Oplæg for kommunikationscentre
29.10.2026

Køn og hjernerystelse

Alexander N. Sørensen, cand.psych.
Dansk Center for Hjernerystelse



Dansk Center for Hjernerystelse

Køn som en risikofaktor

- 1 af de 7 vigtigste faktorer
- Øget risiko med1,6-3,2x

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Reviews

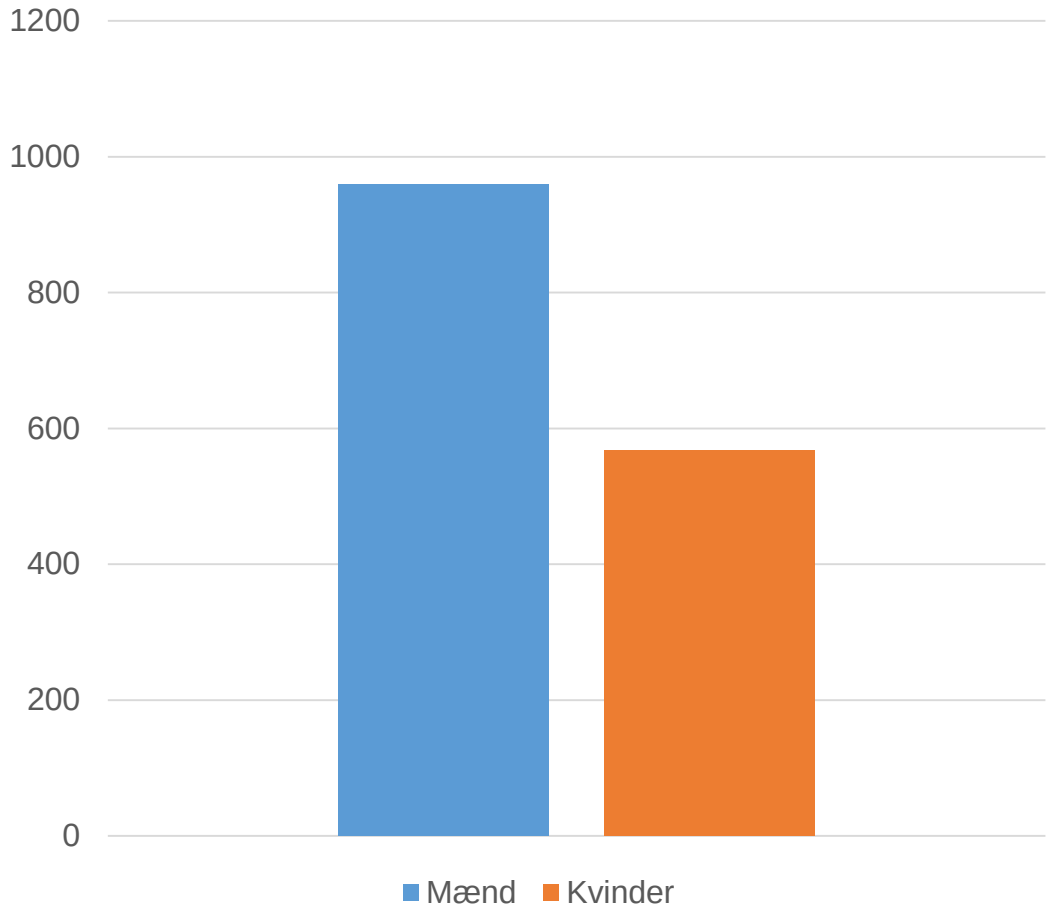
Emergency Department Risk Factors for Post-Concussion Syndrome After Mild Traumatic Brain Injury: A Systematic Review

Veerle F. Lubbers[2,4,*,], Dirk J. van den Hoven[1,**], Joukje van der Naalt[3], Korné Jellema[4], Crispijn van den Brand[2,5], and Barbra Backus[1,5]**

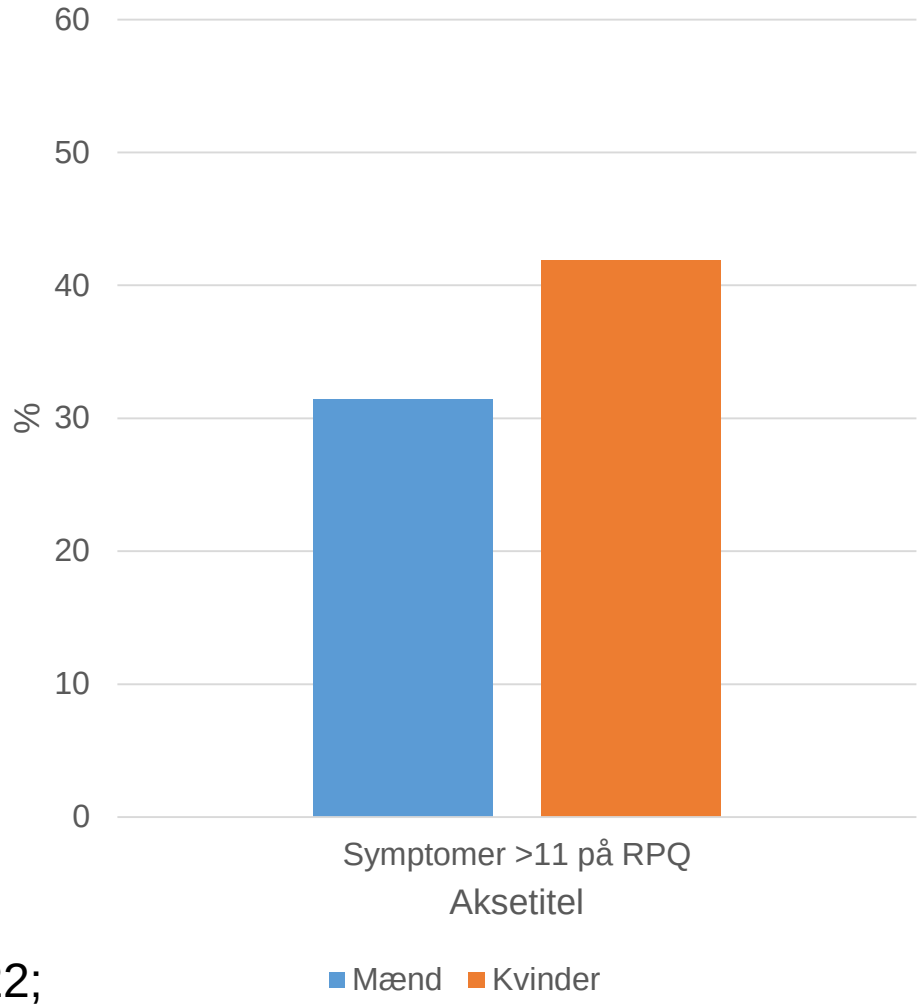
Abstract

Approximately 16% of patients with mild traumatic brain injury (mTBI) develop a post-concussion syndrome (PCS) with persistent physical, neurological, and behavioral complaints. PCS has a great impact on a patient's quality of life, often decreases the ability to return to work, and henceforth has a great economic impact. Recent studies suggest that early treatment can greatly improve prognosis and prevent long-term effects in these patients. However, early recognition of patients at high risk of PCS remains difficult. The objective of this systematic review is to assess risk factors associated with the development of PCS, primarily aimed at the group of non-hospitalized patients who were seen with mTBI at the emergency department (ED). We searched PubMed/MEDLINE, Cochrane Library and EMBASE on September 23, 2022, for prospective studies that assessed the risk factors for the development of PCS. Exclusion criteria were: retrospective studies; > 20% computed tomography (CT) abnormalities, <18 years of age, follow-up <4 weeks, severe trauma, and study population <100 patients. The search strategy identified 1628 articles, of which 17 studies met eligibility criteria. Risk factors found in this systematic review are pre-existing psychiatric history, headache at the ED, neurological symptoms at the ED, female sex, CT abnormalities, pre-existent sleeping problems, and neck pain at the ED. This systematic review identified seven risk factors for development of PCS in patients with mTBI. Future research should assess if implementation of these risk factors into a risk stratification tool will assist the emergency physician in the identification of patients at high risk of PCS.

Forekomst af Hjernerystelse



Forekomst af længerevarende følger



Kilder: Feigin et al. 2013; Mikolic et al. 2020; Maas et al. 2022;

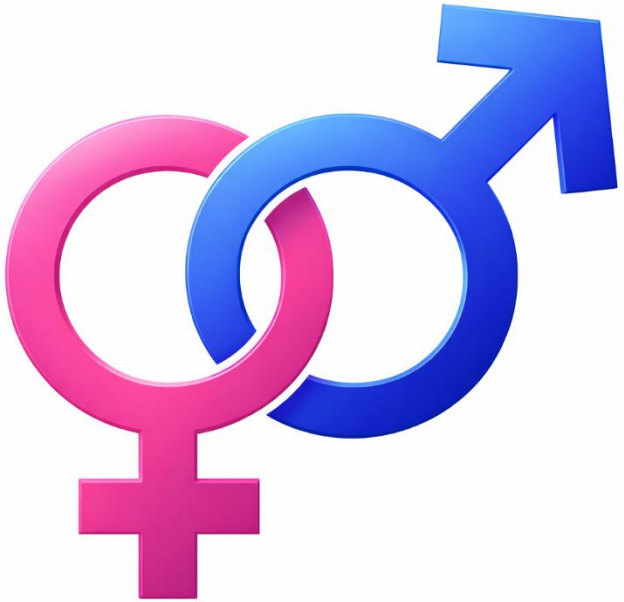
Oversigt

- Forekomst af hjernerystelse på tværs af køn
- Forekomst af længerevarende følger på tværs af køn
- Behandling med fokus på 'køn' i indsatsen

Hovedpointer

- Flere mænd end kvinder får hjernerystelse
- Flere kvinder end mænd oplever vedvarende symptomer
- Hvordan vi måler det har indflydelse på forskellene
- Vold og interpersonlig vold – stort skyggetal.
- Det nonbinære køn - Ukendt betydning for forekomst og prognose.
- Køn og kønsidentitet skal inddrages i rehabilitering.

