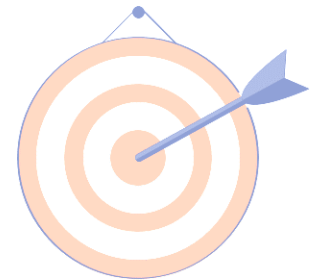# Why should we discuss gender inequalities in Latin America and their effects in later life?
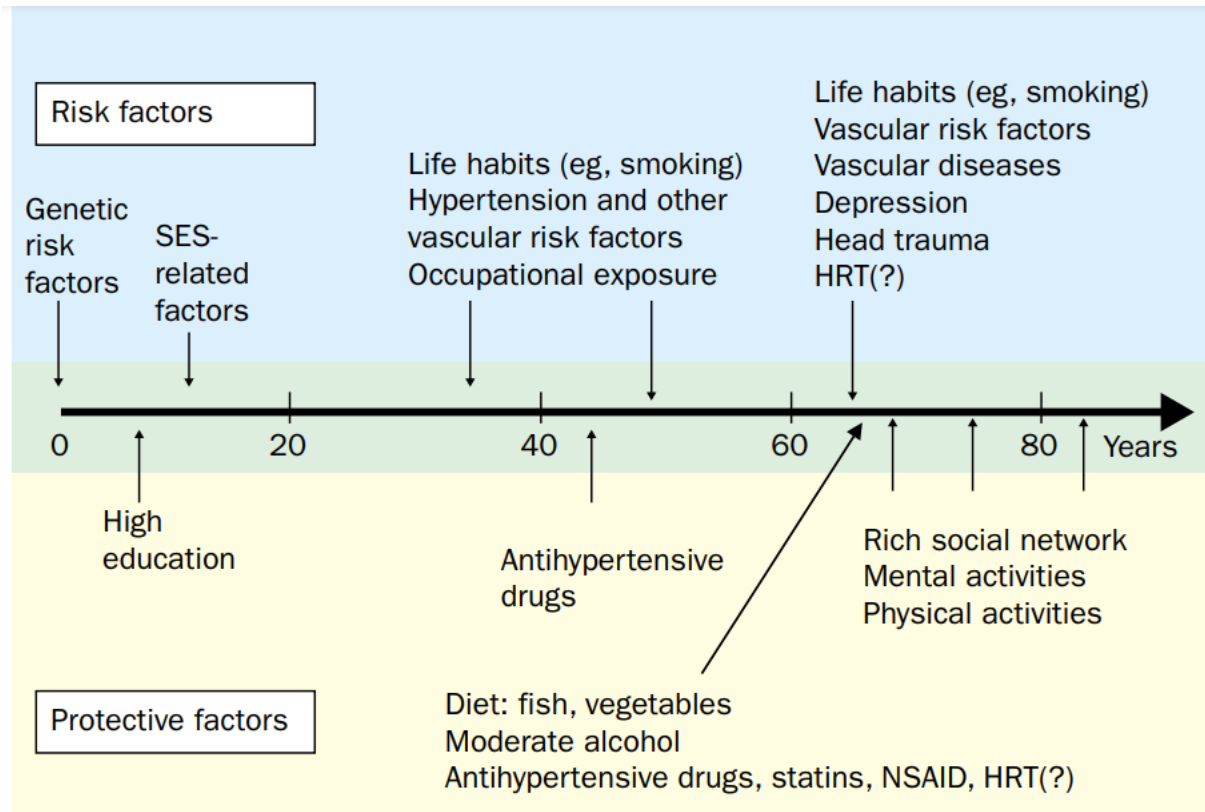
Fabiana Ribeiro & Anja K. Leist

Goals

- Life course trajectories of dementia
- Attempts to discuss sex/gender in dementia
- Why is important to look at LAC?
- Risk factors that should be further discussed.
- Conclusions

Background

Figure 2. The timeline of risk factors and protective factors for dementia. Time for each factor is identified from the available studies. SES=socioeconomic status.

