately affect women. This gap is particularly evident in the study and treatment of Alzheimer's disease, which affects more than 5.5 million Americans,

approximately two-thirds of whom are women (O' Neal, 2024). The article finds that women are disproportionately affected by Alzheimer's disease, possessing both a higher lifetime risk and more rapid cognitive decline compared to men (O' Neal, 2024). Despite this, the article emphasizes the lack of research into the biological, hormonal, and social factors that contribute to the higher rates of Alzheimer's disease in women (O' Neal, 2024). Potential biological and psychosocial factors include APOE4 genetic risk, telomere shortening, hormonal changes, pregnancy-related complications, higher rates of depression and insomnia, and differences in cognitive reserve (O' Neal, 2024). Significant gaps also stem from both the underrepresentation of women in Alzheimer's research and structural barriers to care, including delayed diagnosis, gendered assumptions about aging, and inconsistencies in clinical care (O' Neal, 2024). The authors also posit that women's longer average life span is often used to explain their higher prevalence of Alzheimer's disease. However, the article emphasizes that longevity alone does not fully account for sex-based differences in disease risk and progression (O' Neal, 2024). Despite the wealth of clinical data suggesting that women are disproportionately affected, research and clinical practice have not consistently integrated sex- and gender-based perspectives. Addressing these gaps through more inclusive research and clinical practices is essential to improving women's quality of life, supporting their ability to manage this debilitating disease, and ensuring better long-term outcomes.

CONCLUSION

The evidence presented throughout this paper demonstrates that the disparities in women's health are not isolated instances, but rather interconnected consequences that can be traced to how women have been historically studied and treated in medicine. The gaps include a limited understanding of sex-specific disease mechanisms, differences in treatment responses,

and barriers to preventive and diagnostic care. Progress therefore depends not only on incorporating more nuanced approaches to data collection and research, but also on ensuring that existing knowledge is effectively translated into clinical practices that actively reflect the populations being served. Future work should continue investigating underrepresented conditions and populations while examining whether proposed changes actually translate into improved patient outcomes. Ultimately, closing the gaps in women's health requires both medical professionals and researchers to ensure that patient experiences, comfort, and individual needs are fully accounted for when developing a more thoughtful approach to standard care.

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