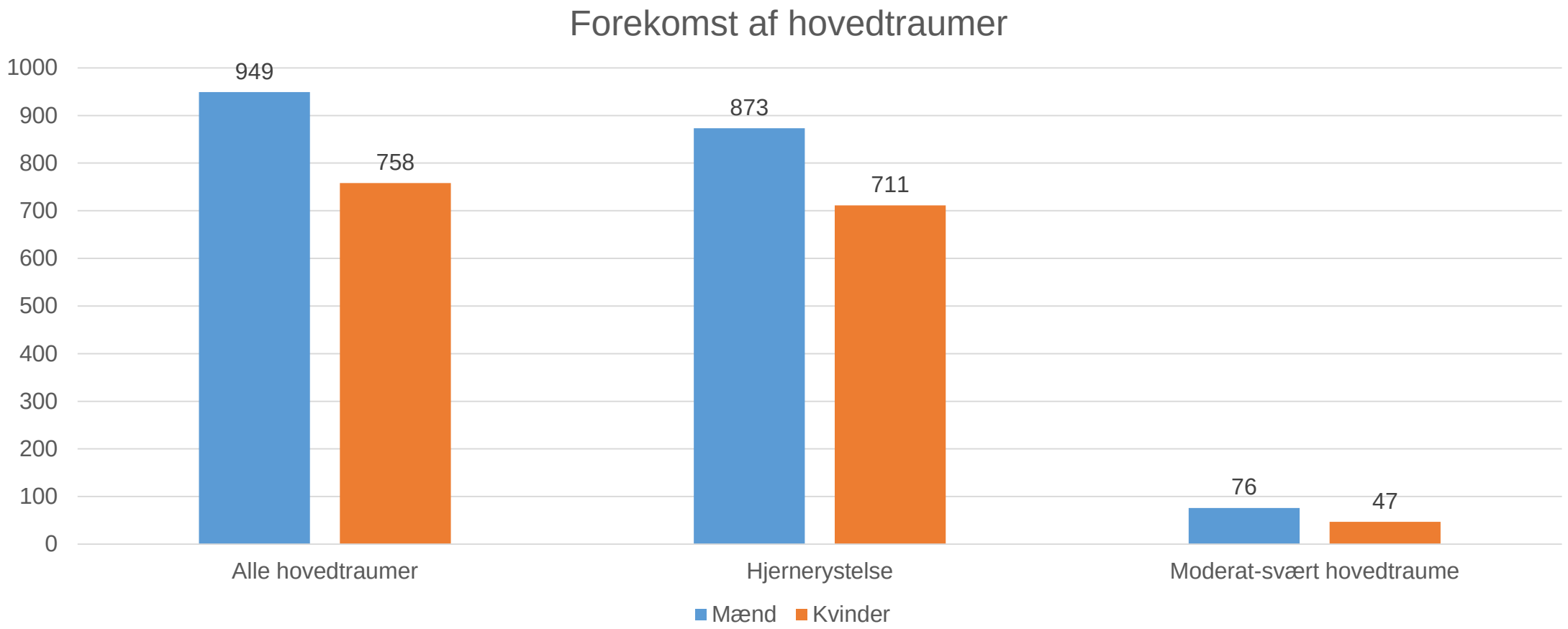
- Sex = biologisk tildelt køn (ydre anatomi / XX vs XY / indre reproduktive organer)



- Gender = Det sociale, psykologiske, kulturelle



Forskelle i forekomst



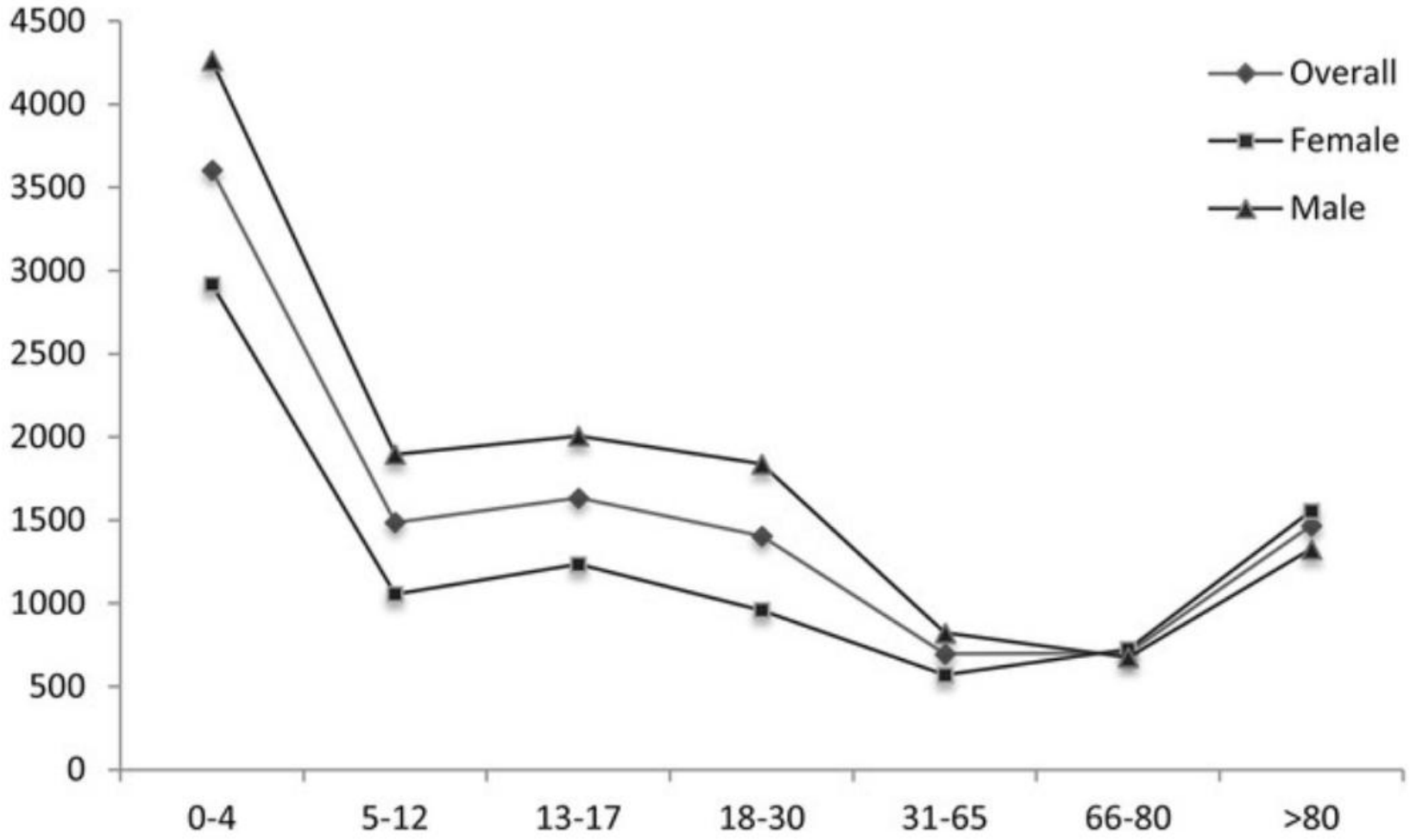
Jones et al. 2026; Feigin et al. 2013.

- Forekomst
  - Japan: 67% mænd
  - Indien: 82% mænd
  - Canada: 59% mænd
- Indlagt på intensiv
  - Spanien:76% mænd
  - Schweiz: 73% mænd
  - Danmark: 69% mænd
- Dødelighed
  - 1.3x højere hos mænd



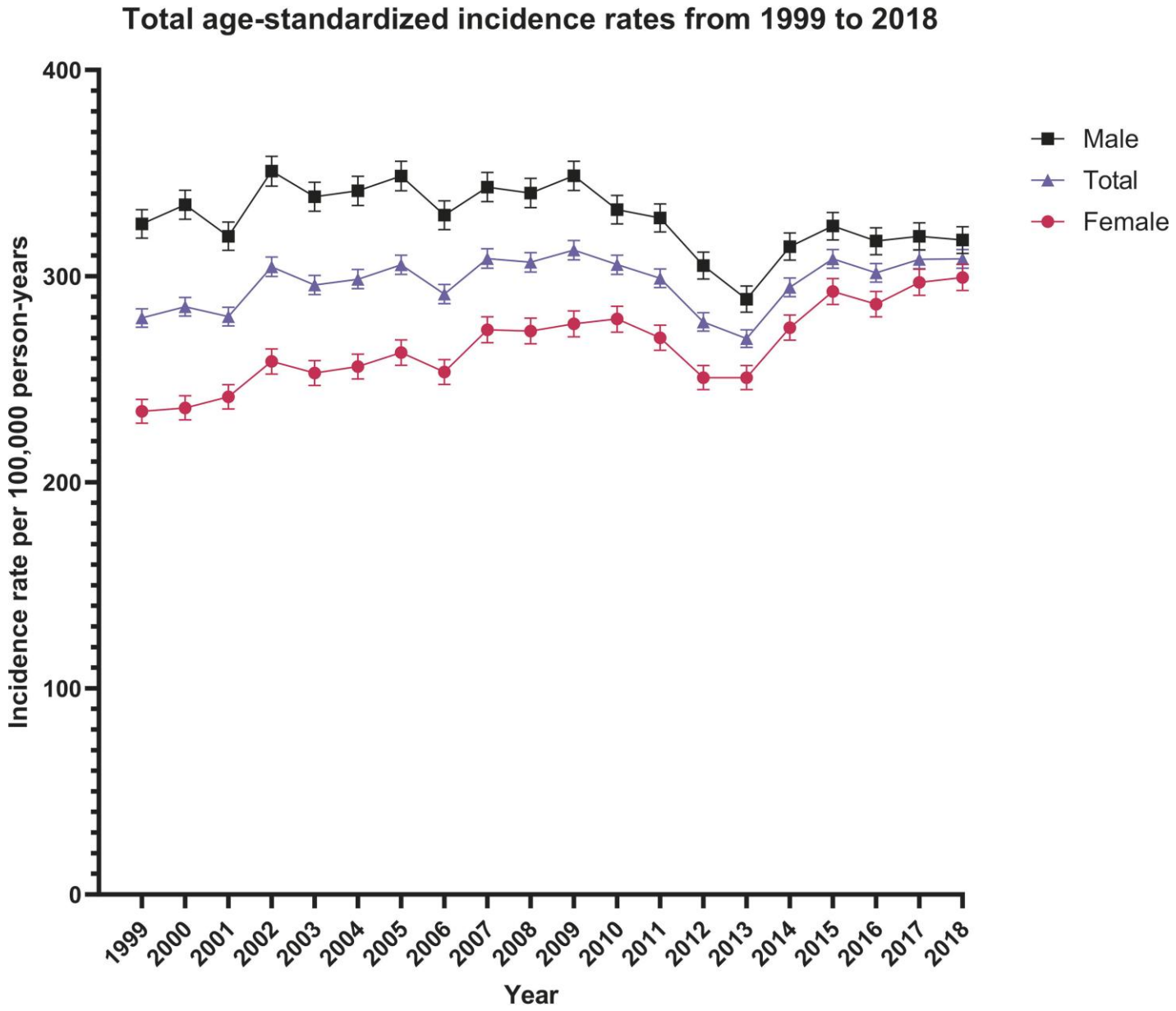


- *Kilder: Cruz-Garcinuño et al. 2025; Fleischer et al. 2025; Hosomi et al. 2021;* Langer et al. 2020; Maas et al. 2022

