

# Association of socioeconomic status with sleep disturbances in the Swiss population-based CoLaus study

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# Background

- Insufficient sleep related to increased risk of cardio-metabolic disorders, vehicle accidents, workplace injuries, and poorer cognitive performances and mental health
- In high income countries, about half of the population reports to suffer from sleep disturbances
- Common determinants: age, gender, heavy drinking and obesity, stress, anxiety and several psychiatric disorders, low SES
- Studies on SES and sleep very heterogeneous

# Objectives

1. To assess the association between SES (education and occupational position) and several subjective and objective measures of sleep disturbances
2. To examine whether other socio-demographic, behavioural and psychological factors explain the SES-sleep association

# Data

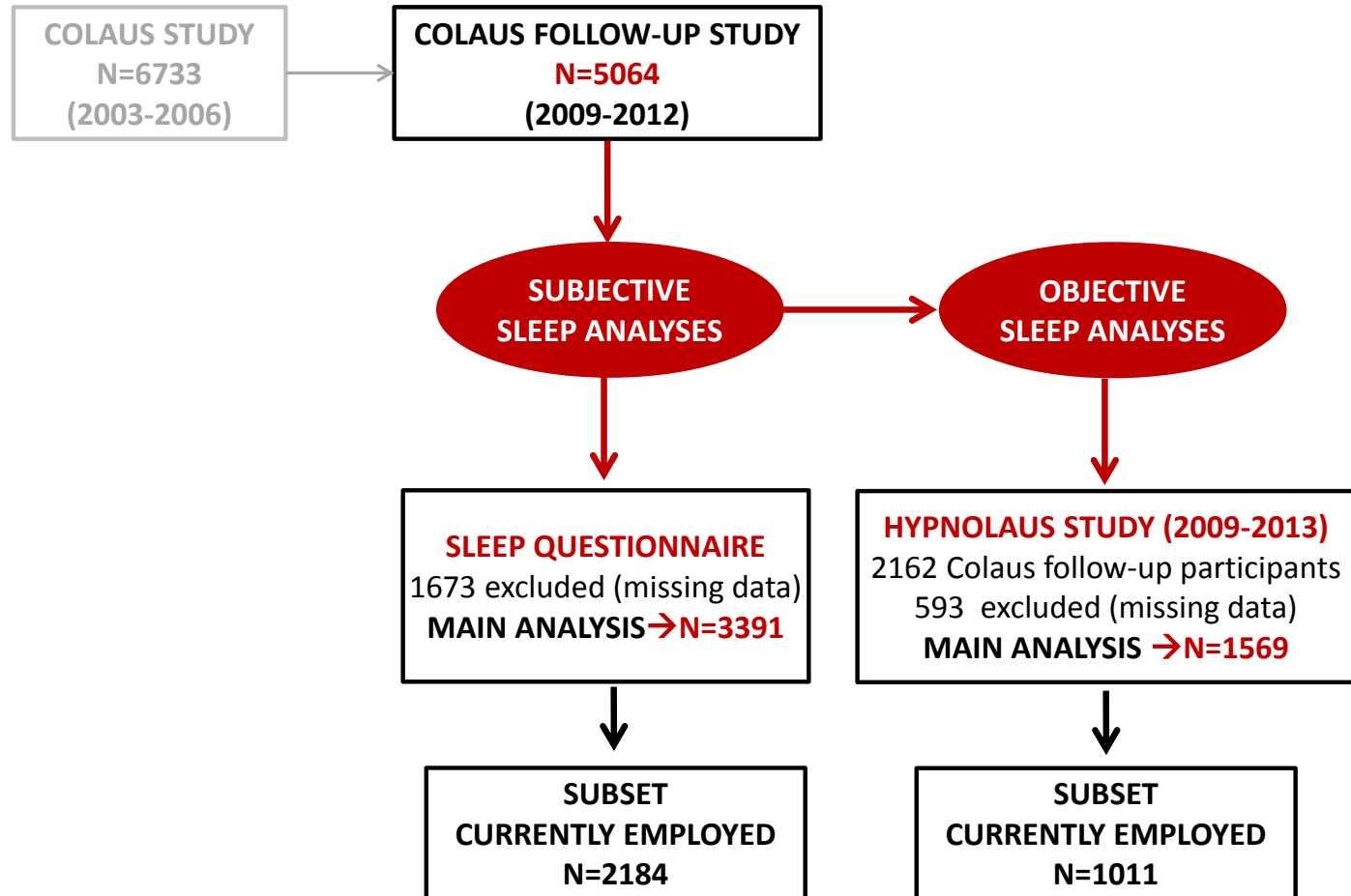
## Colaus Study (2003-2006)

