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Review Article

Revolutionizing Women's Healthcare: Gender-Sensitive Approach for Women's Better Healthy Future

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ABSTRACT

This novel approach recognizes that healthcare is not a one-size-fits-all endeavor and aims to tailor treatment plans and interventions according to gender and sex. Many people are aware that certain diseases and diagnoses are exclusive to one sex such as ovarian or prostate cancer. While that's true, there are health care issues that affect both sexes but receive different treatment, sometimes radically so. However, there are many subtle and distinct differences in anatomy, physiology, and metabolism in body parts shared with men. Women's hearts, brains, and hormones react differently to diagnostic tests, medications, and other treatments compared to men. The term "Bikini Medicine" describes a cutting-edge method of healthcare delivery that emphasizes tailored and comprehensive care while encouraging patient autonomy and empowerment. This phrase, which takes its name from the well-known bikini, emphasizes the value of embracing uniqueness, self-assurance, and self-expression in the medical community. Women do have diseases, disorders, and diagnoses that are specifically related to female organs like their breasts, ovaries, and uterus. Women's health is not simply the bits that are covered by a bikini. By creating ideas and methods designed to give individuals a more active say in revolutionizing women's healthcare. Even though legislation calls for more females to be included in rigorous pharmaceutical, scientific, and medical device studies, there still are not enough females represented. These differences may cause disability, deformity, and even death for some women. Health forms routinely ask for sex and/or gender right next to the name, birthday, and address. Both sex and gender have an impact on healthcare access and treatment. This approach may involve incorporating complementary and alternative therapies, addressing lifestyle factors, and considering social determinants of the traditional healthcare landscape leading to improved women patient outcomes and satisfaction.

Keywords: Women's healthcare, Comprehensive care, Tailor treatment, Women's patient outcomes.

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INTRODUCTION

This approach can enhance patient satisfaction, improve adherence to treatment plans, and ultimately result in women's better health outcomes. Bikini Medicine is a term that has emerged in the field of healthcare, representing a novel approach to medical practice that focuses on personalized and comprehensive care while promoting patient autonomy and empowerment. Inspired by the iconic bikini swimsuit, this concept symbolizes the importance of embracing individuality, confidence, and self-expression in the realm of medicine.[1] Traditionally, healthcare has often followed a standardized and one-size-fits-all approach, where patients are seen as passive recipients of medical advice and interventions. It emphasizes the significance of tailoring healthcare delivery to meet individual needs, moving away from a rigid approach towards a more personalized and patient-centred model.[2] Moreover, the gender-sensitive approach extends health beyond the physical aspects, taking into consideration the psychological, emotional, and social well-being of individuals. It recognizes the interconnectedness of these dimensions with overall health and highlights the importance of a holistic approach to care. This may involve integrating complementary and alternative therapies, addressing lifestyle factors, and considering social determinants of health.[3] The concept represents a significant shift in the traditional healthcare landscape. By embracing individuality, autonomy, and comprehensive care, it has the potential to transform healthcare delivery and improve patient outcomes and satisfaction. This paper will explore the principles and practices of health care, its impact on patient care, and the potential implications for the future of medicine.[4] The implementation of this approach can lead to numerous benefits for women's health. Providing personalized care and involving women as active participants in their healthcare, also contributes

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to women's empowerment and autonomy by giving them agency in making informed decisions about their bodies and healthcare journeys.[5] This Paper will explore the principles and practices of Medicine and its implications for women's health. By shedding light on this innovative approach, we can pave the way for a future where women receive comprehensive, personalized, and empowering women's healthcare.[6]

Women's physiology is different and their disease experiences of many conditions can be different than Men

Women's physiology differs from men's in various ways, leading to differences in disease experiences and responses to treatments.[7] Cardiovascular disease serves as a notable example where gender disparities exist. While heart disease is commonly associated with men, it is the leading cause of death among women worldwide. Women often present with different symptoms, such as atypical chest pain, and diagnostic tests may not be as accurate for women as they are for men.[8] Autoimmune diseases also demonstrate sex-based differences in prevalence and symptomatology. Conditions like rheumatoid arthritis, multiple sclerosis, and systemic lupus erythematosus predominantly affect women.[9] Women are more likely to experience depression and anxiety disorders, while men have higher rates of substance abuse and certain externalizing disorders. Hormonal fluctuations throughout a woman's life, such as during puberty, pregnancy, and menopause, contribute to these differences and should be considered when providing mental healthcare.[10] Research on breast cancer has led to significant advancements in personalized treatments, highlighting the importance of sex-specific research in oncology.[11] Integrating sex-specific considerations into medical research, clinical practice, and healthcare policies can lead to improved diagnosis, treatment, and outcomes for both women and men.