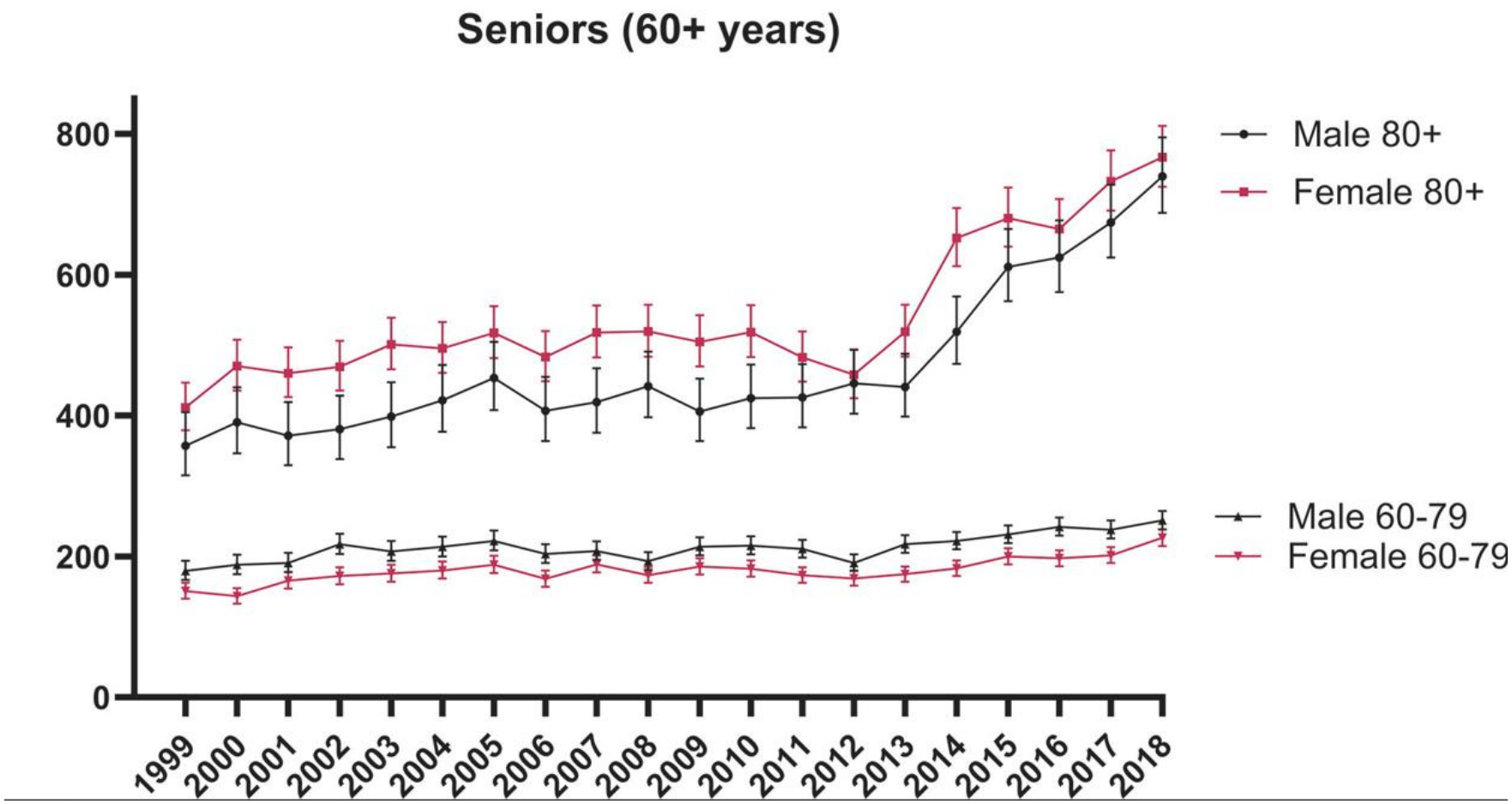


- *Kilder: Langer et al. 2020*

Danmark



- *Kilder: Eggertsen et al. 2024*



- *Kilder: Eggertsen et al. 2024*

Årsagssammenhænge

Faktor	Effekt på TBI risiko	Litteratur
Risikofyldte aktiviteter (sport, kørsel, vold, militær)	**Stor øgning, Alder 15–35 år ‘Young male syndrome’**	(Tamás et al., 2019; Biegon, 2021; Mateu, 2020; Späni et al., 2018; Cheng et al., 2019; Oliverio et al., 2020)
Alkohol/stofmisbrug	**Forøger risiko og typisk sværhedsgrad**	(Matei et al., 2022; Rebko, 2014; Rubinshteyn et al., 2023; Mateu, 2020; Oliverio et al., 2020)
Sociale roller og beskæftigelse	**Større eksponering på grund af farefulde jobs og militær**	(Biegon, 2021; Mateu, 2020; Cheng et al., 2019; Oliverio et al., 2020)

Militær

Kontekst	Prævalens	Kønsmønstre	Kilder
Under udsendelse (OIF/OEF/OND)	~6–22% livstidsprævalens	**Blandet (Lighed blandt køn, men større blandt mænd ved alle TBI)**	(Van Pelt et al., 2019; Helmick et al., 2015; Merritt et al., 2019; Hoge et al., 2008; Cifu et al., 2018)
Militær akademier (alle settings)	6.96% over 3 år	**Kvinder ≈ 2× forøget risiko**	(Van Pelt et al., 2019; Kelly et al., 2024)
Kamp træning	Høj / eksponering	**Kvinder ~1.7× forøget risiko**	(Aderman et al., 2025; Aderman et al., 2023)

Sport

Kontekst	Prævalens	Kønsmønstre	Kilder
Kontaktport **(Rugby, Amerikansk fodbold, Taekwondo)**	0,5-5 pr. 1.000 Træning/Kamp	**Kvinder ~ 1,7x forøget risiko**	(Prien et al., 2018; Ingram et al., 2025; Pfister et al., 2015; Matias-Soto et al., 2024)
Holdsport med kontakt (fodbold, basket)	0,2-1 pr. 1.000 Træning/Kamp	**Kvinder ≈ 1,7-2× forøget risiko**	(Cheng et al., 2019; Merritt et al., 2019; Ingram et al., 2025; Dick, 2009)
Begrænset / ingen kontakt (Golf, tennis, svømning)	0,3-0,5 pr. 1.000 Træning/Kamp	Ikke dokumenteret	(Ingram et al., 2025; Pfister et al., 2015)

Årsager

- Nakkestyrke – Muskelstørrelse og aktiveringsmønstre
- Rapportering – herunder af symptomer
- Kvinder større viden om tegn og symptomer (inden for sport)
- Kønsperformativitet – mænd forsøger at børste det af sig

- Forskelle i udløsende årsager

Vold og partnervold

- Registre vold: 4,8%
  - Mænd = 76%
  - Kvinder = 24%

- Partnervold
  - Mænd = +
  - Kvinder = ++++++



- *Kilder: Eggertsen et al. 2024;* Ganson et al., 2021; Valera et al., 2019; Galovski et al., 2021; Haag et al., 2019; Esopenko et al., 2021

I danske registre

	Mænd	Kvinder	Alle
Violence (*n* = 293) (%, 95% CI)	6.9% (6.1–7.8)	2.4% (1.9–3.0)	4.8% (4.3–5.3)
Unknown person (n = 141) (%, 95% CI)	*54.9% (48.4–61.4)*	*25.4% (15.2–35.5)*	*48.1% (42.1–53.5)*
Partner (n = 24) (%, 95% CI)	*≈0%*[a]	*34% (22.8–44.8)*	*8.2% (5.0–11.3)*
Other family (n = 12) (%, 95% CI)	*3.1% (0.85–5.4)*	*7.0% (1.1–13.0)*	*4.1% (1.8–6.3)*
Acquaintance (n = 47) (%, 95% CI)	*16.1% (11.3–20.9)*	*15.5% (7.1–23.9)*	*16.0% (11.8–20.1)*

- *Kilder:* Eggertsen et al. 2024

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- *Kilder:* Eggertsen et al. 2024

OBS! Skyggetal

- En af de største underraporterede kilder til hjernerystelse – Særligt for kvinder
- De søger ikke behandling
- Symptomoverlap med PTSD / depression / angst



- *Kilder:* Valera et al., 2019; Galovski et al., 2021; Haag et al., 2019; Ayton et al., 2021; Esopenko et al., 2021; Ganson et al., 2021; Rowe et al., 2021; Valera et al., 2019; Galovski et al., 2021; Haag et al., 2019; Esopenko et al., 2021

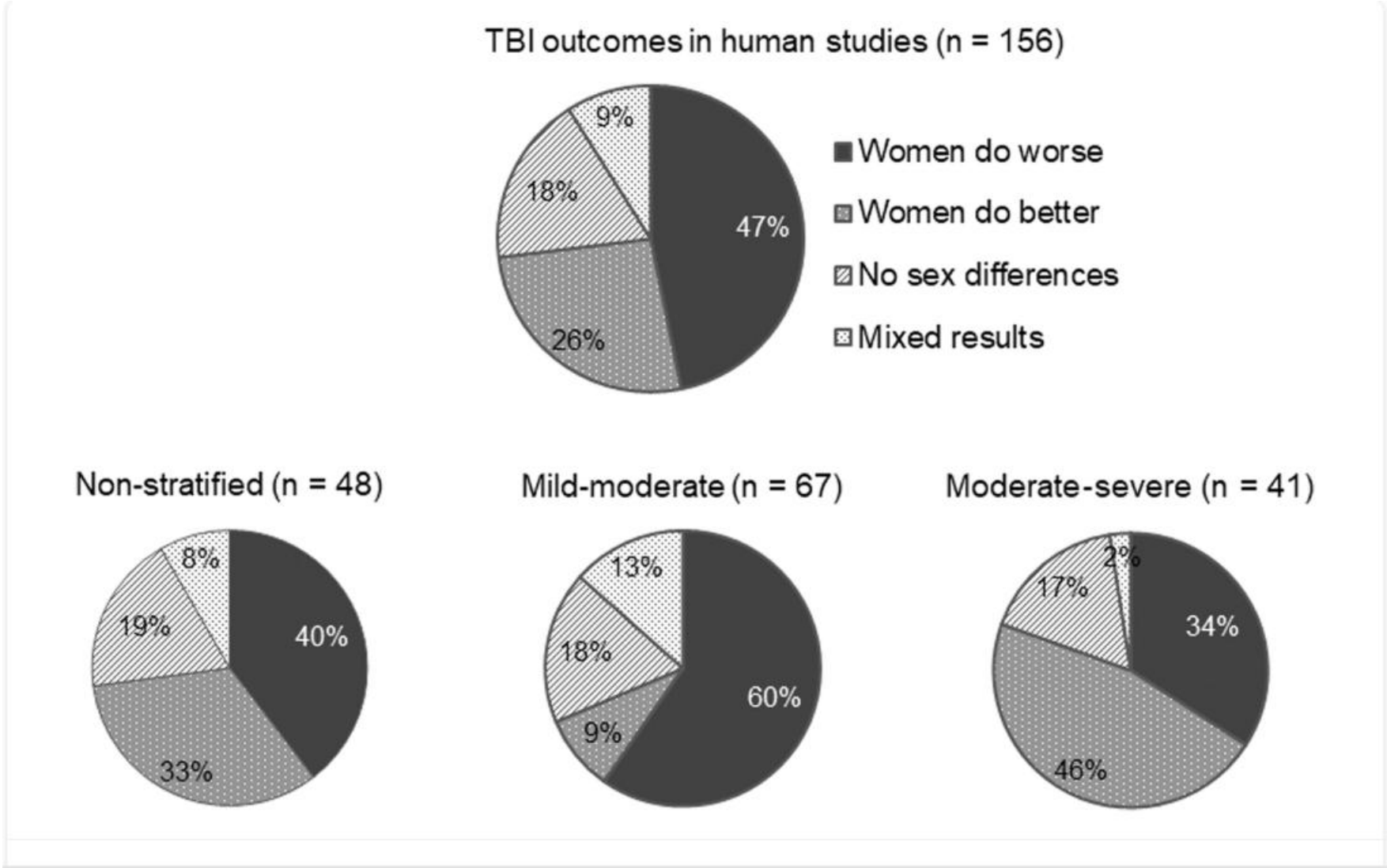
Forekomst af længerevarende følger *(Efter 3-6 måneder)*

