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# From gender medicine to gender-specific medicine

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In 1991, Bernardine Patricia Healy, an American cardiologist and the first woman to become director of the United States' National Institute of Health (NIH), described the "Yentl syndrome". Yentl, the heroine of a story by Nobel prize winner Isaac B. Singer, had to shave her head and dress like a man in order to go to Jewish school and study the Talmud, one of the sacred books of Judaism.

In a famous editorial published in the *New England Journal of Medicine*[1] Healy discussed the discrimination that she had observed at the Institute of Cardiology, which she directed: women were less likely to be hospitalised, less frequently underwent diagnostic (coronary angiograms) and therapeutic (thrombolysis, stenting and bypass surgery) procedures than men and women were less frequently involved than men in clinical trials for the introduction of new drugs and new diagnostic and therapeutic technologies. The article generated a great deal of controversy around the world, but represented a good starting point to give importance to gender medicine.

Over the past 20 years, the attention of gender medicine has increased greatly, despite the fact that its real meaning and scope are not always fully understood. Gender medicine does not mean attracting the attention of the scientific and clinical world to illnesses that more frequently affect men or women, or to the illnesses related to the reproductive system or female health/problems. Gender medicine means understanding how diseases in all organs and bodily systems present in the two genders and, above all, evaluating the gender differences concerning the symptoms of illness, the need for different diagnostic pathways and test result interpretation, the differences in response to drugs or, even, the need to use different drugs and again the differences concerning the prevention of all illness.

Gender medicine is not, therefore, a new speciality, rather a necessary and dutiful interdisciplinary dimension of medicine, aimed at studying the influence of sex and gender on human physiology, pathophysiology and pathology. At the beginning of the third millennium, it would appear impossible that we still have to close this gap, and yet the whole of medical practice, which is encoded by important guidelines, is founded on tests obtained from large-scale experiments conducted almost exclusively on the male sex.

We therefore need to re-study the illnesses that affect men and women on a daily basis: cardiovascular diseases, tumours, metabolic, neurological and infectious[2] diseases and all medical and surgical specialties. Gender medicine in actual fact concerns all the specialties of medical knowledge.

In western countries, women have an advantage over men in terms of life expectancy. In Italy, for example, the life expectancy of a man at birth is 79.9 years, whereas that of a woman is 84.6 (ISTAT 2014). Many theories attempt to explain why this difference exists, ranging from genetics to culture. However, healthy life expectancy is the same for both genders[3], meaning that the 5-year advantage that women enjoy are years of sick and disabled life, primarily due to the consequences of cardiovascular, osteoarticular and neurological disease (dementia and depression). This has an enormous influence on quality of life and health expenditure. Moreover, women, especially those aged over 65 are far more alone, they have a lower level of culture and a far more fragile financial situation. And yet, we know little about the treatment and prevention of illness amongst women. "Not merely is Yentl syndrome unknown, to date it is not even "treated"", explains Noel Bairey Merz[4].

Let us take an example from the cardiology field. Infarction is the most common cause of death amongst women. Over the past 40 years, cardiovascular mortality (myocardial infarction, stroke) has dropped dramatically in men, yet to a far lesser extent in women, and not at all amongst diabetic women[5]. Today both women and the medical world believe these illnesses to be primarily male. This has meant that the female gender almost does not exist in the epidemiological trials that have described the risk factors and prevention, symptoms and treatment of infarction. We now know that women can have very different symptoms when affected by myocardial infarction, to the extent that these symptoms are known as "atypical": often instead of precordial pain they experience pain in the neck or back, or do not have any pain at all and merely feel restlessness, anxiety and mild dyspnoea; this may lead to them often not being hospitalised, being treated late or not being triaged as "red". Consequently, fe-

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male mortality during the acute phase whilst hospitalised, after an infarction, is always higher than amongst men. However, mortality 6 months after an infarction is also higher in women, as it is 6 years after by-pass surgery. In addition, in women the heart's smaller arteries (the microcirculation) rather than the large arteries are more likely to become ill, making diagnosis more complex and requiring the following of different pathways. For example, a coronary angiogram is unable to detect severe alterations in the epicardial coronary arteries. There are serious cardiovascular diseases, such as myocardial rupture, coronary dissection and takotzubo cardiomyopathy that are found almost exclusively in women. However, very little has been done in these years of great research and discovery to understand why this diversity exists[6]. The age of onset of coronary disease is higher in women and atherosclerosis is more recent, and therefore less collateral circulation is created; the prevalence of single-vessel coronary disease is higher in women than amongst men. In addition, following an infarction in women greater haemodynamic impairment is observed with frequent ventricular kinetics deficits and more frequent malignant arrhythmias. Risk factors for atherosclerosis in women would appear to have a different impact. One example is diabetes, which is more dangerous for women's hearts that those of men. Despite higher female attendance of medical outpatient clinics, diabetic women and cardiomyopathic women are less pharmacologically treated[7]. Despite all this, cardiology is the specialty that is most advanced in recognising gender differences[8]. So much so that the American Heart Association has published guidelines for the prevention of cardiovascular diseases amongst women[9]. However, to date they are the first and also the only ones.

Many more examples could be found in other sectors of medicine. However, the questions we ask ourselves today are: what has research in the gender-specific medicine field achieved in Italy, Europe and the rest of the world? to what extent is the knowledge on the medical differences between the two genders, male and female, men and women applied? And again, what point has been reached by the teaching of gender-specific research in medicine degree courses, residencies and in the degree course of all healthcare professions?

When faced with these questions, we have to understand that the circumstance of the issue cannot be very different: gender medicine does not exist. What does exist is gender-specific medicine. Because if we teach or practice man- or woman-sized medicine, it cannot take a different route to the rest of medicine. Gender medicine cannot be taught as parallel or alternative medicine. Medicine must be taught and practised in a gender-specific way in all its specialties. There cannot be a gender medicine course, a gender medicine congress, a gender medicine specialty, whilst all branches of medicine are taught and applied as though there are no gender differences.

Incredible as it may seem, at the start of the third millennium, we have to re-found medicine: we have to complete our knowledge, which despite being really very advanced, it is never differentiated according to gender, or better still, not always supported by trials conducted on both genders; and we have to apply gender-specific medicine to our daily practice in all specialties. The most authoritative international journals provide us with guidance in this sense[10-12].

The term gender medicine would appear to refer to a parallel medicine, it is deceptive and should be avoided. We should all strive to establish and practice gender-specific medicine.

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