Include active and socially integrated lifestyle in late life protects against dementia

Fratiglioni, Paillard-Borg, & Winblad, 2004

A life-course approach to the aetiology of late-onset dementias

Lawrence J Whalley, Finlay D Dick, Geraldine McNeill

Substantial progress has been made in the understanding of the neurobiology of dementias, but comprehensive causal models are not available. Genetic and environmental factors probably interact to determine vulnerability to the dementias. The life-course approach to age-related diseases, when systematically applied to the dementias, provides opportunities to identify the nature and timing of environmental contributions. We discuss the relevance of the fetal origins of adult disease hypothesis to the dementias. Associations between the dementias (most often described as Alzheimer's disease) and ischaemic heart disease, obesity, hypertension, hyperlipidaemia, and non-insulin-dependent diabetes mellitus are set against associations between dementias and childhood intelligence, low educational attainments, low socioeconomic status, occupation, and lifetime dietary history. Biological mechanisms that explain how fetal development might influence the risk of adult disease may be relevant to many age-related diseases including the dementias and, possibly, to the biology of ageing.

Introduction

Gene–environment interactions in dementias

factor acting alone or in combination with other factors. The life-course approach to common diseases of late

(Whalley, Dick, & McNeill, 2006)
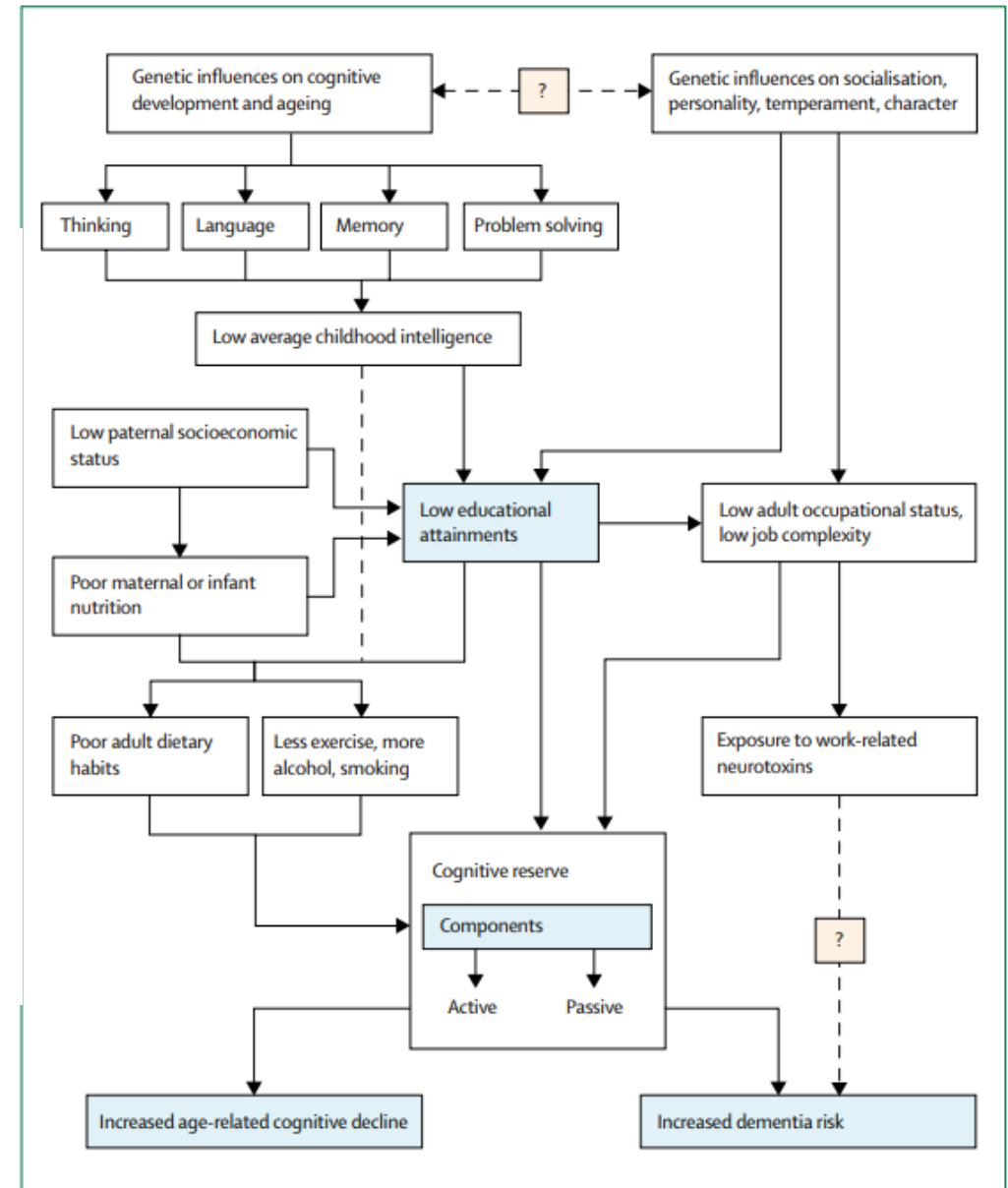
Figure 1: Environmental influences on cognitive development and age-related cognitive decline
The directional arrows are shown as influences on progression to decline or dementia. This progression is mediated through an hypothesised cognitive reserve, also shown in the lower part of the figure. The possible contributions to progressive age-related cognitive decline of accelerated ageing are not shown, but are discussed in the text.