- Symptomer
  - 31% = Symptomer
  - 18% = ↑ ↑Symptomer

- Funktionsniveau
  - 54% = Let under fuldt funktionsniveau (GOSE <8)
  - 30% = Under fuldt funktionsniveau (GOSE <7)

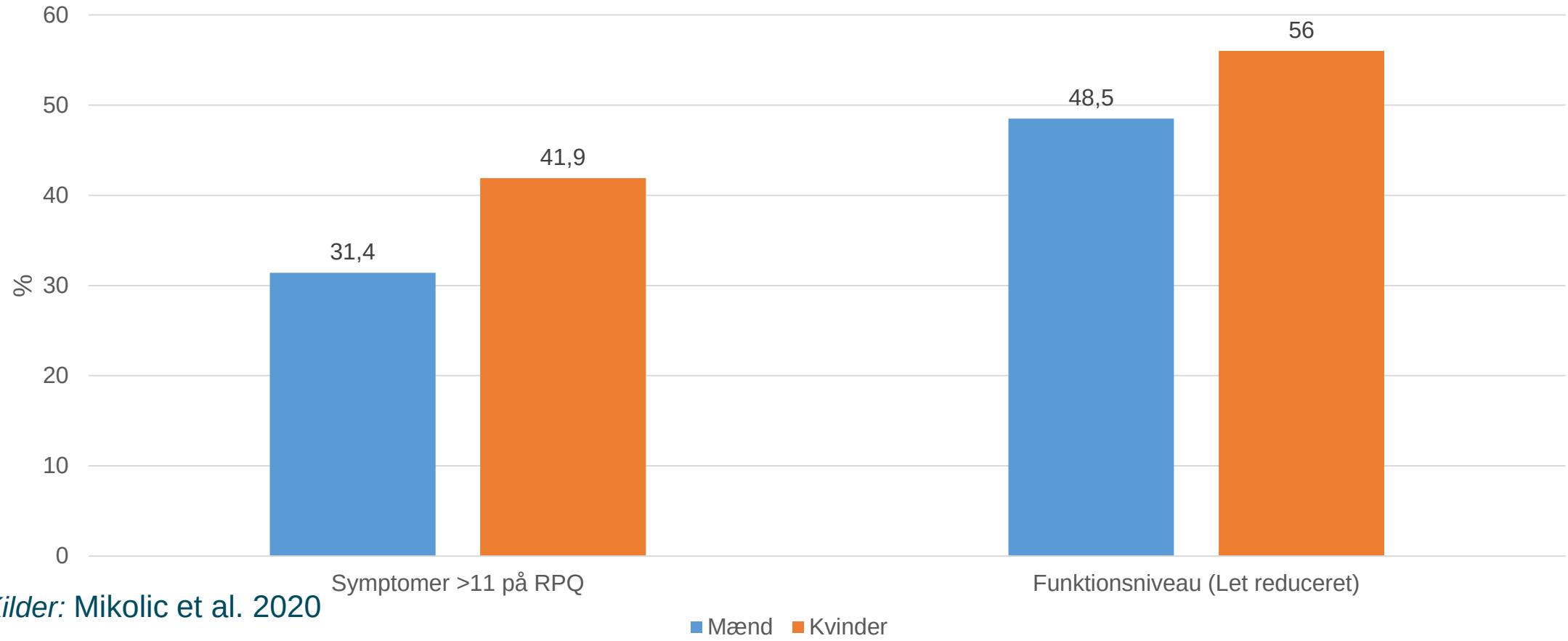
- *Kilder:* Cancelliere et al. 2023 (Meta-analyse: 21 studier)

Køn

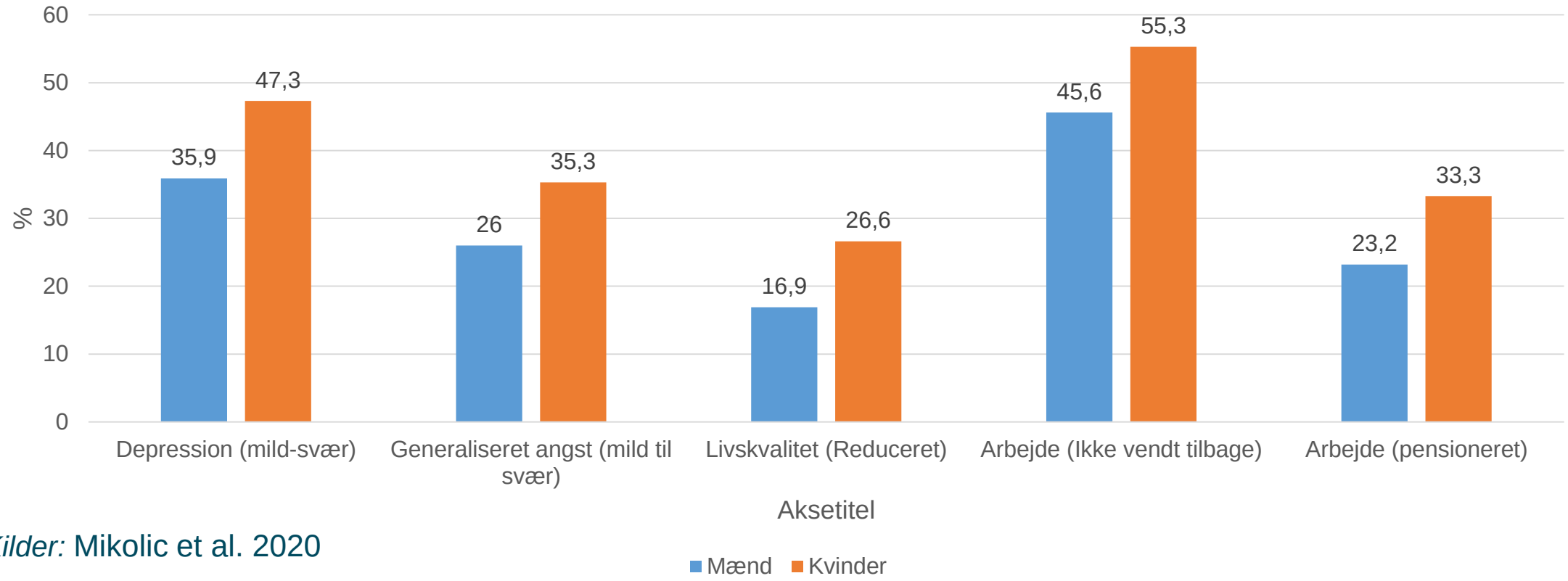


- *Kilder:* Gupte et al. 2019

Forekomst i køn

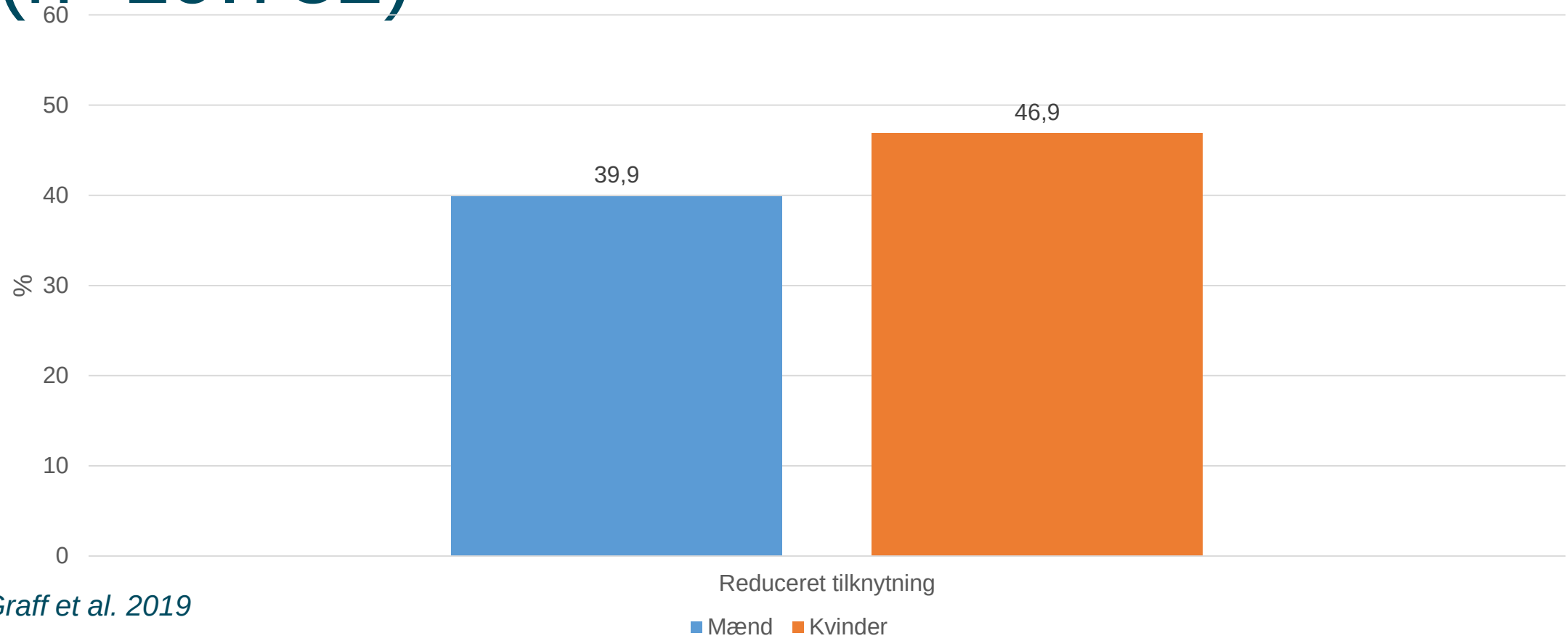


- *Kilder:* Mikolic et al. 2020



- *Kilder:* Mikolic et al. 2020

Tilbagevenden til arbejde i DK (n=19.732)



