

Drug treatment and side effects/Expert

Men and women differ in many ways with regard to the use and effects of pharmaceutical treatments. Not only do women undergo drug therapy more often, but they also suffer more frequently than men from side effects ^[1] Women are 50 to 70 percent more likely to experience drug side effects compared to men. For example, drugs which can increase QT-length in an EKG (such as antiarrhythmics, antipsychotics, antihistamines and antibiotics) have a potential to cause heart arrhythmias, especially in women. This is not normally taken into account during treatment ^[2] In addition, women have an increased incidence of drug-induced liver toxicity, adverse gastrointestinal events due to steroidal anti-inflammatory drugs, and drug-induced allergic rashes ^[3]

Until the last century, women (and female laboratory animals) were systematically excluded from drug research experiments ^[4] because of the assumption that study results would be influenced by the female hormone cycle or the use of contraceptives. There was also a fear of early drop-out due to pregnancy during the study period. In the meantime, it has been recognized that it is precisely these hormonal influences on medications that need to be investigated. In the same context, the risk of medication use during pregnancy should also be investigated more thoroughly (study results are currently available for only certain drugs such as antidepressants) ^[5]

Sex-specific efficacy

Sex differences exist in pharmacokinetics and pharmacodynamics. Although the pharmacokinetics of new substances are usually described separately for men and women, the treatment effects (pharmacodynamic effects) are almost never investigated in a sex-sensitive manner ^[6] The specific effects of a large number of existing drugs is simply not known for women. Patient information distinguishes between children and adults, but often not between men and women. Sex-related physiological differences mean that drugs are absorbed and excreted by the body in different ways and at different rates ^[7] Renal clearance is lower in women due to reduced glomerular filtration. Sex-specific activity of the cytochrome P450 (CYP) and the enzymes of uridine diphosphate glucuronosyltransferase (UGT) and renal clearance lead to this sex difference ^[3]. In addition, factors such as body size, fat content and metabolism are determining factors. For example, a higher fat percentage in women leads to the possibility of the disproportionate distribution of certain drugs in the body. Body weight certainly plays a key role: women tend to be lighter than men, but this is not considered in the respective drug dosing recommendations ^[8]

Outlook

The fact that women take multiple medications in comparison to men cannot be explained by the use of contraceptives alone. Even after menopause, women take more medications and with greater frequency than men. At present, too little is known about the specific effects that certain drugs and drug combinations have on women in different hormonal phases. Further research on sex and gender could lead to significant health gains and cost savings ^[9]. In the future, more attention should be paid to sex, but also to aspects such as height, age and comorbidities when determining the appropriate dosage of medication. In general, hormonal and immunological factors as well as anatomical, physiological, biochemical and endocrine sex differences can influence the use and tolerance of medications ^[3].

Detailed information on this topic can be found under **Pharmacological Principles**.

Back to Module 1: Sex and Gender in medicine

Literature

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1. Merens A, van den Brakel, M. Emancipatie monitor 2014. Den Haag: SCP/CBS; 2014 Dec 16.
2. Drici M, Clément N. Is Gender a Risk Factor for Adverse Drug Reactions? *Drug Safety* 2001; 24(8):575-85.
3. Nieber K. *Geschlecht und Gender in der Pharmakologie*. Berlin: Charité Universitätsmedizin; 2015.
4. Merkatz RB, Junod SW. Historical background of changes in FDA policy on the study and evaluation of drugs in women. *Academic medicine journal of the Association of American Medical Colleges* 1994; 69(9):703-7.
5. Macklin R. Enrolling pregnant women in biomedical research. *The Lancet* 2010; 375(9715):632-3.
6. Yang Y, Carlin AS, Faustino PJ, Motta, Mónica I Pagán, Hamad ML, He R et al. Participation of women in clinical trials for new drugs approved by the food and drug administration in 2000-2002. *Journal of women's health (2002)* 2009; 18(3):303-10.
7. Soldin OP, Mattison DR. Sex differences in pharmacokinetics and pharmacodynamics. *Clinical pharmacokinetics* 2009; 48(3):143-57
8. Tran C, Knowles SR, Liu BA, Shear NH. Gender differences in adverse drug reactions. *Journal of clinical pharmacology* 1998; 38(11):1003-9.
9. The Netherlands Organisation for Health Research and Development. *Gender and Health: Knowledge Agenda*. Den Haag; 2015

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