Livingston et al, 2020

We could not consider other risk factors such as poor health in pregnancy of malnourished mothers, difficult births, early life malnutrition, survival with heavy infection burdens alongside malaria and HIV, all of which might add to the risks in LMIC.
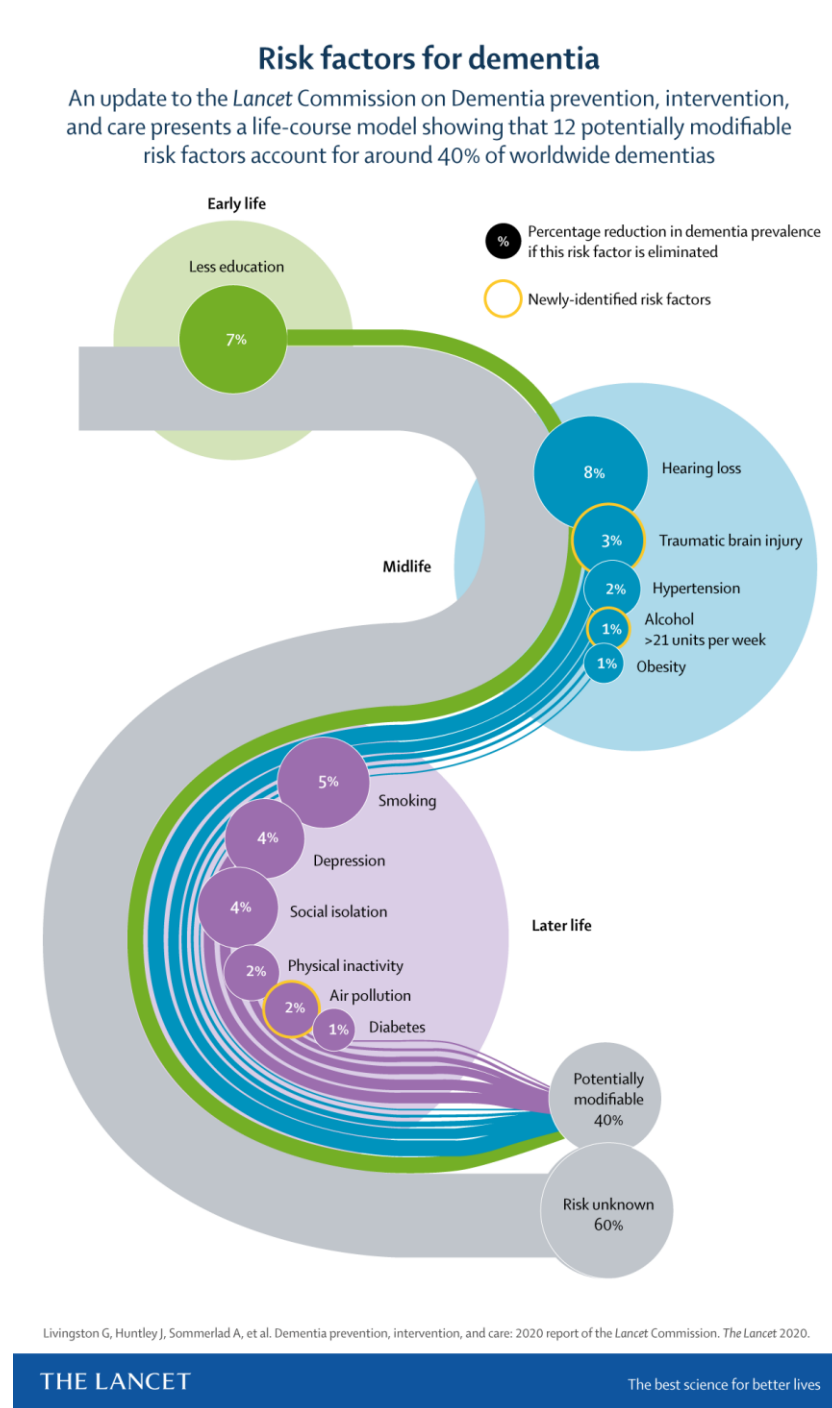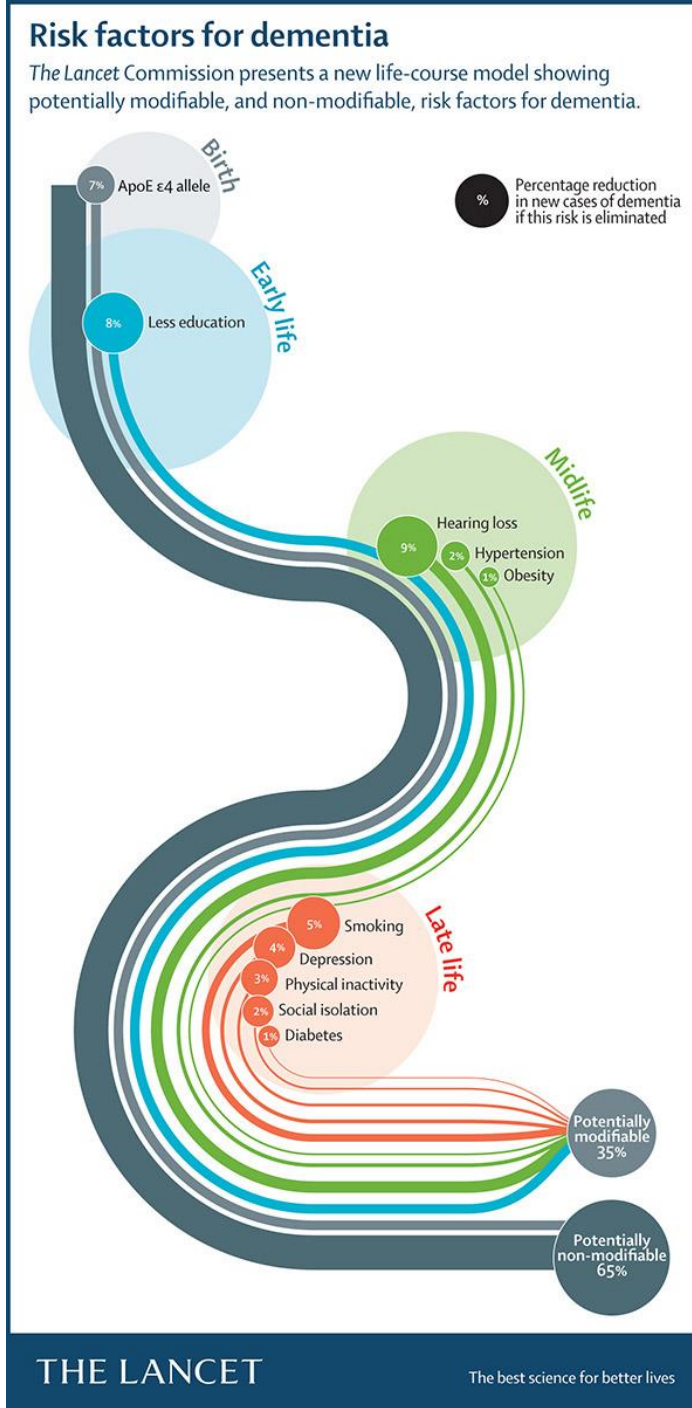
Livingston G, Huntley J, Sommerlad A, et al. Dementia prevention, intervention, and care: 2020 report of the Lancet Commission. *The Lancet* 2020.