- Random sample of the city of Lausanne (N~120.000)
- 6184 participants aged 35 – 75 years

## Colaus First Follow-up (2009-2012)

- 5064 participants administered a sleep questionnaire
- 2162 participants underwent a polysomnography  
**(Hypnolaus study)**

# Data



# Measures

## Socioeconomic indicators:

- **Educational level:** *high* (tertiary education), *middle* (upper secondary non tertiary education, including vocational) and *low* (lower secondary education or lower)
- **Occupational position:** *high* (entrepreneurs, professionals, higher managers), *middle* (self-employed, lower managers, skilled clerks) and *low* (unskilled clerks, farmers, skilled manual workers, unskilled manual workers)

## Other factors:

- **Socio-demographic:** age, sex, employment status, marital status and place of birth
- **Behavioural factors :** smoking, heavy drinking, sedentary behaviour, high coffee consumption and obesity
- **Psychological factors (CES-D):** **depression**, somatic complaints, depressed affect, positive affect and interpersonal problems

# Sleep measures

## Subjective evaluation of sleep (questionnaire-based):

- Sleep quality (Pittsburgh Sleep Quality Index)
- Sleep latency (time before falling asleep)
- Sleepiness (Epworth Sleepiness Scale)
- Sleep duration
- Insomnia (sleep latency >30 min OR waking up in the middle of the night or too early in the morning)

## Objective evaluation of sleep (polysomnography-based):

- ✓ 3051 consecutive CoLaus subjects invited to undergo a complete full night in-home polysomnographic (PSG) recording (HypnoLaus nested study)
- ✓ PSG recordings manually scored by trained sleep technicians and reviewed by an expert sleep physician
  - **Total sleep time**
  - **Sleep latency**
  - **Slow wave sleep**
  - **Sleep efficiency**
  - **Stage shifts**

