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Gender bias in medicine

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Gender bias has implications in the treatment of both male and female patients and it is important to take into consideration in most fields of medical research, clinical practice and education. Gender blindness and stereotyped preconceptions about men and women are identified as key causes to gender bias. However, exaggeration of observed sex and gender differences can also lead to bias. This article will examine the phenomenon of gender bias in medicine, present useful concepts and models for the understanding of bias, and outline areas of interest for further research.

Research has shown that different biological processes, anatomies, conditions in daily life, environmental experiences, risk behaviors and responses to stressful events, may all contribute to variation in health and disease in men and women [1–5]. There is also evidence that women, for no apparent medical reason, are not offered the same treatment as men, a phenomenon that raises the question of gender bias. Many studies, for example, show that women are less likely than men to receive more advanced diagnostic and therapeutic interventions [6–11].

The word bias means ‘prejudice’ or ‘distortion’ and is a threatening phenomenon in all kinds of research and human activity. When we talk about gender bias in medicine we usually either mean an unintended, but systematic neglect of either women or men, stereotyped preconceptions about the health, behavior, experiences, needs, wishes and so on, of men and women, or neglect of gender issues relevant to the topic of interest. Gender bias has implications in treatment of both male and female patients and it is important to take into consideration in most fields of medical research, clinical practice and education. Gender bias is also a relevant issue in the discussion of clinical and academic advancements and careers [12]; however, that aspect is not the focus of this article. Since there is confusion in medicine about the use of the concept of gender [13], my use of the term is presented below.

Sex & gender

In gender research, sex and gender are distinct concepts. Generally, while sex signifies biological characteristics in men and women, for example chromosomes, hormones and reproduction, gender describes variability between men and women that is attributable to society and culture.

The ‘gender order’ in society means that a ‘normal’ human being is assumed to be a man, women as a group are regularly subordinated to men, and boys and men are seen as being more important and valuable compared with girls and women [14]. The gender order implies that social determinants such as economic wealth, education, and political power, are unequally distributed between men and women. The concept of gender also refers to the constantly ongoing social construction of what is considered ‘feminine’ and ‘masculine’ and is based on power and sociocultural norms about women and men. Seen in this way, gender is constantly created in interaction between people, we are all ‘doing gender’ [15]. In the patient–doctor interaction, the patient is ‘doing gender’ by presenting herself or himself in line with what is seen as acceptable for each gender; and the male or female doctor does the same. The construction of gender involves the actor(s), such as patients who present their symptoms, as well as the observer(s), doctors who interpret the patients’ narratives and behaviors.

In medicine, the dichotomy between sex and gender might cause problems. Biological and social aspects are related and the explanation of a patient’s health problem can seldom be ascribed to only one of the categories [16]. For example, on a population level men have heavier bones than women but there are large differences within the two populations. Teenage girls who exercise are ‘doing gender’ differently compared with girls who are not physically active and these two groups will develop bones and bodies that differ. Many girls who exercise will probably have heavier bones than boys who do not exercise [17]. In bone building, what should be referred to sex and what should be ascribed to gender? A gender

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future
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perspective in medicine implies that men and women's life conditions, life styles and positions in society, as well as societal expectations about 'femininity' and 'masculinity', are considered along with biology.

Gender bias in clinical practice

In a large variety of conditions, such as coronary artery disease [8,11,18], Parkinson's disease [9], irritable bowel syndrome [19], neck pain [20], knee joint arthrosis [21] and tuberculosis [10], men are investigated and treated more extensively than women with the same severity of symptoms. In a recent study of treatment in psoriasis, the number of patients and the severity of the disease did not differ between men and women, yet there was far more expenditures for clinic-based treatment for male patients, than female patients who received emollients for self-care to a greater extent [22]. In a retrospective study of intensive care use, large disparities were found between men and women [23]. Specifically, older women (aged 50 years or older) were less likely than older men (with similar severity of illness) to be admitted to intensive care units or receive life-saving interventions. Research indicates that physicians are more likely to interpret men's symptoms as organic and women's as psychosocial [24,25], and female patients are assigned more nonspecific symptom diagnoses [20,26]. Women are also prescribed more psychoactive drugs than men [27,28].

In most of the studies referred to above, it is difficult to know the extent to which gender differences in management reflect the gender bias of physicians, or is due to other physician, patient or communication characteristics related to gender [29,30]. For example, the biological differences between men and women might imply that the type and severity of symptoms vary, thus explaining the differences in treatment [4]. Patients' wishes and communication behavior are other suggested reasons for the gender differences in the medical process [3,18,31]. It is, for instance, argued that men describe their symptoms in a straightforward and demanding way, while women often give vague symptom descriptions and hesitate to accept potentially dangerous measures such as surgery [9,21].

