Sex und Gender in der Medizin: Konsequenzen für die Weiterbildung

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Klinik für Nuklearmedizin, UniversitätsSpital Zürich
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Gender: Socially constructed characteristics of women and men

Sex: Biological differences such as genes, sex hormones, anatomy, physiology

Epigenetics

Germ Cells

Genes

Societal Influence

Nutrition

Lifestyle

Foetus

Child

Adult

Sex hormones
Study of how diseases differ between men and women in terms of prevention, clinical signs, therapeutic approach, prognosis, and social impact.

Gender-specific Medicine is a neglected dimension of medicine
Why is sex and gender an important subject in medicine?

Personalized Medicine
Molecular diagnosis and biomarker-based stratification

«One-fits-all» Medicine

Severe side effects  Reduced efficacy  Excellent efficacy

Severe side effects  Reduced efficacy  Excellent efficacy
The differences.....

300g
70-72 beats/min

257g
78-82 beats/min

Source: Gettyimages.com
Myocardial perfusion imaging

Male patient, 72 years

Female patient, 68 years
Pancreatic cancer: Some blood pressure drugs put women at risk

By Ana Sandoiu | Published Thursday 19 April 2018

Article

Anti-Hypertensive Medication Use, Soluble Receptor for Glycation End Products and Risk of Pancreatic Cancer in the Women’s Health Initiative Study

Zhensheng Wang 1, Donna L. White 2,3,4,6,7,8, Ron Hoogheveen 5, Liang Chen 2,3,4, Eric A. Whitsel 9, Peter A. Richardson 3,4, Salim S. Virani 3,4,5, Jose M. Garcia 10,11, Hashem B. El-Serag 2,3,4,6,7,8, and Li Jiao 2,3,4,6,7,8,*
Example: Pharmacology

Conducted solely in men

«...strongly indicates lack of therapeutic efficacy of the 2.5-mg/day mixed conjugated-equine-estrogen regimen [...] also suggest possible adverse effects [...].»
The consequences of gender-unspecific medicine...

• Between 2004 and 2013, women in the United States suffered more than 2 million drug-related adverse events, compared with 1.3 million for men, according to the US Food and Drug Administration (FDA).

• Out of 10 drugs removed from the US market between 1997 and 2000, eight were withdrawn because of side effects that occurred only, or mainly, in women.

US Food and Drug Administration
United States General Accounting Office
Example: Cardiology

Cardiovascular disease is the most common cause of death in women.

Pan-European analysis, Eur Heart J. 2017
The symptoms of a myocardial infarction differ between women and men.

- Dyspnea
- Chest pain
- Palpitations
- Back pain
- Abdominal pain
- Vomiting
- Nausea
- >3 symptoms

Zürich, 10. Januar 2019

Medienmitteilung

Frauen mit Herzinfarkt sollten schneller medizinische Hilfe beanspruchen

Gemäß einer kürzlich veröffentlichten Studie des Stadtspitals Triemli zögern Frauen bei einem Herzinfarkt länger als Männer, bis sie medizinische Hilfe in Anspruch nehmen. Einerseits da Herzinfarkte fälschlicherweise als typische Männerkrankheit betrachtet werden, andererseits weil bei Frauen häufig andere Symptome auftreten als bei Männern.
Men suffering from acute stroke arrive earlier at the hospital than women.

Study in 1134 patients, *Stroke*. 2010
Only 18-24% of study participants in cardiovascular clinical trials are female.

The percentage of female cardiovascular patients amounts to 53%.

Bikini-Medicine

Women’s health research focuses on breasts and the reproductive system.

Pilote L et al. J Am Coll Cardiol. 2018
Scott PE et al. J Am Coll Cardiol. 2018
Metaanalyse, Circ Cardiovasc Qual Outcomes. 2011
Eating Disorders in Men: Underdiagnosed, Undertreated, and Misunderstood

«Stereotypers of eating disorders inhibit the availability of evidence-based treatment for males and falls short of the successful management of gender specific problems. [...]»

«Resources are limited as treatment paradigms have been geared towards females.»
Depression is underdiagnosed in men.....
Alzheimer's disease disproportionately affects women, but is often diagnosed late in women.

Women are more sensitive to pain. A meta-analysis comprising 122 studies showed that women are more sensitive to cold and heat stimuli compared to men. The results were statistically significant (P<0.0001).
...and suffer more often from chronic pain

...but:

79% of animal studies in Neurology are being conducted in male animals

Analysis of all experimental studies focusing on pain perception that were published between 1996 and 2005.

*Nature Reviews Neuroscience. 2012*
Dopamin, a neurotransmitter mediating pain perception, is being ingested twice as fast in female neurons as compared to male neurons.