(Mukadam, Sommerlad, Huntley, Livingston, 2019)
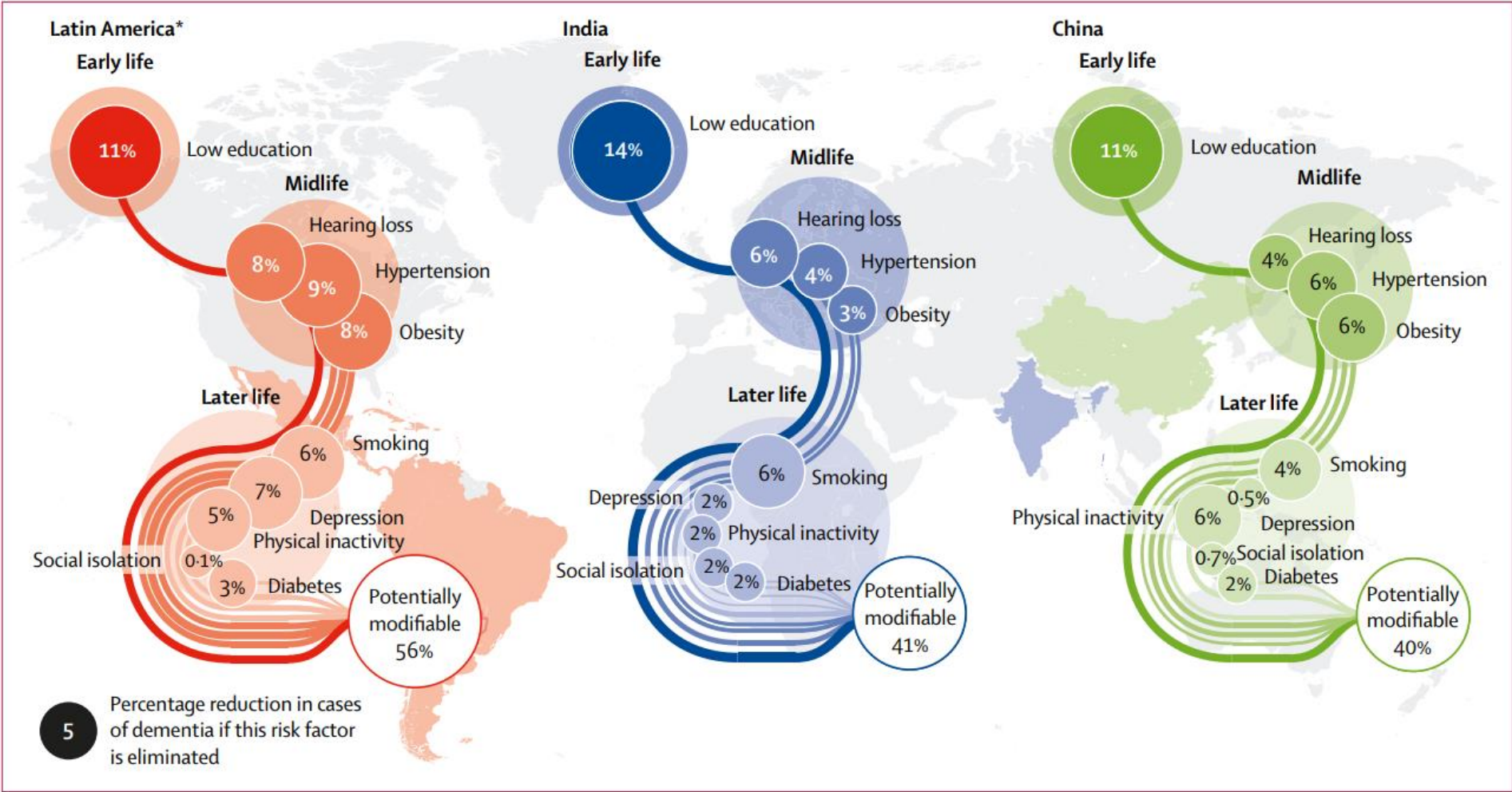