However, gender differences in diagnosis and treatment are also found in studies of the medical management of male and female 'paper-patients' or 'video-vignettes', situations where the influence of patient behavior and interaction between patient and doctor are controlled

[7,19,20]. In such studies, it is hard to explain the differences in terms other than gender bias as a result physicians' lack of awareness about gender, stereotyped expectations about health and needs in men and women, or a routine-like application of statistical sex or gender differences on individual patients. The roots of gender bias in clinical work might also be found at a system level [32], which is to say in the healthcare organization or routines, or in distorted content in established medical knowledge.

Gender blindness in research

The custom of performing clinical trials on populations consisting exclusively or mainly of young or middle-aged white men, and generalizing the results to whole populations has been criticized since the 1970s as a way of producing biased knowledge.

In order to correct the gender imbalance in research populations, the influential NIH in the USA issued guidelines in 1990 requiring the inclusion of women in all NIH-sponsored clinical research. Since 1994, the NIH has also required analyses of trial outcomes by sex. Nevertheless, even if scientific journals are more aware of sex/gender nowadays, there are still many recommendations about treatments and drugs that are based on studies where the majority of participants were men [33–37]. It is equally common that no sex-based analyses are performed even though both men and women are enrolled, or that too few women (or men) were included to allow for sex-based analyses. This means that gender blindness has still not been eradicated and a great deal of contemporary knowledge about diseases and risk factors is constructed without considering the relevance of either sex or gender.

Advancements

Even if gender blindness is still a problem, huge efforts have been made by some researchers to counteract the neglect of women and support medical science with data on women [1–4]. To date, this research has been fruitful and has shown its potential mainly concerning differences and similarities in cardiovascular diseases (CVDs) [38,39]. It is, for example, now acknowledged that myocardial infarction without plaque is more common in women than men and this has consequences for the investigations required to secure a patient's diagnosis [39,40]. Recently, evidence-based guidelines for cardiovascular disease prevention in women were presented [41].

With few exceptions these recommendations did not differ from those for men. However, the use of the term ‘evidence-based’ signifies that there is now a substantial amount of research performed on the issue of CVD prevention in women, making it possible to rely on scientific knowledge about women instead of just transferring knowledge about men to guidelines for women.

Other examples of gender bias in research

Looking beyond gender blindness and probing into the awareness of gender in research, implies posing new and critical questions and scrutinizing concepts generally taken for granted. I will give examples of bias risks concerning the common concepts; depression, sex hormones, and maleness and femaleness. The first example challenges the reliability of the depression diagnosis.

Throughout the western world, depression is regularly reported as being twice as common in women as in men [42]. The higher prevalence of depression in women has been ascribed to social and cultural living conditions, for example, many women suffer sexual and physical abuse, as well as biological processes, primarily processes involving estrogen and progesterone. At present, the connection between women and depression is fuelling a great deal of research into biological mechanisms in women [4,42,43].

However, according to Hirschbein, there is reason to scrutinize the very concept of depression [44]. In her medical history research, she found that even before depression was described and established as a diagnosis in Diagnostic and Statistical Manual of Mental Disorders-III, psychiatrists assumed that women were more often depressed than men. Between the 1950s and the 1980s researchers studied hospitalized patients whose symptoms were counted and used to define a category of depression. The patients studied were mostly women because there were more women than men with assumed depression in the hospital wards. In addition, patients who abused drugs and alcohol, the majority of them being men, were regularly excluded from the studies. This means that the connection between women and depression has become a closed circle: researchers studied mainly women to establish the grounds for the diagnosis, thus more women fitted into the descriptions and received the diagnosis, which in turn supported conclusions that more women than men are depressed. Inasmuch as the construction of the depression diagnosis inherited gender-biased assumptions, these biased beliefs

affect research and clinical practice even today [2,42,44]. Furthermore, it has been shown that men who score high on depression scales are less likely to be diagnosed as depressive than women with similarly high scores [45]. This shows that physicians’ preconceptions about a gendered pattern of depression are also biased to the interpretations of standardized data.

Realizing that depression is a diagnosis reframed by gender bias, how can we then assess the fact that billions of antidepressant pills are prescribed to women (and maybe withheld men) of all ages? More critical research is needed about gender and mental illness, such as the use, misuse and side effects of medication in relation to gender.