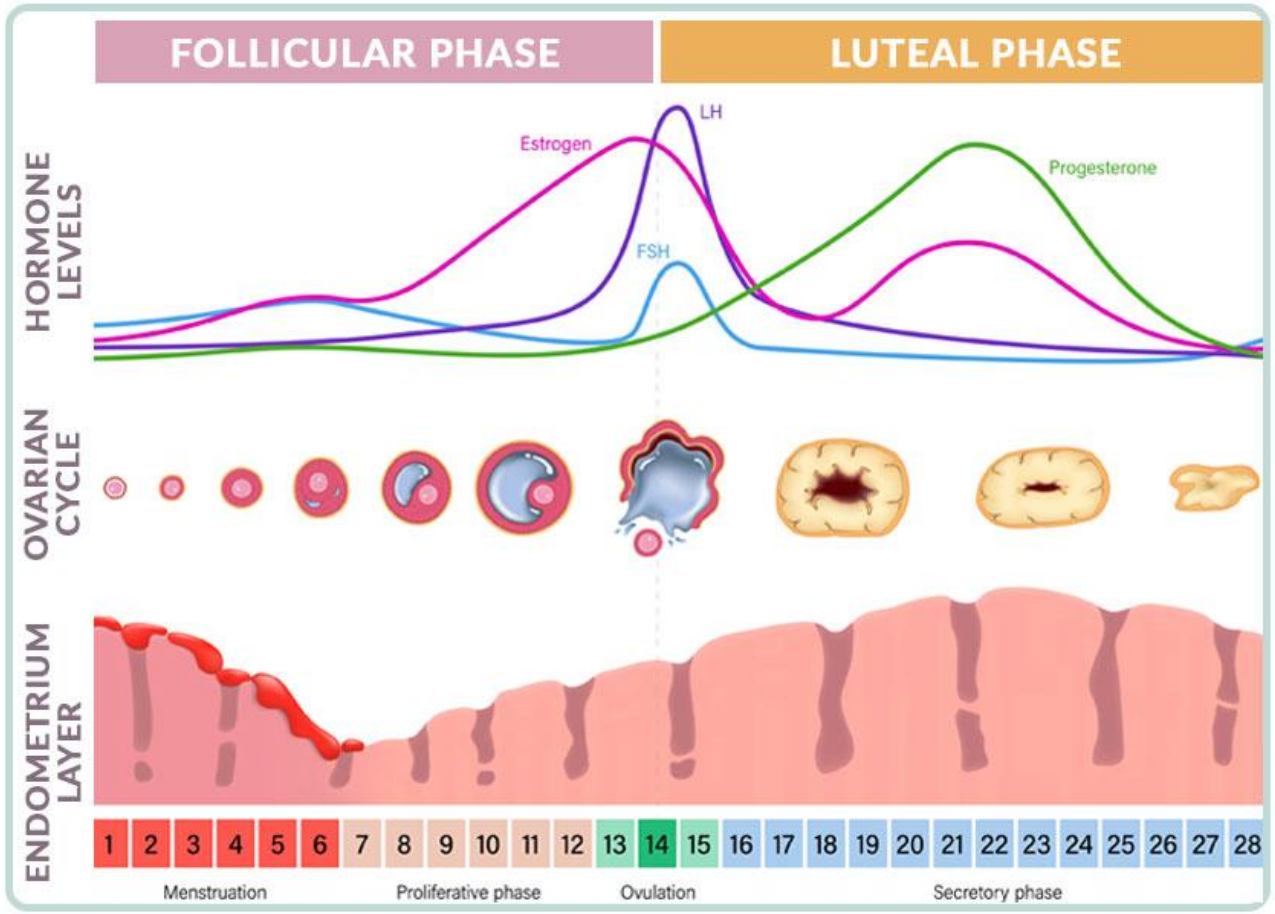
- *Graff et al. 2019*

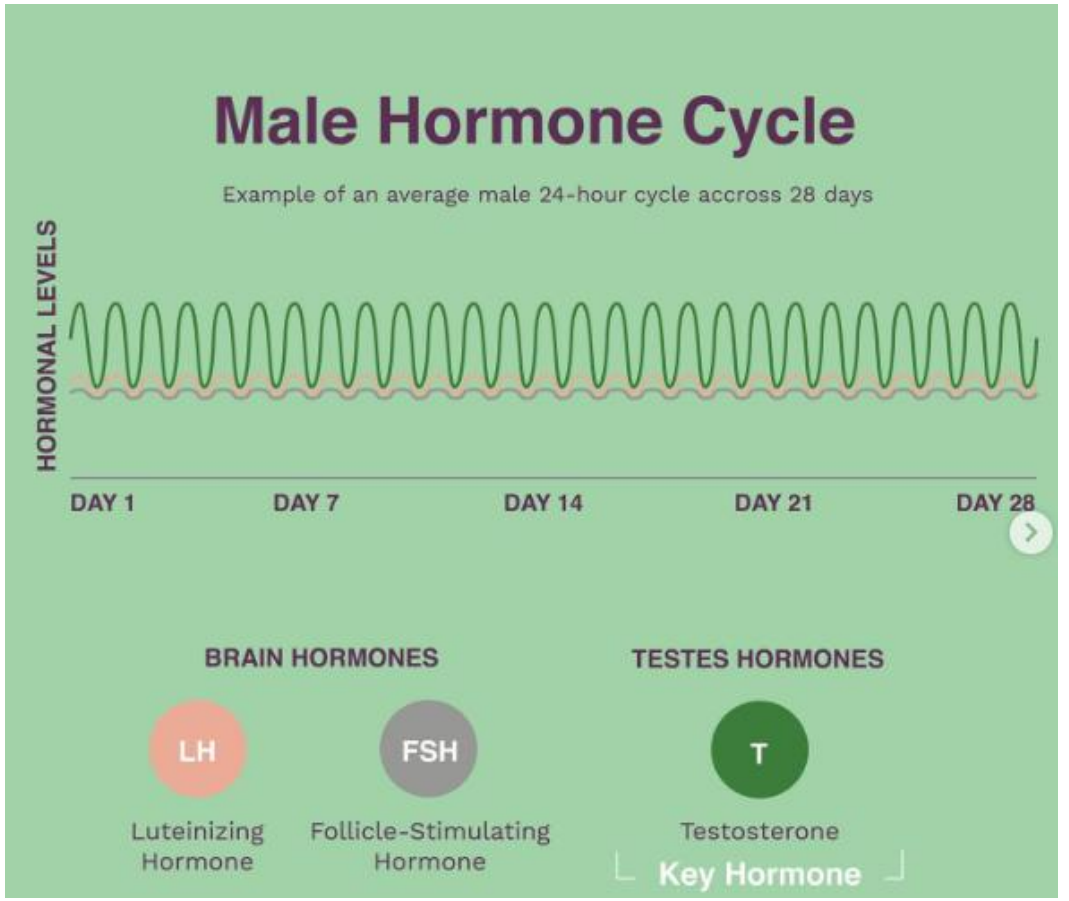
Forskelle mellem køn uden hjernerystelse

- Antal Symptomer (4 uger): Kvinder 6,0 - Mænd 4,8
- Depression: Højere hos kvinder
- Angst: Højere hos kvinder
- PTSD: Højere risiko hos kvinder
- Stress: Højere forekomst hos kvinder
- Søvnproblemer: Hyppigere i aldersgruppen 18-45
- Migræne: Højere hos kvinder
- Køresyge og svimmelhed: Højere hos kvinder
- Hormoner

- *Kilder: Elnegaard et al. 2015; Schmidt et al. 2020; Ballering et al. 2023; Yang et al. 2024; Chalmer et al. 2023; Koslucher et al. 2015. Tortella-Feliu et al. 2019; Ahn et al. 2024;Gupte et al. 2015.*

Menstrual Cycle





From: The Effect of Menstrual Cycle Phase and Hormonal Contraceptive Use on Post-concussive Symptom Reporting in Non-concussed Adults

	Eumenorrheic females		Hormonal control females		Males	
	Time 1	Time 2	Time 1	Time 2	Time 1	Time 2
DASS Depression	6.05 (6.17)	4.62 (7.00)	6.74 (6.41)	6.35 (7.33)	8.82 (9.79)	7.26 (9.10)
DASS Anxiety	6.76 (7.32)	3.71 (4.56)	6.65 (5.81)	4.87 (5.56)	7.91 (7.92)	6.74 (7.34)
DASS Stress	13.76 (11.09)	9.43 (8.61)	14.96 (9.52)	11.39 (8.61)	10.91 (9.67)	9.68 (9.10)
PCSS	33.24 (25.82)	23.71 (18.98)	31.43 (19.60)	25.35 (21.35)	23.95 (19.22)	21.42 (18.10)