Figure: Population attributable fractions for potentially modifiable risk factors in low-income and middle-income countries
*Our data for Latin America include the data for Cuba, Dominican Republic, Mexico, Peru, Puerto Rico, and Venezuela.

Attempts to discuss sex/gender in dementia

- "There are now sound reasons to consider sex-specific effects of dementia prevention strategies and to identify opportunities across the life course when these might be most effective" (Whalley, 2016)

Understanding the impact of sex and gender in Alzheimer's disease: A call to action

Rebecca A. Nebel[a,*], **Neelum T. Aggarwal**[b], **Lisa L. Barnes**[b], **Aimee Gallagher**[a], **Jill M. Goldstein**[c,d], **Kejal Kantarci**[e], **Monica P. Mallampalli**[a], **Elizabeth C. Mormino**[f], **Laura Scott**[g], **Wai Haung Yu**[h], **Pauline M. Maki**[i,j,1], and **Michelle M. Mielke**[k,l,1]

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Risk Factors (Nebel et al., 2018)

- Sex
  - Cardiovascular risk factors
  - Depression
  - Sleep Pattern

- Specific for women
  - Hypertensive pregnancy disorders
  - Menopause

- Gender:
  - Education
  - Physical exercise
  - Marital Status
  - Caregiving for Dementia

Why is important to look at LAC?

- Latin America has one of the highest rates of socioeconomic and health inequality in the world (Cardona, Acosta, & Bertone, 2013).

- The number of people with dementia in these countries is predicted to rise more rapidly than in higher-income countries because an increasing number of people in LMICs are living to an older age.

- High inequalities in Latin America (LA) affect social groups differently, with women being disadvantaged in many domains.

Prevalence of Dementia in LAC

- 30 different samples, published between 1999 and 2017. Sample sizes ranged from 101 to 18,351 respondents, corresponding to 62,360 participants in total. Eleven of the 20 LAC countries were covered.

- A prevalence of dementia of 12% for adults > 50 years old, which is a higher prevalence when compared with high-income countries.

(Ribeiro, Teixeira-Santos, Caramelli, & Leist, 2021)

Prevalence of dementia women and men

- Dementia prevalence is higher and with earlier onset in LA, especially among women, after accounting for women's longer life expectancy.

- 23 studies, including data for prevalence by sex, were included in two separated meta-analyses for men and women and showed a pooled prevalence of dementia estimated as 3% (95% CI: 2% - 4%) and 7% (95% CI: 5% - 9%), respectively.

Goal

- Our narrative review discusses the modifiable risk factors of dementia established by previous studies and postulates further harmful, often hidden, factors experienced by women that might influence gender-specific time of onset and general prevalence of dementia.