The second example concerns the concept of sex hormones. In the years between 1920 and 1940, hormone research had a heyday [46]. Researchers learned how to purify active factors from testes and ovaries and how to produce crystals of steroid hormones. In this process they gave the hormones names, which reflected their structures and assumed biological functions. During the steps toward isolation, measurement and naming, the researchers made scientific decisions that were understood as biological truths about sex; there are two sex characters and two sex hormones defining maleness and femaleness [46]. The definitions were, however, based on stereotyped ideas about gender, and the notion that the hormones extracted from testes and ovaries were closely linked to maleness and femaleness, respectively. This labeling of estrogens and androgens as sex hormones has distorted our thinking about them and probably also delayed progress in the research. For example, when excretion of estrogenic hormone was identified in urine from stallions in the 1930s, this finding was interpreted as being caused by contaminations. Although hormone researchers today label androgens and estrogens ‘growth hormones’, and investigate their effects in both men and women, estrogens and testosterone are still often called ‘sex hormones’ in medical literature and in clinics [47].

The third example concerns a similar problem. According to my own experiences, the concepts of maleness and femaleness have to be used with caution since they also carry with them a risk of creating blind spots and circular proofs. Naming a specific feature or behavior as masculine implies loading it with preconceptions and notions that render it hard to identify in women. When a so-called ‘masculine behavior’

is identified in women this might easily be seen as an exception or something very interesting. Thus, to reduce the risk of bias in research it is important to choose labels that are not loaded with gendered preconceptions, because such labels reinforce the risk of producing distorted interpretations and results.

Knowledge-mediated gender bias

Although more knowledge is crucial to eradicate mistreatment and bias as a result of gender blindness and ignorance, availability of facts and information is no safeguard against bias. Despite the many publications about gender bias in treatment and investigations of cardiovascular diseases, inappropriate treatment of women is regularly reported even today [7,8,11]. Furthermore, once we learn about differences between populations of men and women a new kind of risk occurs on the individual level, the risk of 'knowledge-mediated bias' [19]. For instance, it is well known that hypothyreosis is less common in men than women. Thus, the risk that physicians fail to investigate thyroxin levels is greater in male than in female patients, when patients complain of tiredness, loss of energy, constipation or other vague symptoms that might be caused by hypothyreosis.

Another aspect of knowledge-mediated bias is described in relation to the pharmaceutical industry, the information they give out and their marketing activities. For example, migraine is a disorder that affects millions of people, three-quarters of them being women [4]. Based on this fact the pharmaceutical industry portrays predominantly female patients in direct-to-consumer advertisements, as well as advertisements directed to doctors, thereby reinforcing the impression that migraine is a 'women's disorder' [48]. An audience consisting of female patients is constructed while millions of male patients are ignored. It is hardly surprising then, as in the case of hypothyreosis, that male patients with migraine are less often correctly diagnosed when they consult a doctor [49].

A two-way view of gender bias

Ruiz and Verbrugge presented a useful model for understanding gender bias in the delivery of health services and research [29]. One view assumes that health situations and risks are similar for women and men, when in fact they are not, while the other view assumes differences between men and women when there actually are similarities. According to the authors, the views originate in

the biomedical model that assumes similarities in the case of physical health problems and differences when it comes to emotionally toned problems and self-expressed health.

This two-way view represented a step forward since it is emphasized that bias is not only based in gender blindness and implicit ideas about similarities, but might also rely on stereotypical preconceptions about men and women being different, or on an overestimation of observed differences. One example of the latter was presented in a recent research review, which evaluated the validity of claims of sex differences regarding genetic effects [50]. The review concluded that most claims concerning sex differences were insufficiently documented or spurious, and claims with good documented internal and external validity were uncommon.

Adding gender theory

To the two-way model, I would also like to add insights from gender research in understanding the framework of gender bias in medicine. First, when discussing why women have been neglected in research and clinical practice, it is important to consider the gender order [14], which in most situations and societies implies that women are less valued, politically and economically influential, and subordinate to men. It is generally agreed upon that the reason for selected abortions of female fetuses in large parts of Asia and North Africa, is that more value is put into the life of men than the life of women [51]. Less obvious, but nevertheless similar attitudes implying neglect and omission of women, are probably reasons behind that women receive fewer coronary angiography procedures than men in the USA [18], or that women are not offered the same level of care as men when suffering from psoriasis in Sweden [22].

Second, when trying to understand gender bias it is relevant to consider the construction of gender and the continuous 'doing gender' processes [14,15]. Preconceptions about men and women, their behavior, reactions and needs, contribute to our constructions of gender in everyday life as well as in medicine. Such preconceptions also contribute to patients' help-seeking and risk-taking behavior as well as in caregivers' interpretations of patients' narratives and conduct. The construction of gender is done in interaction, involving the patient as well as the doctor or other caregivers. There are several examples from research where identical narratives are interpreted in different ways depending on whether the

narrator was male or female [7,19,20,52]. Translated to clinical situations this means that when male and female patients tell their stories, the doctor, nurse or other member of the healthcare staff is inclined to interpret even identical narratives in different ways because of assumptions and preconceived ideas about women and men.