Reluctance to include Women in Clinical Trials

Reluctance to include women in clinical trials has had significant consequences on women's health outcomes and has hindered our understanding of sex-specific differences in disease manifestation and treatment response.[12] One factor is the concern about potential harm to women of childbearing age and the potential risks to the fetus. Additionally, the menstrual cycle and hormonal fluctuations in women were considered confounding factors that could complicate study results, leading to the exclusion of women from research studies.[13] Bias and the generalization of research findings from male participants to female populations have resulted in gaps in knowledge about sex-specific differences in disease presentation, progression, and treatment response.[14] The U.S. Food and Drug Administration (FDA) and other regulatory bodies now require the inclusion of women in clinical research to ensure the safety and effectiveness of treatments for both genders. The NIH Revitalization Act of 1993 mandated the inclusion of women in NIH-funded clinical trials,[15] Increased representation of women in research studies will provide better evidence-based care and enhance our understanding of gender-specific differences in disease prevention, diagnosis, and treatment.[16]

Women's Pain and Fatigue symptoms are not taken as seriously as Men

Women's symptoms of pain and fatigue are often not taken as seriously as men's, leading to potential disparities in diagnosis, treatment, and overall healthcare outcomes.[17] Gender bias and stereotypes can play a role in the perception of women's symptoms. Societal beliefs and stereotypes may lead to the dismissal or downplaying of women's pain and fatigue, attributing their symptoms to emotional factors or as being "all in their head."[18] Pain and fatigue can be complex and multifactorial, often overlapping with other conditions. Furthermore, traditional diagnostic criteria and assessment tools may not adequately capture the unique manifestations and severity of pain and fatigue in women.[19] Women may face challenges in articulating their symptoms and concerns, Encouraging open dialogue, active listening, and providing a supportive environment can facilitate effective communication and empower women to advocate for their healthcare needs.[20] Healthcare providers should be trained to recognize and validate women's experiences of pain and fatigue, employing a holistic and individualized approach to assessment, diagnosis, and treatment. Incorporating gender-specific considerations into medical education and guidelines can help raise awareness and improve the quality of care provided to women.[21]

Hormonal Deficiency impacts women's menopause symptoms, Such as Hot flash, Weight gain, Bone Density etc

Hormonal deficiency during menopause can have a significant impact on women's health, leading to various symptoms such as hot flashes, weight gain, and changes in bone density. Understanding the hormonal changes that occur during menopause and their effects on women's bodies is crucial for providing appropriate care and management of menopausal symptoms.[22] Menopause is a natural biological process marking the end of reproductive years in women. Estrogen and progesterone, are two key hormones involved in regulating various physiological processes. The hormonal imbalance during menopause can contribute to a range of symptoms and health changes experienced by women.[23] Most common symptoms of menopause are hot flashes, characterized by sudden waves of heat, flushing, and sweating caused by the fluctuation and decline in estrogen levels. Hot flashes can vary in intensity and frequency, affecting the quality of life and sleep patterns of women during the menopausal transition.[24] Hormonal changes during menopause can also impact metabolism and contribute to weight gain. A decline in estrogen levels may affect fat

distribution, leading to an increase in abdominal fat. impact appetite regulation and energy expenditure,[25] Estrogen plays a vital role in maintaining bone health by regulating bone turnover and calcium balance it also results in accelerated bone loss and increased risk of osteoporosis, a condition characterized by reduced bone density and increased susceptibility to fractures.[26]

Women's Alzheimer's disease differs from Men

Women may experience Alzheimer's disease differently than men, both in terms of prevalence and clinical presentation.[27] Women make up nearly two-thirds of individuals living with Alzheimer's disease worldwide. This difference in prevalence has been attributed to various factors, including age, genetic predisposition, hormonal influences, and sex-specific risk factors.[28] Women tend to show a higher incidence of memory impairment, which is a hallmark symptom of Alzheimer's disease. These differences suggest potential variations in underlying disease mechanisms and patterns of brain pathology between genders.[29] Estrogen is believed to have a neuroprotective effect, promoting synaptic plasticity and neuronal survival. The loss of estrogen in women during menopause may contribute to an increased vulnerability to Alzheimer's disease pathology.[30] Apolipoprotein E (APOE) gene, a known genetic risk factor for Alzheimer's disease, may have varying effects on men and women. Studies have shown that the APOE ε4 allele is associated with a higher risk of Alzheimer's disease in women compared to men. Women may exhibit a higher burden of Alzheimer 's-related brain pathology, such as beta-amyloid plaques and tau tangles.[31]