*Walker QD et al. Neuropsychopharmacology. 2006*
Only 5% of studies are being conducted in female cells

Taylor KE et al. Biol Sex Differ. 2011
Accounting for sex in the genome

Genetic association studies of the human genome often omit the X chromosome because of the unique analytical challenges it presents. A concerted effort to undo this exclusion could offer medically relevant insights into basic biology that might otherwise be missed.
Growing public awareness of the sex- and gender neglect in medicine
More Women Dying Of Heart Disease, Yet Men Still Get More Treatment

THE YENTL SYNDROME
Bernadine Healy, M.D., Pharmacologic Research in Pregnant Women
— Time to Get It Right

FDA Takes Action on Ambien; Concerns Women at Risk

Osteoporosis Significantly Underdiagnosed, Undertreated in Men

EDITORIAL
Myocardial Infarction in Young Women
An Unrecognized and Unexplained Epidemic

FDA analysis: Women underrepresented in HF, CAD, ACS trials

Vulnerability of Female Drivers Involved in Crashes: An Analysis of US Population at Risk

Sex Differences in Efficacy and Toxicity of Systemic Treatments: An Undervalued Issue in the Era of Precision Oncology

Geschlecht in der Medizin: ein Thema mit vielen Facetten

Carole Clair

naturmedicine

Accounting for sex in the genome

Technical models in the study of sex differences

Maria Buonocorelli, Matteo Marconi, Alessandra Carè, Paola Piscopo, Walter Malorni, and Paola Mattarelli
Sex and gender in medicine: vulnerable populations

HIV-positive women less likely to use statins, even though they qualify

Dec 08, 2017 | Anicka Slachta

NEWS - INTERVENTIONAL | SCAI 2017

Minority Women Face 50% Increased Risk of Death/MI After PCI Compared With White Men at 1 Year

Social disadvantage (eg. Low income, Lack of control, Increased stress, Childhood adversities)

Elderly

Non-white ethnicity (South Asian, Indigenous)

Statins' expanding reach falls short among women, minorities

Torres M et al. Ann Behav Ned. 2018
Kandasamy S et al. Can J Cardiol. 2018
Salami JA et al. JAMA Cardiol. 2017
Batchelor W et al. JAMA Cardiol. 2017
Todd JV et al. AIDS Patient Care STDS. 2017
New regulations since 2016

- **National Institutes of Health**: issued its mandate for including females in vertebrate studies.

- **Canadian Institutes of Health Research**: expects that all research applicants will integrate sex and gender into their research design when appropriate.

- Gender policy committee of the European Association of Science Editors recommends that journal editors should ask all authors to report their results separated by sex and gender.

- **The International Committee of Medical Journal Editors (ICMJE)** integrated sex and gender analysis into its guidelines in December 2016.

- **The Lancet and Sex and Gender Equity in Research (SAGER)** have published guidelines for authors and journal editors for evaluating manuscripts for excellence in sex and gender analysis.

- **UK National Centre** for the Replacement, Refinement and Reduction of Animals in Research has issued guidelines calling for basic research to **always** report the sex of lab animals.

- **Horizon 2020**: sex and gender must be integrated into all stages of research and innovation.
Sex and gender in medicine: the other side

Primary prevention of cardiovascular disease: More patient gender-based differences in risk evaluation among male general practitioners

Raphaëlle Delpech¹, Virginie Ringa², Hector Falcoff³,⁴ and Laurent Rigal¹,²
Sex and gender in medicine: the other side

39% of men intended to pursue interventional cardiology compared to only 17% of women.

Sex Differences in the Pursuit of Interventional Cardiology as a Subspecialty Among Cardiovascular Fellows-in-Training

Celina M. Yong, MD, MBA, MSc,ab Freddy Abnousi, MD, MBA, MSc,b,c Anne K. Rzeszut, MA,d Pamela S. Douglas, MD,e Robert A. Harrington, MD,b Roxana Mehran, MD,f Cindy Grines, MD,g S. Elissa Altin, MD,g Claire S. Duvernoy, MD,b for the American College of Cardiology Women in Cardiology Leadership Council (ACC WIC) and the Society for Cardiovascular Angiography and Interventions Women in Innovations (SCAI WIN)

RESULTS Of 574 respondents, 33% anticipated specializing in IC. Men were more likely to choose IC than women (39% men, 17% women, odds ratio: 3.98 [95% confidence interval: 2.38 to 6.68]; p < 0.001). Men were more likely to be married (p = 0.005) and have children (p = 0.002). Among married FITs, male IC FITs were more likely to have spouses who do not work (p = 0.003). Although men were more likely to be influenced by positive attributes to pursue IC, women were significantly more likely to be influenced negatively against pursuing the field by attributes including greater interest in another field (p = 0.001), little job flexibility (p = 0.02), physically demanding nature of job (p = 0.004), radiation during childbearing (p < 0.001), "old boys’ club" culture (p < 0.001), lack of female role models (p < 0.001), and sex discrimination (p < 0.001).
Sex and gender in medicine: the other side

Science faculty's subtle gender biases favor male students

"We are only as blind as we want to be"
- Maya Angelou

Moss-Racusin CA et al. PNAS. 2012
Limited knowledge and lack of awareness......