Education requested

Implementation of education about sex- and gender-related processes, reactions, and treatments in medical school curricula and other forms of health education is an important step forward in preventing gender bias [53–55]. Yet, as outlined above, more knowledge does not eradicate the problem of knowledge-mediated bias or bias owing to notions and stereotyped ideas about men and women. Thus, it is also necessary to address attitudes to and preconceptions about men and women [56,57], and to give the students a chance to reflect on their own and others interpretations, reactions and conduct in patient care. This can be organized by way of group discussions about paper-cases, role-playing with simulated patients of different sex, analyses of video consultations, or in reflective writing. Since gender bias is an unintentional process, it is reasonable to believe that critical reasoning and reflection are important for identifying and learning about it.

However, knowledge about the effects of gender perspective in education on students conduct in medical work is scarce. There is a need for more research concerning the implementation of sex- and gender-related knowledge in medical education, the methods to increase students' awareness of gender aspects in individual meetings with patients, and specifically the effect the education has in reducing gender bias in the medical decision-making of the students.

Future research

Gender bias in healthcare will continue to be an important research field for years ahead. There is still the need for descriptive studies about gender disparities in many specialities, disorders and countries. There is also a need to learn more about the cognitive and interaction processes that lead to gender bias in clinical work, and gender bias that is built into research designs and analyses. The following six points summarize the areas and topics that I regard as most important.

First, despite the insights we already have, there is a continuous need for research about gender bias in medical investigations and treatments in everyday clinical practice. Much

remains to be done in all fields of medicine – even in cardiovascular disease, where the large bulk of studies have so far been conducted. There is also a need for the development of follow-up protocols, for regular use in healthcare, measuring the medical treatment given and the outcome by gender of patient. Such protocols might be evaluated on local, regional and national healthcare levels. Descriptive research and repeated evaluations are important to provide new data and ideas for how to prevent and avoid gender bias.

Second, studies about the cognitive, behavioral and communication processes creating gender bias in individual consultations and investigations have thus far been scarce. Still, knowledge about such processes is crucial when trying to find ways to avoid bias and heighten the healthcare workers' awareness of their own role in the bias process. Observations of authentic consultations in different clinics and contexts would be of certain value. For this research, qualitative methods such as action research, analyses of tape recordings and video filming are suggested. More research grants have to be allocated for this field.

Third, analyses of sex and gender differences will continue to be of importance in all health research, including basic sciences, epidemiology, clinical trials and health services. This means that the number of men and women included in studies must be sufficient to allow for sex- and gender-based analyses and to assess whether sex, gender or both are important for the results.

Fourth, in basic science and clinical trials, the consequences of sociocultural conditions for biological processes, bodily features and health have thus far often been overlooked. This means that gender differences might have been interpreted as sex differences, in other words, owing to biology. There is a need for new and reliable designs and analytical models in research into biological differences, designs and models that integrate and consider the impact of sociocultural conditions on the results.

Fifth, gender blindness and stereotyped preconceptions about men and women are identified as key causes of gender bias. There is a need for more research into gender blindness and preconceptions about gender in basic medical concepts and definitions that are taken for granted. Hitherto such research has mainly been conducted by scholars outside medicine. To increase the impact of such research within medical science, interdisciplinary studies that also involve medical researchers are welcome.

Sixth, nowadays, education about sex and gender differences in health is requested in medical schools. Helping the students avoid making gender-biased assessments, students' attitudes to and preconceptions about men and women should also be addressed. At present, little is known about the effects of such education. Thus, there is a great need for scientific evaluations of the implementation of gender in medical education.

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Executive summary

- Gender bias means unintended but systematic neglect of either men or women.
- Gender blindness and stereotyped preconceptions about men and women are identified as key causes to gender bias.
- Exaggeration of observed sex and gender differences can also lead to gender bias.
- 'Knowledge-mediated' gender bias implies neglecting patients belonging to the sex in which a disease is known to be less common or severe.
- The gender order, often implying that women are less valued and influential than men, helps explaining gender bias.
- 'Doing gender' processes mean that healthcare staff is inclined to interpret identical narratives in different ways for male and female patients.
- Research grants need to be allocated for studies about the cognitive, behavioral and communicating processes creating gender bias.
- Scientific evaluations are required to determine the effect that gender perspective has in medical education regarding the tendency to make gender-biased assessments.

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