Menopause transition and heart disease risk

Menopause transition, marked by the cessation of ovarian function and hormonal changes, emerging evidence suggests that this transitional period may be associated with an increased risk of heart disease.[32] Estrogen has several cardioprotective effects, including promoting healthy blood vessel function, reducing inflammation, and improving lipid profiles. The decrease in estrogen levels during menopause may contribute to unfavourable changes in cardiovascular risk factors.[33] Changes include an increase in total cholesterol, LDL cholesterol, and triglyceride levels, as well as alterations in glucose metabolism and blood pressure regulation. These shifts in risk factors may contribute to the higher incidence of cardiovascular events observed in postmenopausal women.[34] Vasomotor symptoms, such as hot flashes and night sweats, are associated with increased cardiovascular risk. Women who experience more frequent and severe vasomotor symptoms may have a higher risk of hypertension, endothelial dysfunction, and adverse changes in lipid profiles.[35] Lifestyle modifications, including regular physical activity, a heart-healthy diet, smoking cessation, and stress reduction, play a significant role in reducing cardiovascular risk and individualized approaches, such as hormone therapy and cardiovascular medications.[36]

Less funding is allocated towards research of women's disease than men's disease

There is a significant disparity in research funding allocated towards women's diseases compared to men's diseases this leads to gaps in knowledge, limited treatment options, and unequal healthcare outcomes.[37] Medical research has focused predominantly on male populations, leading to a bias in knowledge and understanding of diseases that primarily affect women. This bias has resulted in limited funding for research on women's specific health conditions, such as reproductive health, breast cancer, autoimmune diseases, and gynaecological disorders.[38] Biases and stereotypes may influence funding decisions, perpetuating the belief that men's health issues are more important or relevant. Limited evidence base for women's health, leading to a perceived lack of urgency in funding research on women's diseases.[39] Insufficient funding for women's health research has real-world consequences for healthcare outcomes. It hampers the development of innovative diagnostic tools, therapies, and preventive strategies tailored to women's unique needs. Furthermore, the lack of research and evidence-based guidelines can result in misdiagnosis, inadequate treatments, and suboptimal healthcare delivery for women.[40] Advocacy groups, policymakers, and researchers are raising awareness about the importance of gender equity in research and healthcare. Initiatives, such as the National Institutes of Health (NIH) policy requiring consideration of sex as a biological variable in research, aim to improve the representation of women in research studies and ensure that sex-specific factors are adequately addressed.[41]

Increase research on sex differences in cardiovascular disease

Women may experience unique risk factors such as hormonal fluctuations, pregnancy-related complications, and autoimmune diseases that influence their cardiovascular health.[42] By Understanding the unique symptomatology in women, healthcare providers can develop better diagnostic algorithms and guidelines that consider sex-specific indicators.[43] Sex differences in cardiovascular disease will help close the knowledge gap and address the historical underrepresentation of women in cardiovascular research. This approach will provide a more comprehensive understanding of the disease mechanisms, identify novel biomarkers, and develop targeted therapies based on sex-specific factors.[44]

Increase research on sex disparities in STEMI and other disease

Specific diseases such as ST-Elevation Myocardial Infarction (STEMI), have gained recognition as an important area of research. This article highlights the significance of increasing research on sex disparities in STEMI and other diseases,[45] Women experiencing STEMI may face delays in diagnosis due to atypical symptoms and under-recognition of cardiac symptoms in women.

Moreover, they may receive less aggressive treatments, leading to higher mortality rates compared to men.[46] Hormonal factors, differences in plaque morphology, microvascular dysfunction, and genetic variations may play a role.[47] Increased research on sex disparities in STEMI and other diseases has the potential to improve healthcare outcomes for all patients like reducing mortality rates, optimizing quality of life, and promoting gender equity in healthcare.[48]