• .....that sex- and gender-differences exist in pathogenesis, diagnosis, therapy and prevention of disease

• .....that sex and gender impacts the physician-patient relationship

• .....that gender impacts the training, mentoring, and career-decisions of residents
What can we do?

Fix the knowledge
Research
Teaching/Education
Patient Care
How to implement this into clinical practice?
Fix the knowledge: patient care

• Be aware that disease development, manifestation, and course are different in men and women
• Know about the demographic groups that currently have insufficient or suboptimal medical care
• Develop and implement gender-sensitive diagnostic tools and gender-sensitive treatments
Fix the knowledge: patient care

http://www.isogem.eu
Institute for gender-specific medicine
Fix the knowledge: teaching

- Single courses involving sex and gender medicine aspects
- Multiple stand alone courses on sex and gender medicine
- Integration of sex and gender medicine in multiple teaching courses
- Integration of sex and gender medicine in all teaching formats throughout the curriculum
- Integration into assessment
Fix the knowledge: medical education

• Provide information on gender sensitive disease manifestation and gender disparities in disease management
• Detect gender-specific problems in medical training and mentoring of residents
• Take measures to eliminate these problems:
  • Be aware of unconscious bias
  • Address a lack of support in the workplace
  • Specific mentoring needs of women and men
  • Flexible working hours and opportunities to align work and family
  • Support for returners after career breaks
„Der Patient darf nicht als Neutrum mit männlichen Zügen behandelt werden“

Vera Regitz-Zagrosek
Direktorin Institut für Gender-Medizin
Charité Berlin
Veranstaltungen

**Kick-off Symposium "Sex and Gender in Medicine"**
Datum: 15.11.2019  
Zeit: 13:30 – 18:45 Uhr, anschliessend Apéro  
Ort: Aula UZH  
Mit: Prof. Regitz-Zagrosek (Berlin), Prof. Kautzky-Willer (Wien)  
Prof. Beck Schimmer, Prof. Buch, Dr. Ferretti, Prof. Gebhard, Prof. Jäncke, Prof. Nadal (UZH)

**Workshop Laufbahnplanung für Nachwuchswissenschaftlerinnen: "Wie plant Frau ihre Karriere?"**
Datum: 09. Oktober 2019  
Zeit: 17:00 - 18:30  
Ort: Careum 2, Raum 286  
Mit: Prof. Dr. med. Dr. h.c. Vera Regitz-Zagrosek,  
↓ Flyer_Wie plant Frau ihre Karriere? (PDF, 250 KB)

**Impulsreferat "Medizin und Chancengleichheit – Fiktion oder Wirklichkeit?"**
Datum: 31. Oktober 2019  
Zeit: 17:00 - 18:00, anschliessend Apéro riche  
Ort: Restaurant UniTurm  
Universität Zürich, Hauptgebäude  
Mit: Prof. Dr. med. Dr. h.c. Vera Regitz-Zagrosek, Prof. Dr. Beatrice Beck Schimmer, Prof. Dr. med. Klara Landau

**Kontakt**
Für Anfragen zu Vorträgen oder Treffen während der Gastprofessur:  
miriam.buchmann2@uzh.ch

**Agenda**
- 25.09.2019, Seminar CMC - "Sex differences in the molecular mechanisms of cardiac hypertrophy"
- 04.10.2019, Vortrag am Zentrum für Experimentelle Rheumatologie, Schlieren
- 08.10.2019, ETH Medizin Bachelor: Vorlesung "Sex differences, und wie untersucht man geschlechtspezifische Unterschiede?" Modul "Translationale Tiermodelle"
- 09.10.2019, Workshop Laufbahnplanung für Nachwuchswissenschaftlerinnen: "Wie plant Frau ihre Karriere?"
- 10.10.2019, Workshop: input Gender Medizin
- 15.10.2019, ZIHP Veranstaltung "Warum brauchen wir Gendermedizin?"
- 28.10.2019, Einführungsvorlesung Medizin 3.4.8: SJ
- 31.10.2019, Vortrag: "Sex differences in cardiovascular cells"  
- 05.11.2019, Interner Dienstagsweiterbildung: "Sex and Gender in Medicine"  
- 06.11.2019, Einführungsvorlesung in Medizin "Gender in Medicine" 2. SJ  
- 15.11.2019, Kick-off Symposium "Sex and Gender in Medicine"  
- 18.11.2019, Workshop: Implementierung von Gender Medizin: Gender alleine reicht nicht
Vielen Dank!