# Statistical analysis

## Methodology: Poisson regression with robust standard errors

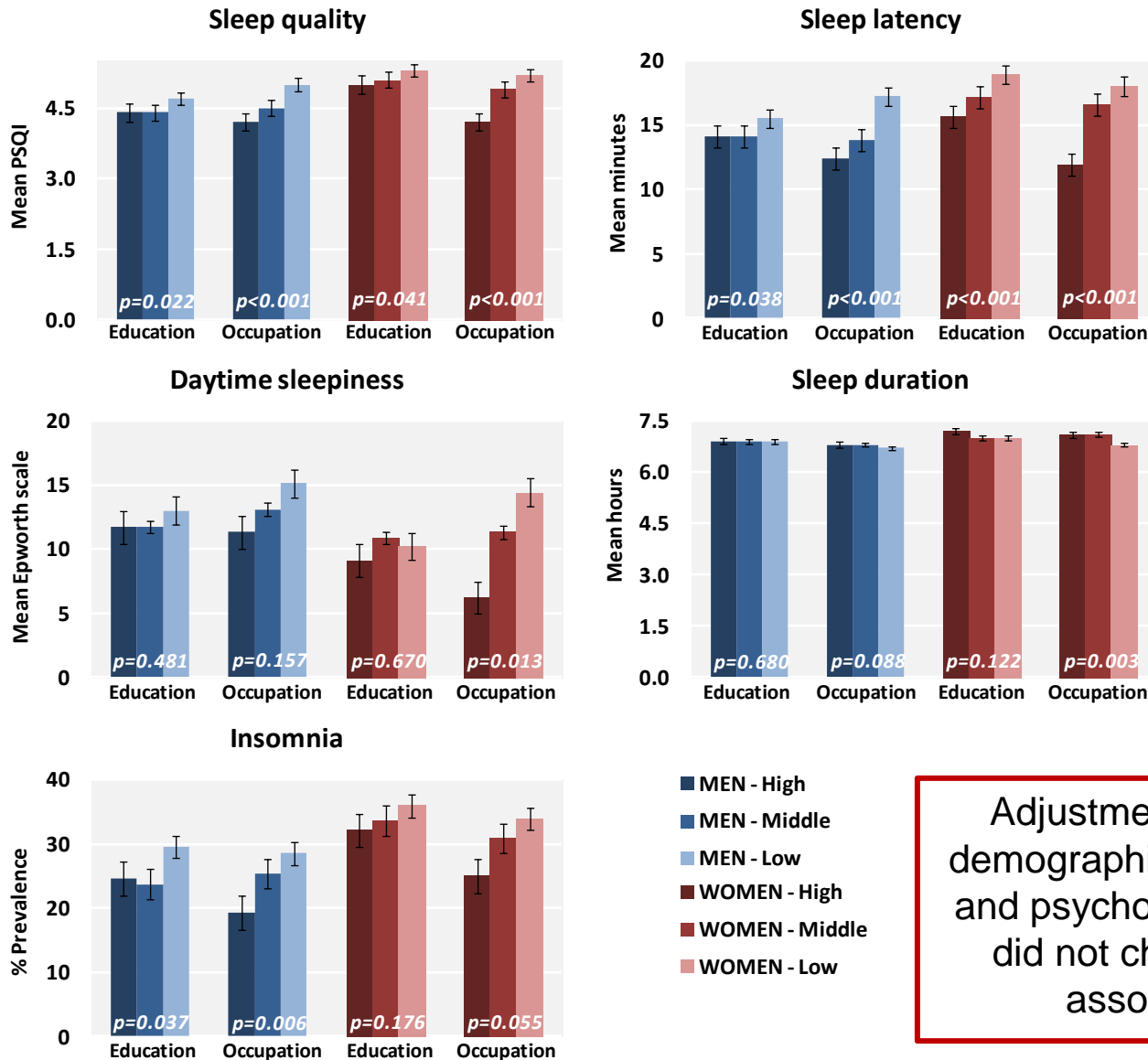
- **Model 1** → adjusted for age and use of sleep medications
  - **Model 2**= model 1 + socio-demographic factors
  - **Model 3**= model 1 + behavioral factors
  - **Model 4**= model 1 + psychological factors
  - **Model 5**= Fully adjusted
- Analysis stratified by sex for subjective sleep analysis and sex-adjusted for objective sleep analysis (smaller N)