Need for a gender-sensitive approach to brain and mental disease

Women may have a higher prevalence of certain mental health disorders, such as depression and anxiety, while men may exhibit a higher incidence of neurodevelopmental disorders, such as autism spectrum disorders. This neglect of sex as a biological variable in drug research and development has potentially led to a knowledge gap, hampering the effectiveness and safety of medications for both men and women. Sex differences encompass biological variations between males and females, including differences in anatomy, physiology, genetics, and hormone levels. These dissimilarities can influence the absorption, distribution, metabolism, and excretion of drugs, as well as their pharmacodynamics and pharmacokinetics. Researchers may inadvertently overlook critical factors that impact drug efficacy and safety for different sexes like potential hormonal fluctuations and reproductive considerations. Consequently, the safety and efficacy of drugs were primarily established based on the responses observed in men. This approach, known as "one-size-fits-all" medicine, has disregarded potential gender-specific differences, leading to suboptimal treatments for women and potentially adverse effects for both sexes. Regulatory agencies, such as the U.S. Food and Drug Administration (FDA) and the European Medicines Agency (EMA), have implemented guidelines to encourage the inclusion of both sexes in clinical trials. These initiatives improve the understanding of gender-specific differences in drug response and guide personalized treatment approaches. Differences in drug metabolism, renal function, body composition, and hormone levels can impact drug clearance rates and therapeutic outcomes. Furthermore, gender-specific adverse drug reactions and side effects have been reported, Recognizing sex differences in drug development has broader implications for advancing precision medicine, which aims to provide personalized treatment strategies based on an individual's unique characteristics. Incorporating sex as a biological variable allows for more tailored drug dosing, improved therapeutic efficacy, reduced adverse events, and enhanced overall patient care.[49]

Need for gender-specific therapeutic target

Cardiovascular disease, autoimmune disorders, and certain types of cancer demonstrate different prevalence rates and manifestations in males and females. Understanding gender-specific differences in disease biology opens doors to developing targeted therapies that account for divergent molecular pathways, signaling cascades, and cellular responses between sexes this leads to more effective interventions by addressing unique disease mechanisms present in males and females. Females generally exhibit stronger immune responses to infections and vaccinations, leading to enhanced resistance against certain pathogens. Conversely, males often display a higher susceptibility to infectious diseases and are more prone to developing severe symptoms this contributes to differences in immune cell populations, cytokine production, and immune signaling pathways. Tailoring treatments based on these targets may enhance treatment response rates, minimize drug resistance, and optimize dosing regimens underlying mechanisms that drive gender-related differences in disease. This knowledge can aid in understanding the role of sex hormones, genetic factors, and gender-specific gene expression patterns in disease pathogenesis.[14]

Parkinson's disease affects women differently than men

Parkinson's disease, a neurodegenerative disorder affecting movement and cognition, exhibits variations in symptomatology, response to treatment, and overall disease trajectory between the sexes. Parkinson's disease is a progressive neurological disorder characterized by motor symptoms such as tremors, rigidity, and bradykinesia, as well as non-motor symptoms affecting cognition, mood, and autonomic function. Estrogen, the primary female sex hormone, may exert a neuroprotective effect, potentially delaying disease onset or reducing symptom severity in women. Conversely, androgens, such as testosterone, have been associated with an increased risk of developing Parkinson's disease in men. Genetic mutations and variations also play a role, with some gene variants showing differential effects on disease susceptibility and progression between the sexes. Hormonal changes during pregnancy, menopause, and hormonal contraceptive use, can influence the onset and progression of Parkinson's disease. Fluctuations in estrogen and progesterone levels during these phases may contribute to differences in symptom severity and treatment response. women with Parkinson's disease may experience exacerbation or improvement of symptoms during specific phases of their menstrual cycle. Women with Parkinson's disease tend to have a higher prevalence of tremor-dominant motor symptoms, while men more frequently exhibit bradykinesia and rigidity as primary symptoms. Non-motor symptoms, such as depression, anxiety, and cognitive impairments, may also differ in prevalence and severity between the sexes. Women may require different dosages or adjustments in medication regimens due to variations in drug metabolism and distribution and co-morbidities and concurrent medication use can impact treatment outcomes differently in women compared to men. LRRK2 gene mutation, a common genetic risk factor for PD, may have a greater impact on disease risk in women. Epigenetic modifications, such as DNA methylation patterns, may also differ

between the sexes and influence PD susceptibility and severity. Women with PD often have a higher burden of co-morbidities, such as depression and osteoporosis, which may impact treatment outcomes differently compared to men. Personalized treatment strategies considering these gender-specific factors can improve therapeutic efficacy and patient outcomes so research is necessary to unravel the underlying mechanisms and develop targeted interventions that consider the unique needs of both women and men living with PD.[50]

Alzheimer's disease affects women differently than men

Gender disparity in prevalence may be attributed to a combination of biological, genetic, and hormonal factors, as well as differences in lifespan and longevity. Understanding the higher incidence of AD in women is crucial for developing targeted prevention strategies and improving early detection and intervention. Changes in hormone levels during menopause and postmenopausal years may influence AD risk and progression. Genetic variations, including the presence of the apolipoprotein E (APOE) ε4 allele, are associated with increased AD risk, and the effects of these genetic factors may differ between women and men.[27] Women with AD tend to have a higher prevalence of memory impairment and verbal deficits, while men may experience more visuospatial and executive function deficits. Additionally, studies suggest that women may experience a faster rate of cognitive decline and progression from mild cognitive impairment to AD.[31] Women may be more susceptible to certain cardiovascular risk factors, which could contribute to their higher risk of developing AD. Furthermore, women with AD are more likely to have co-morbid conditions such as depression and anxiety, which can impact their overall well-being and disease management.[51] Recognizing and addressing these social and cultural factors are essential for promoting equitable care and support for individuals affected by AD. Understanding the unique impacts of AD on women and men is vital for early detection, accurate diagnosis, and tailored interventions.

