Review Article

Interventional Cardiology

Gender competence in medicine

Abstract

Since the previous century, gender mainstreaming has been attempting to gain a foothold in our culture. The goal is to achieve gender equality at all societal levels, enforcing the equal status of all genders. However, the so-called 'gender gap' is still evident in many areas, including medicine with the 'gender health gap'.

The evidence shows that men continue to be at the center of (medical) research, with an androcentric worldview and strong binary thinking persisting. This has severe consequences for medicine, often leading to misdiagnoses or delayed diagnoses for other genders: heart diseases in women are frequently not recognized or identified too late. Pain is more often unjustifiably diagnosed as psychosomatic in women, as they are perceived as sensitive and emotional from a young age. Non-binary individuals are almost entirely absent in medical research.

Medical insights into gender differences are relevant to all healthcare professions, as symptoms need to be interpreted and treated in a gender-sensitive manner to rule out contraindications and provide fast and correct treatment.

Keywords: Sex • Gender • Gender health gap • Pain • Heart disease

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Introduction

The concept of gender in medicine

Since the dawn of time, humanity's understanding of gender has undergone significant changes. In antiquity, the so-called one-gender model prevailed, with clearly defined binary roles: Men were considered anatomically perfect, while women were seen as an inferior version of men, often described as soft and weak [1]. During this period, no distinction was made between male and female reproductive organs; the Roman physician Galen regarded all genitals as identical, differing only in their anatomical position due to a lack of heat in females. For example, ovaries, the uterus, and the vagina were interpreted as "inverted" testes, scrotum, and penis until the 17th century [2]. Newborns who did not fit into the binary thinking of antiquity-where the perfect man was the single gender and women were an imperfect deviation-were often drowned out of fear of impending misfortune [3].

This mindset and Galen's teachings persisted into the modern era and Renaissance and were only gradually dismantled during the Age of Enlightenment. The separation of body and mind enabled the first efforts toward gender equality in society and led to a focus on physiological and anatomical differences between genders. As a result, a binary gender order, strictly differentiating men and women, solidified in the 19th century.

The unclear biological development of reproductive organs was much debated in the 18th century, with philosopher Georg Wilhelm Friedrich Hegel pioneering research in this field. People with unclear sexual development were often labeled as 'malformations',

excluded from legal texts, and forcibly assigned to one of the two known genders, male or female, by medicine in the 18th and 19th centuries [4].

At the beginning of the 20th century, Richard Benedict Goldschmidt emphasized the importance of chromosomal distribution, particularly the X chromosome, for sexual determination [5]. This idea was also explored by Fausto-Sterling [6], who, in her much-discussed article called for alternative gender systems beyond binary thinking [7].

Today, the following categories are agreed upon as significant for sex determination in medical and biological research: The sociologically influenced distinction between 'sex' and 'gender' has also been integrated into medical thinking. The WHO proposes a classification into female, male, and intersex [7].

Some European legal systems have recognized that 'sex' and 'gender' exist independently of each other. Constitutional courts in Austria and Germany for example decided in 2017. Germany and 2018 Austria to allow the entry of a third gender in civil status registers and documents. In the U.S., this step was taken in 2021. The terms "diverse," "inter," or "open" are suggested, as proposed by bioethics commissions [8]. The classification into only two or three genders is now considered outdated in both biological and sociological research, reflected in cultural practices such as gender-sensitive and neutral language and pedagogy [9].

Literature Review

Gender in medicine

In the 1990s, gender-specific thoughts were revisited as a subfield of personalized medicine. Gender medicine (or gender-sensitive medicine) now aims to precisely research and treat diseases concerning gender-specific differences on biological, psychological, and sociocultural levels [10,11]. These specific factors include, on a biological level, body size, weight, hormonal cycles, percentage of body fat, and muscle mass. On a psychological level, this is complemented by emotionality, empathy, and coping with affects. Sociocultural health determinants include education, social norms, financial resources, religion, ethnic background, and sexual orientation [12].

These potential gender-specific differences and the gender health gap extend across the entire medical diagnostic and treatment process. Women's complaints and pain are generally more often categorized as emotional and psychosomatic than those of men [13]. A 2021 study by Harvard University found that women are prescribed antidepressants two and a half times more often than men, even when they do not suffer from depression [14]. Non-binary people are almost absent in these studies. Due to a lack of awareness of gender-sensitive differences in specific disease symptoms, physical causes of pain are often not sought further, and the psyche is diagnosed as the source of problems.

Gender-relevant differences in medicine: Heart diseases and pain

One of the most critical topics in the gender health gap is heart disease. Although myocardial infarction and Coronary Heart Disease (CHD) are still often perceived as a male disease, it is now known that all people are equally susceptible to so called heart attacks and CHD [15]. The British Heart Foundation stated in 2019 that CDH kills more than twice as many females in the UK as breast cancer with being the biggest death cause for women worldwide [16]. Physicians and therapists overlook or misinterpret pathologies due to a lack of awareness of gender-sensitive differences and deviations [17]. The known symptoms of a myocardial infarction are severe pain or a feeling of pressure in the chest, often more pronounced on the left side, radiating pain in the left arm, and shortness of breath [18]. However, women often do not describe this symptom complex or do so alongside other signs indicative of heart problems. These include severe discomfort, nausea or vomiting, sweating, dizziness, pain on the right side of the chest radiating to the right arm, upper abdominal pain, and, above all, unusual and severe fatigue. Additionally, they may complain of pain between the shoulder blades, in the jaw area, upper back, or abdomen [19]. Depression is also cited as a possible precursor to a myocardial infarction in women. Young female patients are particularly at risk, as the British Medical Journal reported in a 2016 study: due to their age, heart problems are not suspected and thus overlooked [20]. This phenomenon the misrecognition of symptoms in non-male individuals-is also referred to as the "Yentl Syndrome," named after a film starring Barbara Streisand [21]: The initial diagnosis for women with CHD and further on myocardial infarction is 50% higher to be wrong than for men [22].

