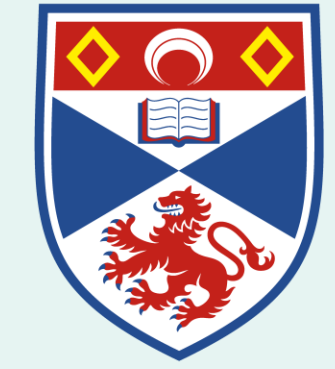


The UK Biobank: what can it tell us about female reproductive factors and dementia risk?



What can it tell us about female reproductive factors and dementia risk?

Rose Overton, School of Medicine
Supervisor: Professor Peter Donnelly



University of St Andrews

Dementia

There are currently over 944,000¹ people in the UK living with dementia, an umbrella term for diseases that reduce a range of brain functions from memory to movement. It has an impact on both a personal and economic level with an estimated annual cost to the UK of £42 billion in 2024.² Around 65% of dementia cases occur in women, and while increased age is a significant risk factor, biological factors may also play a role.³



Implications

Without a dementia cure, improving our understanding of risk factors is a key step to reducing cases. Due to its scale and breadth of questions, the UK Biobank is a crucial resource to be able to consider a wide range of factors that influence age-related conditions, and has inspired similar projects such as Our Future Health.

There are limitations, such as the length of follow-up to allow cases to occur; demographics of participants that are not representative of national age, ethnicity and gender identity; and the lack of depth into some topics.



The UK Biobank is a biological database containing information on 500,000 participants aged 40-69 at recruitment, with information from initial questionnaire responses, physical measurements, health records, biosamples and imaging. It acts as a large prospective cohort study, accessible to global researchers.⁴

Results

Identified risk factors

- Older age at menarche
- Earlier natural menopause
- Shorter cumulative oestrogen exposure
- Ever hysterectomy
- Greater number of live births
- Earlier age at first birth
- History of gestational diabetes

U-shaped relationship

- Age at menarche
- Age at surgical menopause
- Age at oophorectomy
- Number of pregnancies

Ambiguous associations

Contradictory findings:

- Surgical menopause
- Age of HRT initiation
- parity

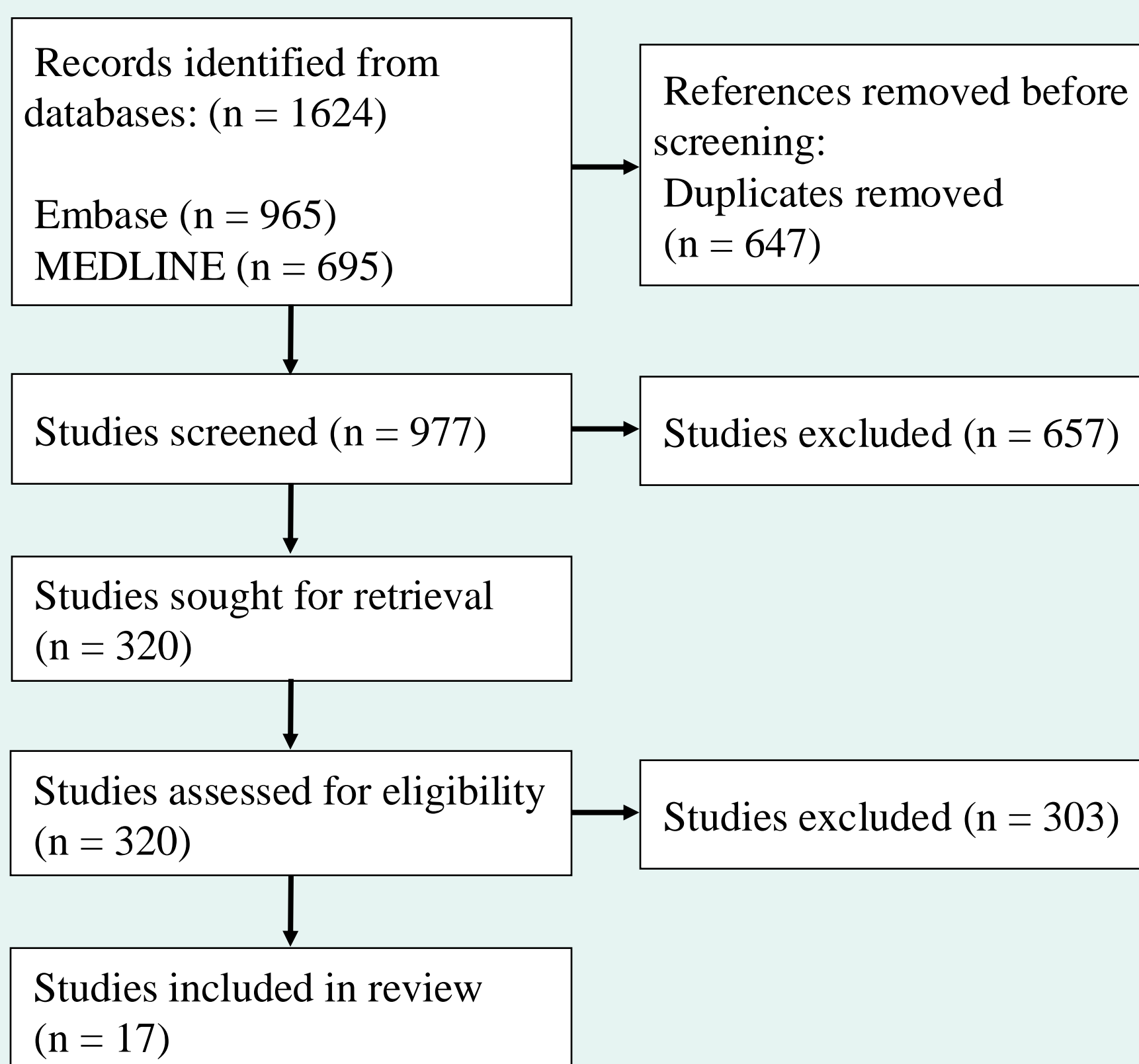
No impact on dementia risk:

- Ever HRT use
- Duration of HRT use
- Miscarriage or stillbirth

Risk-reducing factors

- Longer cumulative oestrogen exposure
- Later age at menopause
- Ever oral contraceptive pill use

PRISMA 2020 Flow diagram



Scan for more information:



Digital poster
References
Blog post
Essay

Gender vs sex

While we now understand gender as a social construct compared to the biological basis of sex, the UK Biobank launched in 2006 and uses these terms interchangeably, reflecting the societal norms of the time.⁵ This review, acknowledging this limit of the biobank, also has to use the terms “female” and “woman” interchangeably as this is how they are discussed by the literature being reviewed and the available data.



Scope and analysis

This review assesses the literature produced using data from the UK Biobank, summarising research into the following risk factors and their associations with dementia incidence: hormone exposure, pregnancy and brain imaging. It discusses the impact of these findings; discrepancies and similarities between methodologies; and the advantages and limitations of the UK Biobank as a resource. There was a significant degree of overlap of the factors investigated by the literature reviewed for this research and existing research using large cohorts.

In general, factors indicating reduced cumulative lifetime oestrogen exposure were associated with an increased risk of all-cause dementia, in line with existing theories around its neuroprotective effects.

To view the literature included in this literature review, please scan the above QR code.

In-text references:

- NHS. What is dementia [Internet]. nhs.uk. 2023
- Alzheimer's Society. How many people have dementia and what is the cost of dementia care? [Internet]. Alzheimer's Society. 2024
- UK Biobank: Protocol for a large-scale prospective epidemiological resource [Internet]. 2006 Nov
- Alzheimer's Research UK. Prevalence and Incidence [Internet]. Dementia Statistics Hub. 2023
- Ackley SF, Zimmerman SC, Flatt JD, Riley AR, Sevelius J, Duchowny KA. Discordance in chromosomal and self-reported sex in the UK Biobank: Implications for transgender- and intersex-inclusive data collection. PNAS [Internet]. 2023 Apr 24