- Tid 1 = Follikulære fase
- Tid 2 = Luteale fase

- *Malleck et al. 2019*

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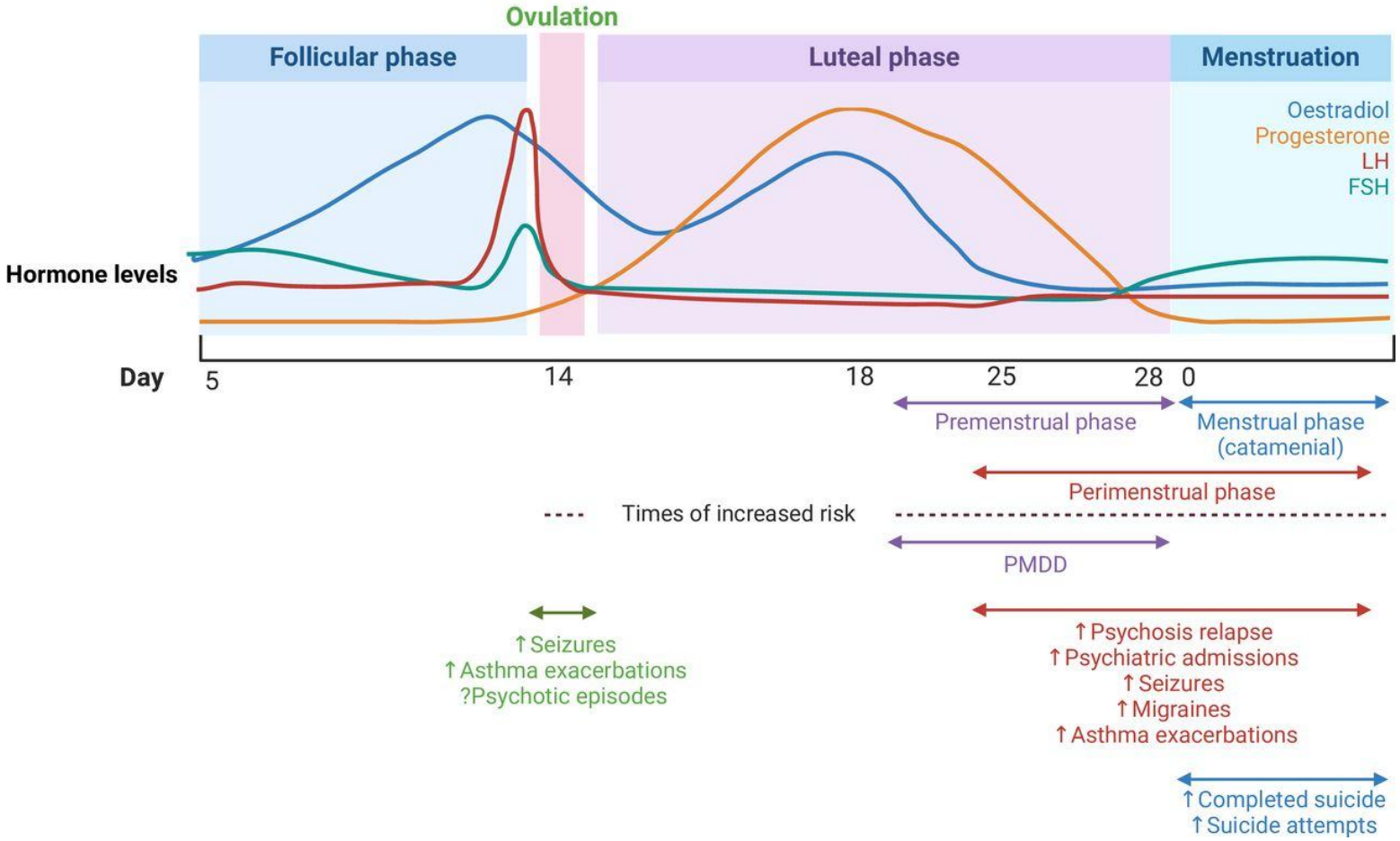
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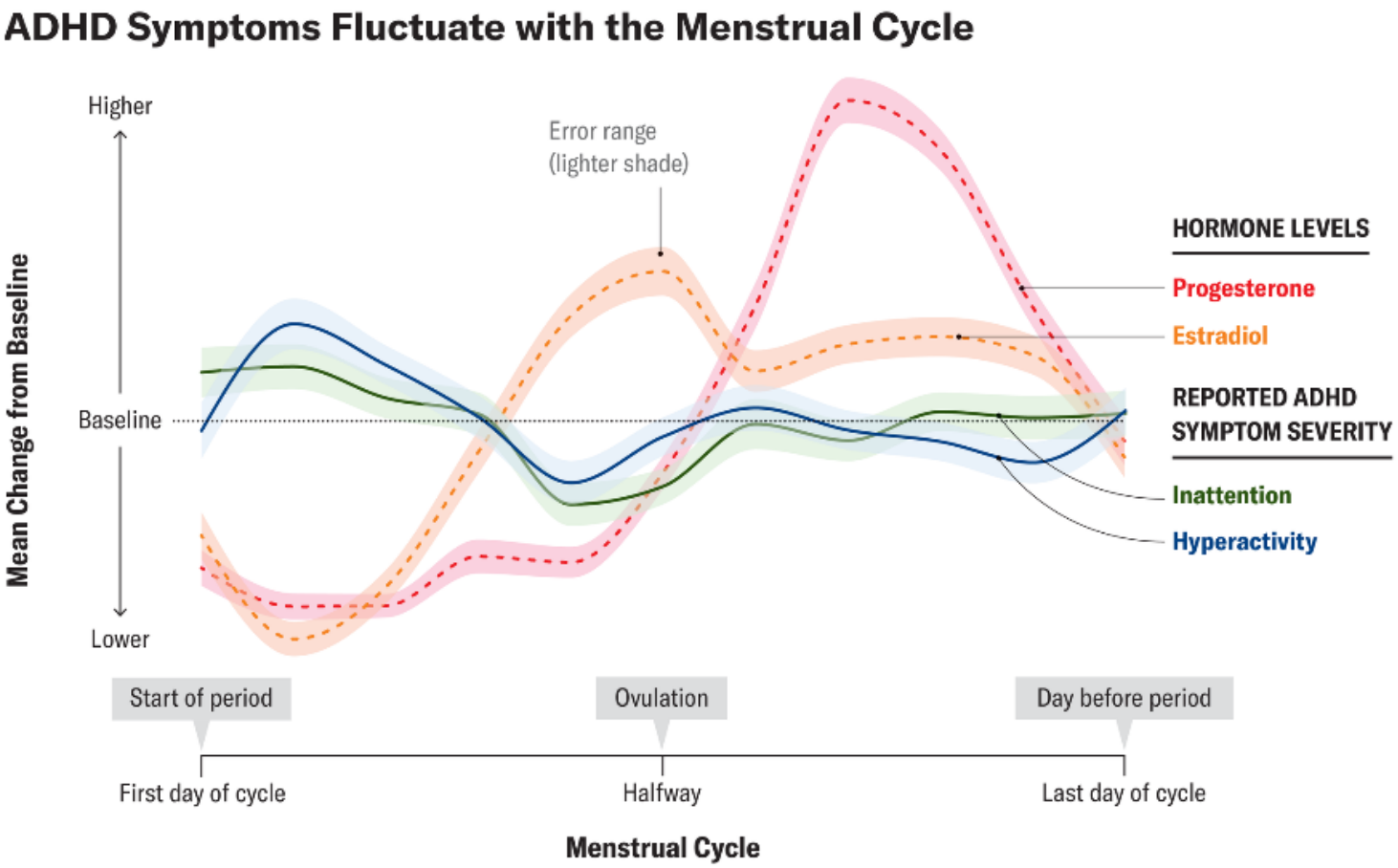
- *Malleck et al. 2019*

Transdiagnostic risk across the menstrual cycle



- *Marwick et al. 2025*

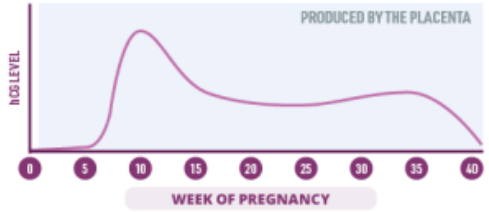
ADHD og Menstruationscyklus



Ripley Cleghorn; Source: ADHD in Adult Women: Challenges and New Directions," by Michelle M. Martel. Presented at Psych Congress, Boston, November 2024 (*data*)

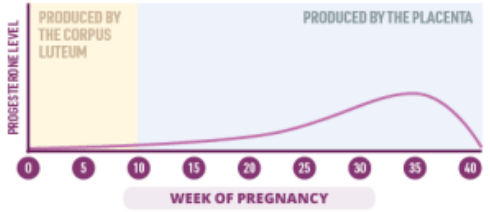
SIX KEY HORMONES IN PREGNANCY

HUMAN CHORIONIC GONADOTROPIN



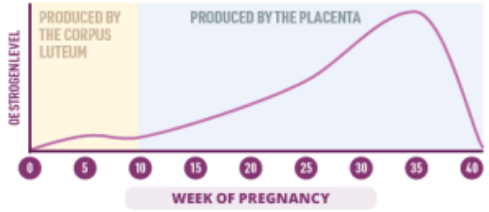
hCG is produced by the placenta after implantation. It supports the function of the corpus luteum, a temporary structure in the ovaries essential in early pregnancy. It's also the hormone detected by pregnancy tests.

PROGESTERONE



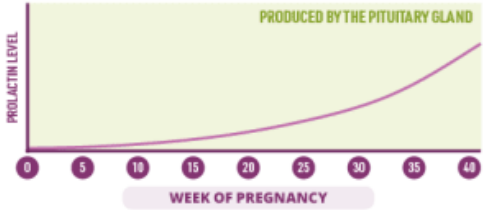
Progesterone helps establish the placenta. It stimulates growth of blood vessels that supply the womb and inhibits contraction of the uterus so it grows as the baby does. It also strengthens pelvic wall muscles for labour.

OESTROGEN



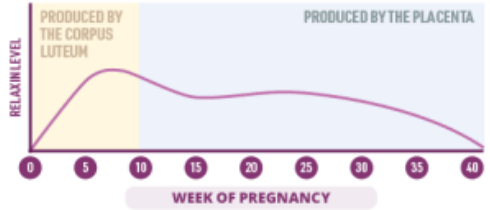
Oestrogen helps the uterus grow, maintains its lining, and helps foetal organs develop. Activates and regulates production of other hormones. With progesterone, stimulates breast growth and milk duct development.

PROLACTIN



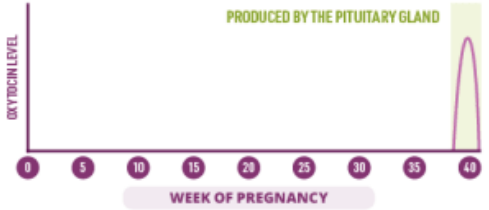
Prolactin is the main hormone needed to produce breast milk. It contributes to enlargement of the mammary glands and prepares them for milk production. Progesterone inhibits lactation during pregnancy.

RELAXIN



Relaxin inhibits uterus contraction to prevent premature birth. It relaxes blood vessels, increasing blood flow to the placenta and kidneys. It relaxes the joints of the pelvis and softens and lengthens the cervix during birth.

OXYTOCIN



Oxytocin levels rise at the start of labour, stimulating contractions of uterine muscle. It triggers production of prostaglandins, which increase contractions further. If labour doesn't start naturally, it can be used to induce it.

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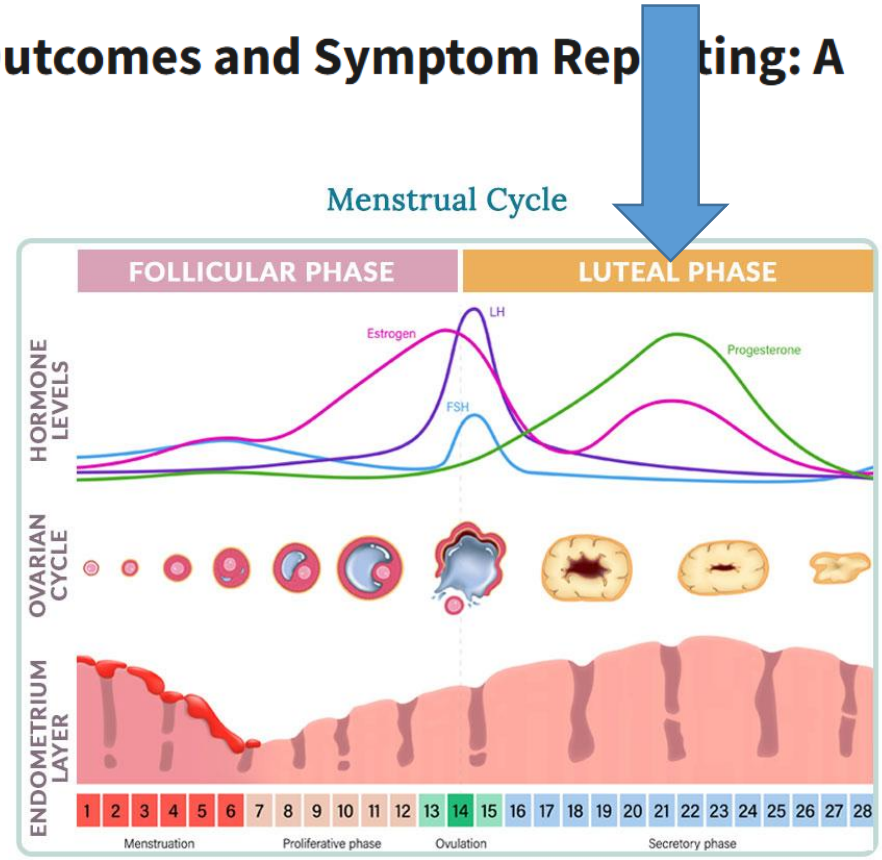
Hjernerystelse i luteal fase = Værre forløb