# Subjective sleep and risk factors

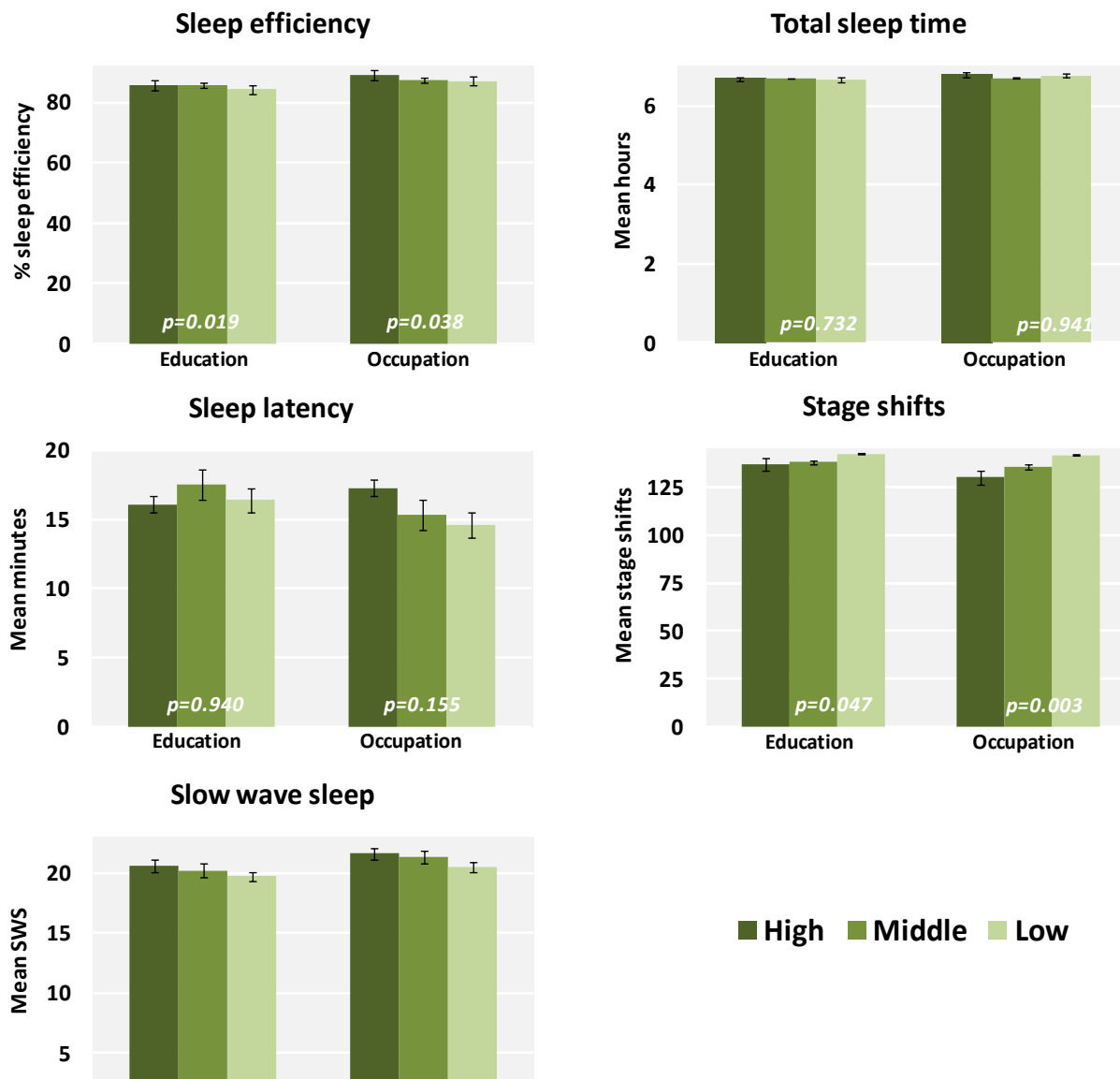
	MEN					WOMEN				
	Poor sleep quality	Long sleep latency	Excessive daytime sleepiness	Short sleep duration	Insomnia	Poor sleep quality	Long sleep latency	Excessive daytime sleepiness	Short sleep duration	Insomnia
	PR <sup>a</sup>	PR <sup>a</sup>	PR <sup>a</sup>	PR <sup>a</sup>	PR <sup>a</sup>	PR <sup>a</sup>	PR <sup>a</sup>	PR <sup>a</sup>	PR <sup>a</sup>	PR <sup>a</sup>
Use of sleep medications (Ref. No)	<b>4.10***</b>	<b>4.24***</b>	1.17	<b>1.20*</b>	<b>2.36***</b>	<b>3.45***</b>	<b>3.44***</b>	0.85	<b>1.52***</b>	<b>1.87***</b>
Non-working full-time (Ref. Yes)	1.07	1.61	0.93	<b>0.57***</b>	1.17	1.10	1.16	0.91	<b>0.81*</b>	1.01
Living alone (Ref. In couple)	1.11	1.42	1.07	0.99	1.03	1.10	1.13	1.03	1.06	1.05
Not born in CH (Ref. Born in CH)	<b>1.23**</b>	<b>1.94**</b>	1.21	<b>1.24*</b>	1.12	1.12	1.15	<b>1.43*</b>	<b>1.20*</b>	1.07
Current smoking (Ref. No)	1.03	1.26	1.29	0.99	0.94	1.00	1.04	0.82	1.14	0.87
Heavy drinking (Ref. No)	<b>1.23*</b>	1.52	0.81	1.01	1.02	<b>1.18**</b>	0.69	<b>1.81*</b>	1.00	1.15
Sedentary (Ref. Active)	0.94	1.11	<b>0.71*</b>	<b>0.68***</b>	1.13	1.06	1.06	0.89	<b>0.74***</b>	0.98
High coffee consumption (Ref. Low)	1.18	0.61	1.13	1.30	1.13	0.95	<b>1.88*</b>	0.48	1.13	1.08
Obesity (Ref. Normal weight)	1.07	0.90	0.91	1.15	0.94	1.09	1.02	1.21	1.17	0.83
Somatic complaints (Ref. Low)	<b>2.11***</b>	<b>2.07***</b>	<b>1.99***</b>	<b>1.52***</b>	<b>2.09***</b>	<b>1.89***</b>	<b>1.69***</b>	<b>1.89***</b>	<b>1.60***</b>	<b>1.64***</b>
Depressed affect (Ref. Low)	<b>1.79***</b>	<b>2.29***</b>	<b>2.11***</b>	1.18	<b>1.67***</b>	<b>1.54***</b>	1.32	<b>1.76***</b>	<b>1.30**</b>	<b>1.28***</b>
Dist. interpersonal rel. (Ref. Low)	<b>1.43***</b>	<b>1.76*</b>	<b>1.79***</b>	1.05	<b>1.47***</b>	<b>1.29***</b>	1.34	<b>1.61**</b>	1.09	1.16
Positive affect (Ref. High)	<b>1.58***</b>	<b>1.89**</b>	<b>1.46**</b>	1.07	<b>1.39***</b>	<b>1.60***</b>	<b>1.50*</b>	<b>1.59**</b>	<b>1.22**</b>	<b>1.32***</b>
Depression (Ref. No)	<b>1.98***</b>	<b>1.97**</b>	<b>1.73***</b>	<b>1.29**</b>	<b>1.90***</b>	<b>1.70***</b>	1.40	<b>1.73**</b>	<b>1.45***</b>	<b>1.48***</b>