- We point out pervasive gender roles around education, labour market participation, but also the distribution of resources within families and across generations.

- Gender roles affect family structure living conditions during childhood and extend their influence over the life course. Other stressors strongly correlated with established modifiable risk factors or intrinsically relevant to dementia risk seem to be commonplace in women's lives in LA, such as food insecurity, overweight/obesity, gender-based violence, and limited career opportunities.

Risk factors to be further discussed and explored

- Gender-roles
- Education and professional opportunities
- Food insecurity, overweight, and obesity
- Gender-based violence

Risk factors to be further discussed and explored

Gender

Protective factors
Education Σ
Professional opportunities
Economic Status Σ
Cognitive activity
Social Activity
Physical activity Σ

Risk factors
+ Gender-roles
+ Gender-based violence
+ Obesity Σ
+ Food insecurity
+ Depression Σ
Smoking Σ
Alcohol Consumption Σ

Protective factors
+ Education Σ
+ Professional Opportunities
+ Economic Status Σ
+ Cognitive activity
Social Activity
+ Physical activity Σ

Risk factors
Gender-roles
Gender-based violence
+ Smoking Σ
+ Alcohol Consumption Σ
Obesity Σ
Food insecurity
Depression Σ

Note **Σ:** Factors showed by previous literature associated with dementia in later life.

+ : Higher prevalence in Latin America

Modifiable factors

Sex

| ♀ | Microvascular disease
Higher propensity for Depression
Higher propensity for Diabetic complications
Hypertension
Higher propensity- cholesterol
hearing loss
Pregnancy complications | ♂ | Obstructive coronary artery
Hypertension
high cholesterol
Depression
Diabetes
Higher propensity to develop hearing loss |

Gender

| ♀ | **Protective factors**
Education Σ
Professional opportunities
Economic Status Σ
Cognitive activity
Social Activity
Physical activity Σ

Risk factors
+ Gender-roles
+ Gender-based violence
+ Obesity Σ
+ Malnutrition
+ Food insecurity
+ Depression Σ
Smoking Σ
Alcohol Consumption Σ | ♂ | **Protective factors**
+ Education Σ
+ Professional Opportunities
+ Economic Status Σ
+ Cognitive activity
Social Activity
+ Physical activity Σ

Risk factors
Gender-roles
Gender-based violence
+ Smoking Σ
+ Alcohol Consumption Σ
Obesity Σ
Malnutrition
Food insecurity
Depression Σ |

Parental Economic conditions
Poor maternal nutrition
Parental education
Gender norms