Another example of insufficient research into gender-specific diseases is the so-called Broken Heart or Takotsubo Syndrome, which occurs much more frequently in women, especially after menopause. The term "Broken Heart Syndrome" highlights the deep-rooted androcentric worldview in medical terminology, where women are perceived as more emotional (historically even hysterical [23]), and symptoms are often attributed to this emotionality. Christiane Tiefenbacher, chief cardiologist and member of the scientific advisory board of the German Heart Foundation, describes the disease, which is fatal in 5% of cases, as follows: The symptoms show clearly visible cardiological changes in the ECG, but their cause is not a blocked coronary artery, as typically occurs in a heart attack. An emotionally stressful event precedes this change in the sensitive coronary vessels, metaphorically 'breaking' the heart. According to Tiefenbacher, emotional stress raises cortisol levels in the blood, causing the fine coronary vessels to constrict, leading to microspasms that prevent

blood from flowing through the vessels [24]. The complex etiology of this disease remains unclear; due to the emotional trigger, it is often referred to as "stress cardiomyopathy," and its treatment is still based on the exclusion principle [25].

Kate Bratt-Farrar, CEO of Heart Researcher UK, clearly points out that "We need your help to remove the gender inequalities in heart attack diagnosis and treatment" also turning to women encouraging them to take the necessary steps towards prevention with regularly checking their blood pressure, cholesterol levels and putting the focus on other risk factors like family history, smoking and hormonal changes [26].

Significant gender health gaps are also evident in pain and pain syndromes, influencing us early in life. Pain behavior is heavily shaped by binary gender norms with male and female from an early age [27]. Pain scales measure pain influenced by social gender [28]. From early childhood, people are socialized into binary gender norms dictating how they respond to and cope with pain [29]. Myers, et al., [22], suggest that boys and men are taught to be strong and endure pain, whereas women are encouraged to verbalize and be sensitive to pain. Men minimize pain perception and seek less help, while women are more attuned to and expressive about pain and more open to medical and therapeutic support [30]. In addition to psychosocial differences in dealing with pain, there are also biological differences underlying pain. As early as 1993, the Journal of the International Association for the Study of Pain (IASP) reported differences between genders regarding pain [31]. Biological origins for gender-specific differences in pain perception, description, and coping strategies include genetic factors, hormonal divergences, and differences in pain mediators in the body [32]. This suggests links between hormones and pain mediators [33]. The female body is influenced by the menstrual cycle, pregnancies, and often the use of contraceptives [34]. Studies show that 15% of the population suffers from migraines-girls are more frequently affected in puberty, and in adulthood, the number of female migraine patients rises to three to four times that of men. The attacks are often more severe, and recovery time is longer, attributed to the hormones progesterone and estrogen. Women are also generally more affected by chronic pain.

Since 79% of the animals used in medical pain research are male, much remains unresolved. To better understand the construct of pain, it is necessary to examine biological and sociological gender differences more closely. If pain continues to be predominantly tested on male organisms, certain pains seem non-existent and are more likely attributed to psychological origins, rendering women's complaints invisible and thus neither timely nor correctly treated.

Conclusion

To recognize medical conditions and exclude contraindications for treatment, it is necessary to consider gender-specific differences in the anamnesis, as these are reflected in the presentation of symptoms and pain. The previously discussed divergent symptoms of heart attacks must be integrated into medical anamnesis, diagnosis, and treatment to ensure the best possible care for all patients. Additionally, in pain anamnesis, it is significant to respect gender differences to avoid overlooking any pain-inducing structures or conditions in the differential diagnosis or prematurely labeling patients as psychosomatic without adequately exploring physical causes in the diagnostic process.

In modern medicine, the unity of mind and body is central. For the osteopath John Martin Littlejohn, the mind could not be confined to the brain but was expressed through the body as a whole. Candace Pert states that the substances regulating our body and brain are the same ones involved in our emotional balance. This implies that we should closely examine our emotions concerning health issues. Ignoring the mind as a cause of pain would contradict these fundamental osteopathic and modern conventional medical principles, as the interaction between mind and body is bidirectional.

To comprehensively address the gender health gap or at least narrow it is imperative to conduct gender-sensitive research. Several medical universities already offer courses in gender medicine.

Based on the findings that diseases and disorders can affect women exclusively, predominantly, or differently than men, demands have been made in the healthcare sector for over 10 years to focus more on a gender-specific view of health for women and men. These demands include increased efforts in the fields of science and research, as well as calls for gender-appropriate healthcare and frameworks in which the health of women and men is maintained, improved, or restored. Insufficient understanding of the development of disease processes, and how and why these differ between women and men, can lead to inadequate or incorrect interventions in prevention, diagnosis, and therapy.

Therefore, modern medicine must engage with gender-sensitive approaches, adapted research, and sufficient knowledge of these developments. As the limitation to a binary gender understanding (male/female) is now considered outdated in both biology and society, concepts of non-binary gender systems should also be incorporated into medical thinking and practice, in line with holistic philosophy.

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