The Influence of Menstrual Cycle Phases on Postconcussion Outcomes and Symptom Rep ting: A Scoping Review

Gina Carr [1], Marie-Therese Fleddermann [1,✉]

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PMCID: PMC12188701 PMID: 40557954

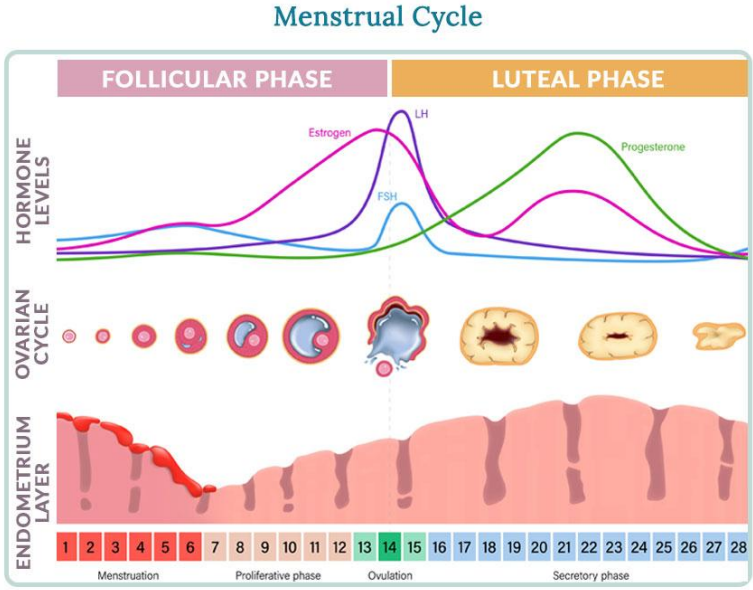


Overgangsalder

Aspekt	Menopause-relateret effekt på TBI	Kilder
Tab af hormonel beskyttelse	Tab af østrogen og Progesteron → reduceret neural beskyttelse	(Blaya et al., 2022; Sinder et al., 2024)
Neuroinflammation	Højere basis niveau af inflammation → Det kan forværre sekundære virkninger.	(Blaya et al., 2022; Merritt et al., 2019)
Kliniske udfald	Ældre postmenopausale kvinder har dårlige forløb sammenlignet med mænd. Periomenopause muligvis høj risiko gruppe.	(Blaya et al., 2022; Rapport et al., 2023; Bazarian et al., 2010)

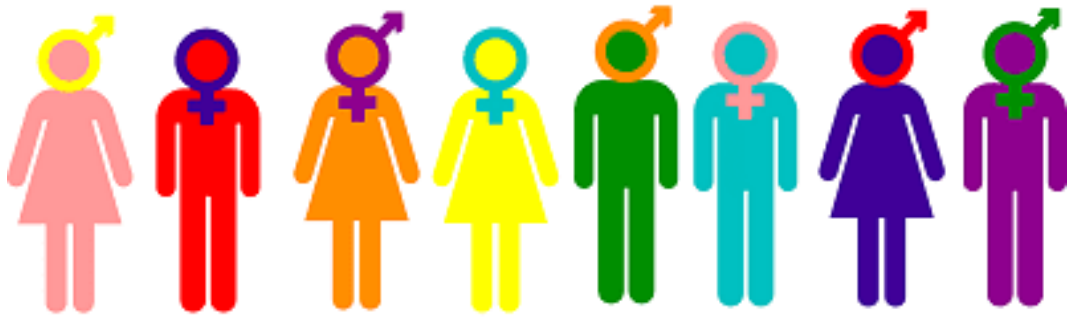
- Indvirkning på symptomrapportering
- Prævention associeret med reduceret symptombyrde
- Overgangsalderen = Øget risiko for PPCS
- Hjernerystelse i den luteale fase = højere risiko for PPCS

- Hormonregulering kan påvirkes efter hjernerystelse (op mod 33%)
- Kvinder kan misse en periode



- *Kilder: Mihalik et al. 2009; Roby et al. 2023 Malleck et al. 2019; Wunderle et al. 2014; Emelifeonwu et al. 2020.*

Non-binær kønsidentitet





Non-binær kønsidentitet

- ↑ affektive lidelser (fx depression, angst)
- ↑ Selvmordsadfærd

- Årsager: Minoritet (+/-)
- Stigmatisering, diskriminering, ÷anerkendelse, manglende validering.
- +Hormonbehandling



- *Kilder: Borgogna et al., 2019; Tebbe & Budge, 2022; Källström et al., 2022; Stanton et al., 2021; Valentine & Shipherd, 2018; Lin et al., 2021; Hainey et al., 2025; Graff et al. 2019; Zonfrillo et al. 2014; T'Sjoen et al., 2018; Doyle et al., 2022; Skewis et al., 2021; Baker et al., 2021; Prokop et al., 2025; Hughto & Reisner, 2016; Nguyen et al., 2018.*