Older life

Middle life

Early life

Prenatal environment

Non-modifiable factors
Age, ethnic, genetic influences
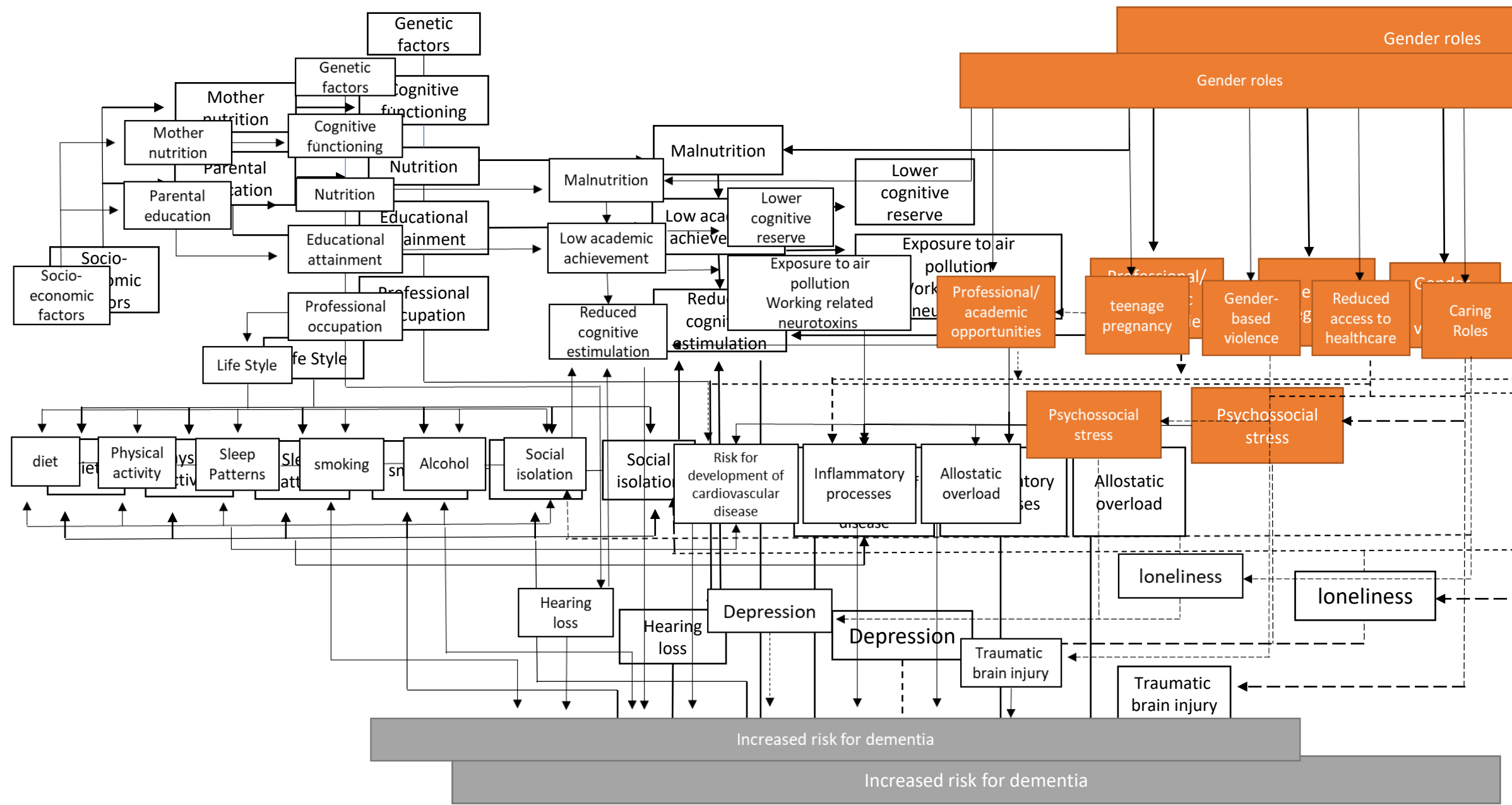
| ♀ | Higher tau burden in APOE-4 allele
Menopause | ♂ | APOE-4 allele
X-linked recessive diseases |

Early life

Genetic factors

Mother nutrition

Parental education

Cognitive functioning

Nutrition

Educational attainment

Socio-economic factors

Professional occupation

Life Style

Malnutrition

Low academic achievement

Lower cognitive reserve

Exposure to air pollution Working related neurotoxins

Reduced cognitive estimulation

Gender roles

Professional/ academic opportunities

teenage pregnancy

Gender-based violence

Reduced access to healthcare

Caring Roles

Midlife

diet

Physical activity

Sleep Patterns

smoking

Alcohol

Social isolation

Risk for development of cardiovascular disease

Inflammatory processes

Allostatic overload

Psychossocial stress

Later life

Hearing loss

Depression

loneliness

Traumatic brain injury

Increased risk for dementia

Conclusions

- Based on the evidence of gender inequalities in many domains to the disadvantage of women in LA, there is a need to consider unexplored risk factors since they could perpetuate burden of dementia among women disproportionately.

- Moreover, bringing hidden risk factors to open discussion can encourage and promote public policies to decrease gender inequalities and protect women's health and well-being.

Thank you!