# Subjective sleep and SES



Adjustment for socio-demographic, behavioural and psychological factors did not change these associations

# Objective sleep and SES



# Discussion

- Both subjectively and objectively measured sleep disturbances are related to low SES
- Association of SES with sleep disturbances was particularly strong for occupational position
- Association of SES with sleep disturbances only marginally explained by socio-demographic, behavioural and psychological factors

# Discussion

- 30% of men and 40% of women had poor sleep quality, and approximately one out of three participants reported short sleep duration and/or insomnia
- Gender, marital status and psychological factors associated to sleep disturbances but not behavioural factors
- Low occupational position strongly associated with all sleep disorders; association particularly evident in women
  - job-related psychosocial stress related to poor sleep and more common among people with a low occupational position
  - people with a low occupational position potentially more exposed to shift work which is known to affect circadian rhythms
  - working women with low occupational position may particularly suffer from the combination of work and family responsibilities, with negative consequences on sleep

# Discussion

- Social differences in sleep disturbances only marginally accounted for by social variations in socio-demographic, behavioural and psychological factors
  - These factors only moderately associated with sleep outcomes
  - Other important factors such as job characteristics, shift work, stress, family commitments, and financial difficulties not assessed
- Results from sleep questionnaire and PSG consistent in indicating higher burden of sleep disturbances in low SES individuals
  - SES differences in sleep duration among women in subjective evaluations but not in PSG
  - PSG analysis conducted in men and women together, subjective evaluation of sleep influenced by underlying psychological/health characteristics potentially patterned by SES, PSG conducted during a single night

# Strengths & limitations

## Strengths

- Population-based study
- Two indicators of SES assessed in relation to several sleep outcomes
- One of the first studies to additionally use objectively measured sleep disturbances

## Limitations

- Low participation rate in the Colaus study (40%)
- Population further reduced because of missing values
- Objective measurements of sleep only available for a sub-sample
- Important factors potentially affecting sleep not assessed in the study

# Implications

- Raise awareness among health practitioners about the higher prevalence of sleep disturbances among socioeconomically disadvantaged individuals
- Further research on the role of other potential mediators of the SES-sleep such as job characteristics (including workload, shift-work, and work-family demand) and psychological and financial stress
- Further research is needed to establish the extent to which social differences in sleep contribute to explain socioeconomic differences in health