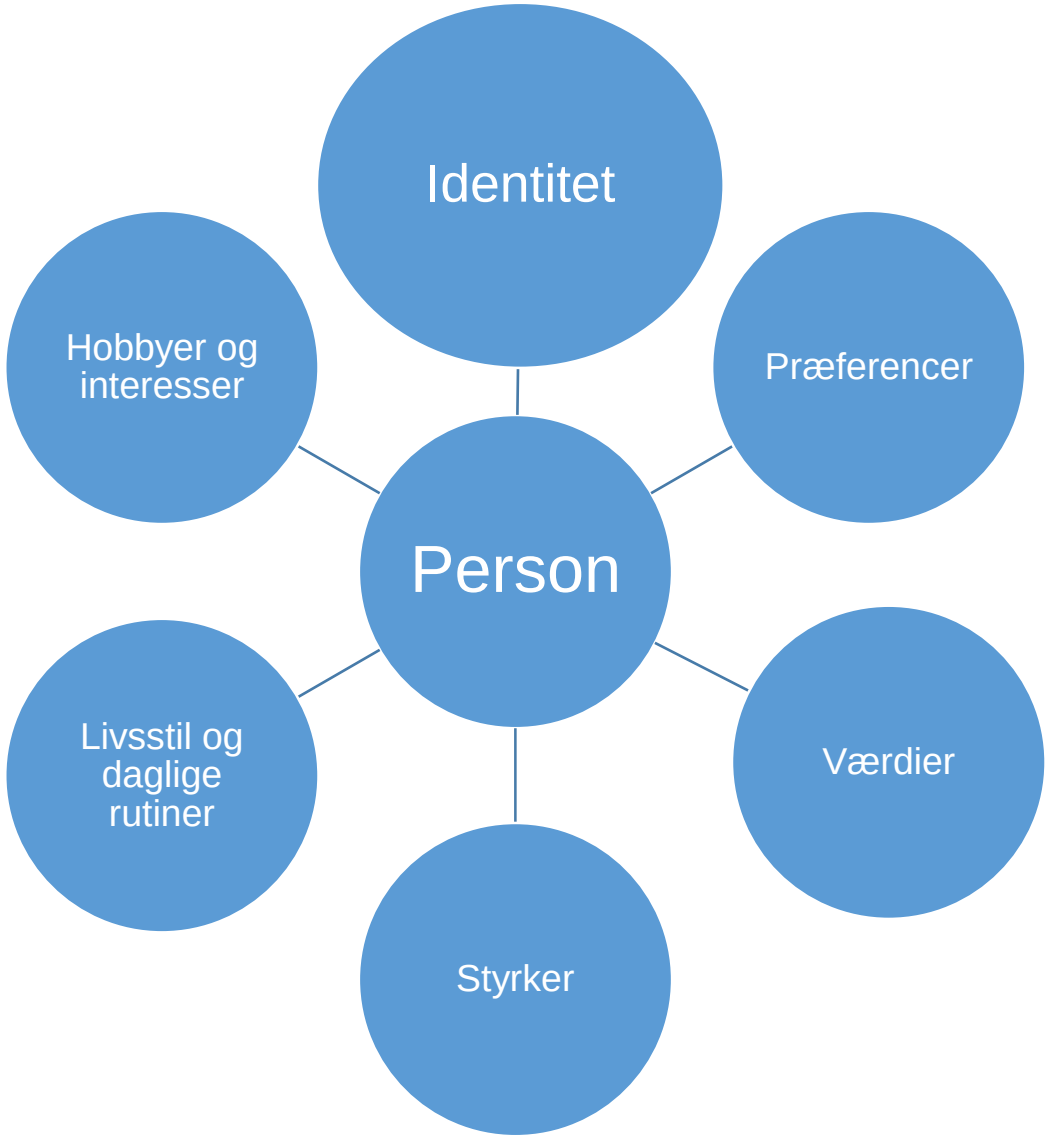
Behandling

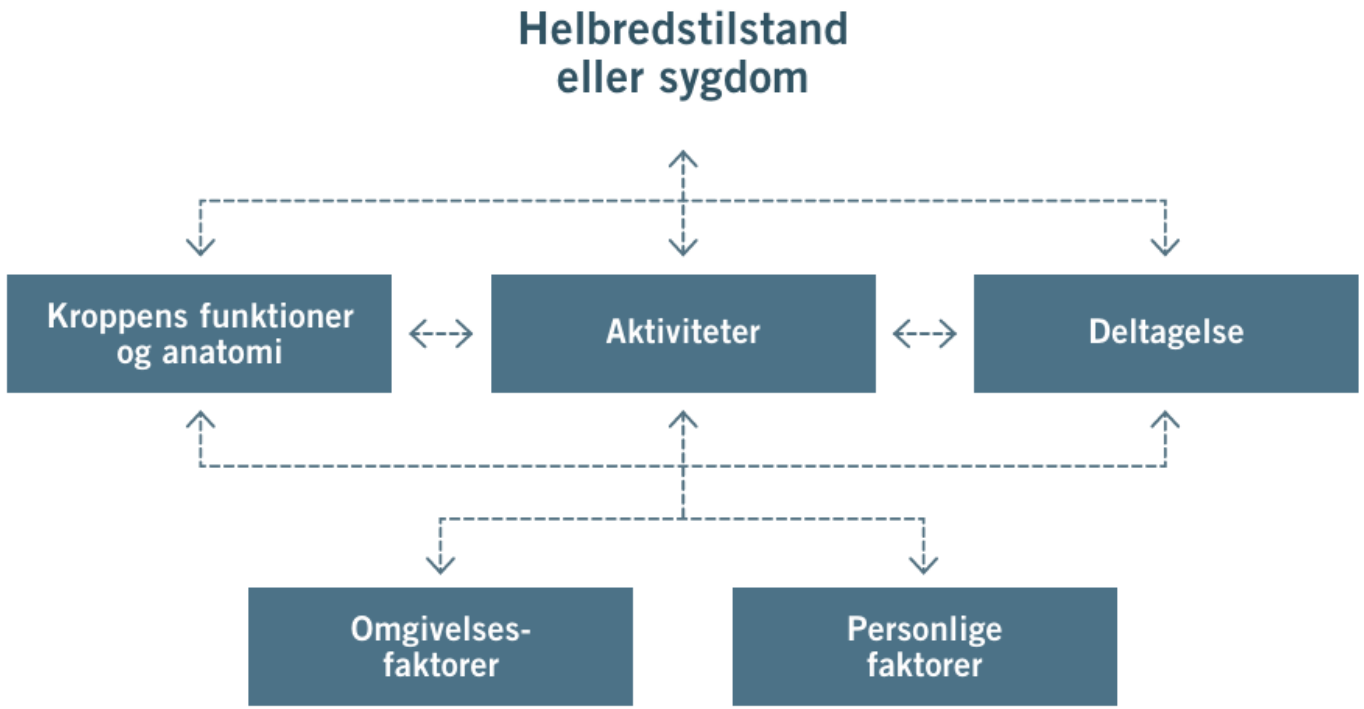
- Kønsspecifik effekt af indsatser?



- *Kilder: Leddy et al. 2023;* Schneider et al. 2023; Rytter et al. 2021; Hesslot et al. 2022

Behandling – Personcentreret

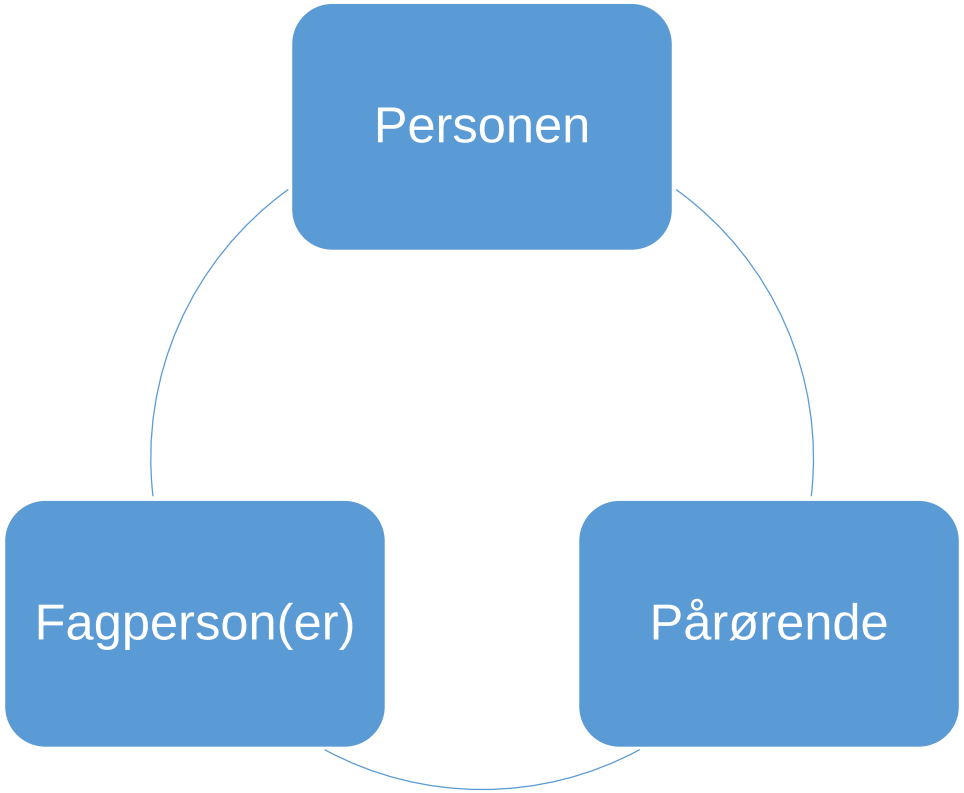




Figur 1. International klassifikation af funktionsevne, funktionsevnenedsættelse og helbredstilstand (ICF)[23]
Tilpasset med tilladelse. Copyright [2003] af Sundhedsstyrelsen.

- *Maribo et al. 2022*

Samarbejde



Hormonelle faktorer

- **<u>Kvinder</u>**
- **Obs menstruationscyklus, menopausal status.**

- Obs! **hormonel dysregulering**.
- Samarbejde med gynækolog/endokrinolog kan være relevant ved mistanke om hormonel påvirkning.

- **<u>Mænd</u>**
- OBS! **Hormonel dysregulation**.
- Samarbejde med endokrinolog kan være relevant ved mistanke om hormonel påvirkning.

Migræne og Hovedpine

- **<u>Kvinder</u>**
- **Obs! Migræne**
- Kvinder: Posttraumatisk hovedpine (**migræne)**

- Behandling:
  - målrettet migrænebehandling
  - Fysioterapeutisk indsats
  - vurdering af hormonelle triggers

- **<u>Mænd</u>**
- **Posttraumatisk hovedpine**
- Identificer primær hovedpinetype

- Behandling:
  - Behandling for hovedpinetype
  - Gradueret fysisk træning

- *Kilder: Ashina et al. 2020 - doi:10.1177/033310242090986 og 10.1186/s10194-020-01202-6; Rytter et al. 2021 (NR); Levin et al. 2021; French et al. 2025.*

. Psykosociale og mentale faktorer

- Kvinder
  Generelt højere risiko for **angst, depression og stressrelaterede symptomer**

- Behandling:
  - screening for psykiske symptomer
  - tidlig psykoedukation
  - evt. psykologisk behandling

- Mænd

•Rapporterer ofte **færre psykiske symptomer**, men (Obs!)

•Behandling:

•Systematisk screening og aktiv opfølgning.

- tidlig psykoedukation
- evt. psykologisk behandling

Arbejds- og belastningsforhold

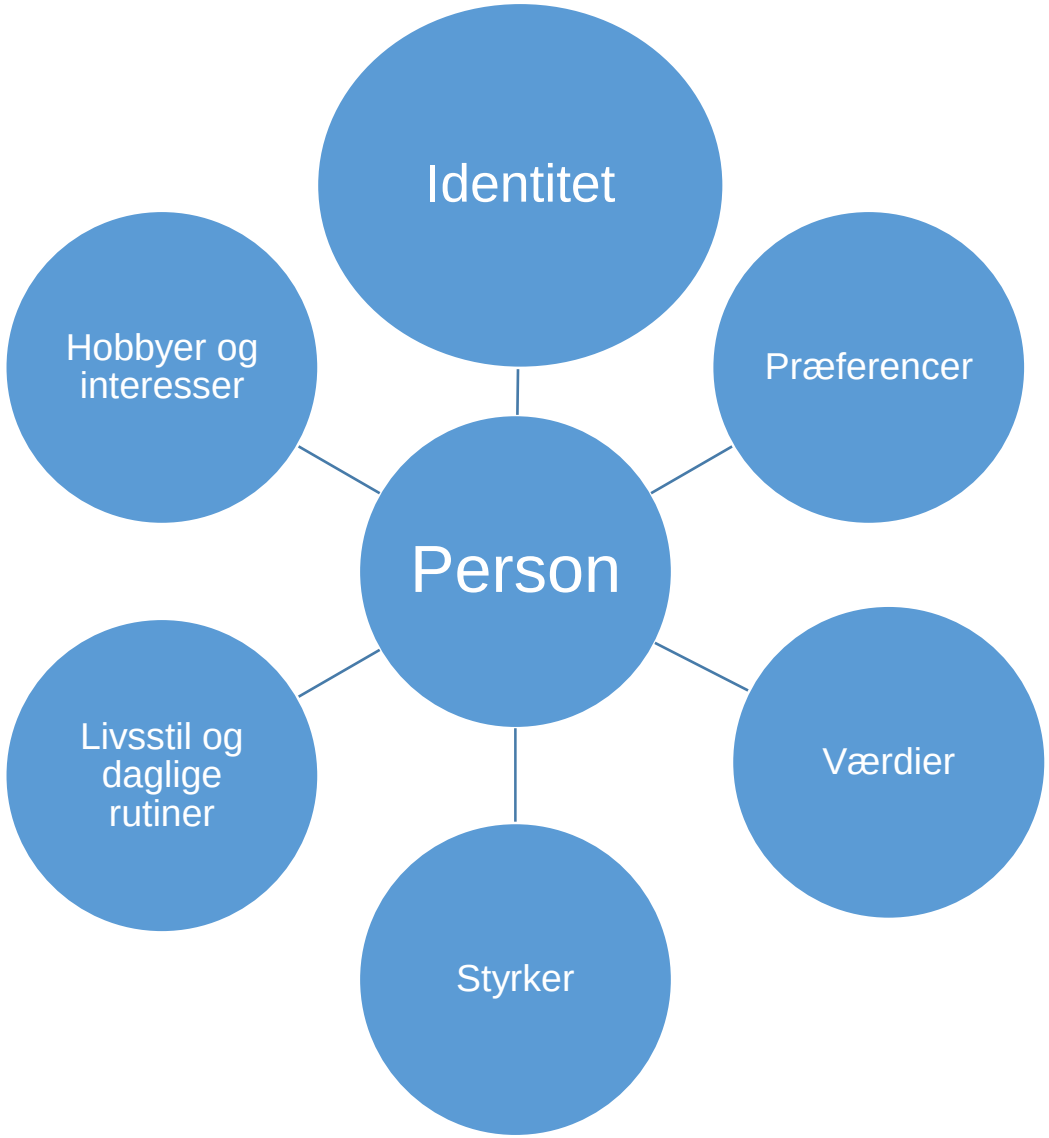
- **Kvinder**
- kvindedominerede erhverv:
  - Høj arbejdsbelastning
  - Skiftende arbejdstider
  - Moralsk belastning

- **Indsats**
  - Gradvis tilbagevenden til arbejde
  - Individuel rådgivning ift tilbagevenden til de specifikke job og udfordringer
  - + ergonomisk rådgivning.

- **Mænd**
- Mandedominerede erhverv:
  - Høj arbejdsbelastning
  - (Skiftende arbejdstider)
  - Fysisk belastning

- **Indsats**
  - Gradvis tilbagevenden til arbejde
  - Individuel rådgivning ift. tilbagevenden til de specifikke job og udfordringer
  - + ergonomisk rådgivning.

Behandling – Personcentreret



Tak for i dag!



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Dansk Center for Hjernerystelse