Example of some drugs that affect women differently than men

Pharmacological treatments can exhibit variations in efficacy, safety, and side effects between women and men. Understanding these gender-specific differences is crucial for optimizing drug therapy and improving patient outcomes. Antidepressant medications, such as Selective Serotonin Reuptake Inhibitors (SSRIs), have demonstrated gender-specific effects. Women tend to have higher response rates to SSRIs compared to men in the treatment of depression. Women may experience different side effects, including weight gain, sexual dysfunction, and increased risk of serotonin syndrome.[52] Statins, commonly prescribed for lowering cholesterol levels and reducing cardiovascular risk, have demonstrated gender-specific differences in their effects. Research suggests that women may experience a greater reduction in Low-Density Lipoprotein (LDL) cholesterol levels compared to men when treated with statins. Moreover, women may have a higher risk of developing statin-related myalgia (muscle pain) and myopathy,[53] Antiarrhythmic drugs used for the management of cardiac arrhythmias have demonstrated gender-related differences in response and adverse events. Women may require lower dosages of certain antiarrhythmic medications, such as flecainide and sotalol, due to differences in drug metabolism and distribution. Additionally, women may have an increased risk of developing drug-induced long QT syndrome, a potentially life-threatening cardiac condition associated with certain antiarrhythmic drugs.[54] Gender-specific differences necessitate individualized approaches to drug prescribing, considering factors such as hormonal fluctuations, metabolism, body composition, and genetic variations. Zolpidem, a sedative-hypnotic medication used for the treatment of insomnia has more severe side effects in women than men. Evidence suggests that zolpidem may exhibit gender-specific differences in side effects, with women experiencing more severe adverse reactions compared to men. One of the most notable gender differences is related to next-day impairment, such as drowsiness, dizziness, and impaired psychomotor function. Research indicates that women tend to have higher blood concentrations of zolpidem after taking the same dose as men, leading to increased residual effects and impaired daytime functioning.[55] Hormonal Influences: fluctuations in hormone levels, such as estrogen and progesterone, throughout the menstrual cycle and during pregnancy, can influence the metabolism and clearance of zolpidem May contribute to differences in drug response and sensitivity to side effects among women.[56] Further differences in body composition, metabolism, and genetic variations women generally have a higher percentage of body fat and lower lean body mass compared to men, which can affect drug distribution and elimination. Additionally, metabolic enzymes involved in zolpidem metabolism may exhibit gender-specific variations, further influencing drug kinetics and response.[57]

CONCLUSION

Examination of various aspects such as cardiovascular disease, cancer, osteoporosis and other diseases increased in recognition of the importance of sex and gender differences in medical research. The field of gender-specific medicine has emerged, aiming to tailor healthcare based on biological, social, and cultural factors specific to women. Also increasing the representation of women in clinical trials and research studies can lead to more precise and effective healthcare interventions that address the unique needs of women. This innovative concept focuses on personalized and comprehensive care while empowering women with autonomy in their healthcare decisions. Bikini Medicine symbolizes the importance of embracing individuality, confidence, and self-expression in the pursuit of women's

well-being. Traditionally, women's health has often been subject to various challenges, including gender biases, lack of personalized care, and limited access to healthcare resources. However, by adopting a patient-centred approach, this model encourages open communication, shared decision making and collaborative partnerships between women and healthcare providers. It promotes holistic care that extends beyond traditional medical interventions to encompass lifestyle factors, mental health support, and addressing social determinants of health specific to women.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

FDA: Food and Drug Administration; **NIH:** National Institutes of Health; **APOE:** Apolipoprotein E; **LDL:** Low Density Lipoprotein; **STEMI:** ST-elevation myocardial infarction; **EMA:** European Medicines Agency; **PD:** Parkinson's disease; **LRRK2:** Leucine Rich Repeat Kinase 2; **AD:** Alzheimer's disease; **SSRI:** sselective serotonin reuptake inhibitors.

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