UC DAVIS HEALTH

Habitual Sleep Duration and its Relationship with Hypertension Control in US Adults with Hypertension

BETTY IRENE MOORE SCHOOL OF NURSING

Everlyne Ogugu, M.S.N., R.N.

PhD Candidate, Nursing & Healthcare Leadership

Hypertension

Systolic blood pressure (BP) ≥130 or Diastolic BP ≥80mmHg, current intake of BP-lowering medication

- *2017 American College of Cardiology and American Heart Association (ACC/AHA)* [1]
  - ➢Better cardiovascular disease outcomes [2]

Main risk factor for heart disease & stroke [1]

- 1st & 5th leading causes of deaths in the US, respectively [3]

Prevalence rate in the US in 2015 – 2018 period - 47.3% [4]

- 116 million US adults
  - ➢Hypertension control: **20.6%**

[1] Whelton et al., 2018. [2] Ettehad et al., 2016. [3] Murphy et al., 2020. [4] Centers for Disease Prevention & Control (CDC), 2021.

Habitual Sleep Duration

Sleep health [5]

- Sleep quality
- **Sleep duration - At least 7 hours/day for adults [6]**

Importance: general well-being, physiological function [6]

- **Regulation of BP** [6]

>1/3 of adults in US sleep <7 hours [7]

[5] Buysse, 2014. [6] Watson et al., 2015. [7] CDC, 2017

Habitual Sleep Duration & Hypertension

Short sleep duration

- Associated ↑ risk of hypertension [8 – 13]

Long sleep duration

- Associated with ↑ risk of hypertension [9, 14]

Gaps in literature in those with hypertension

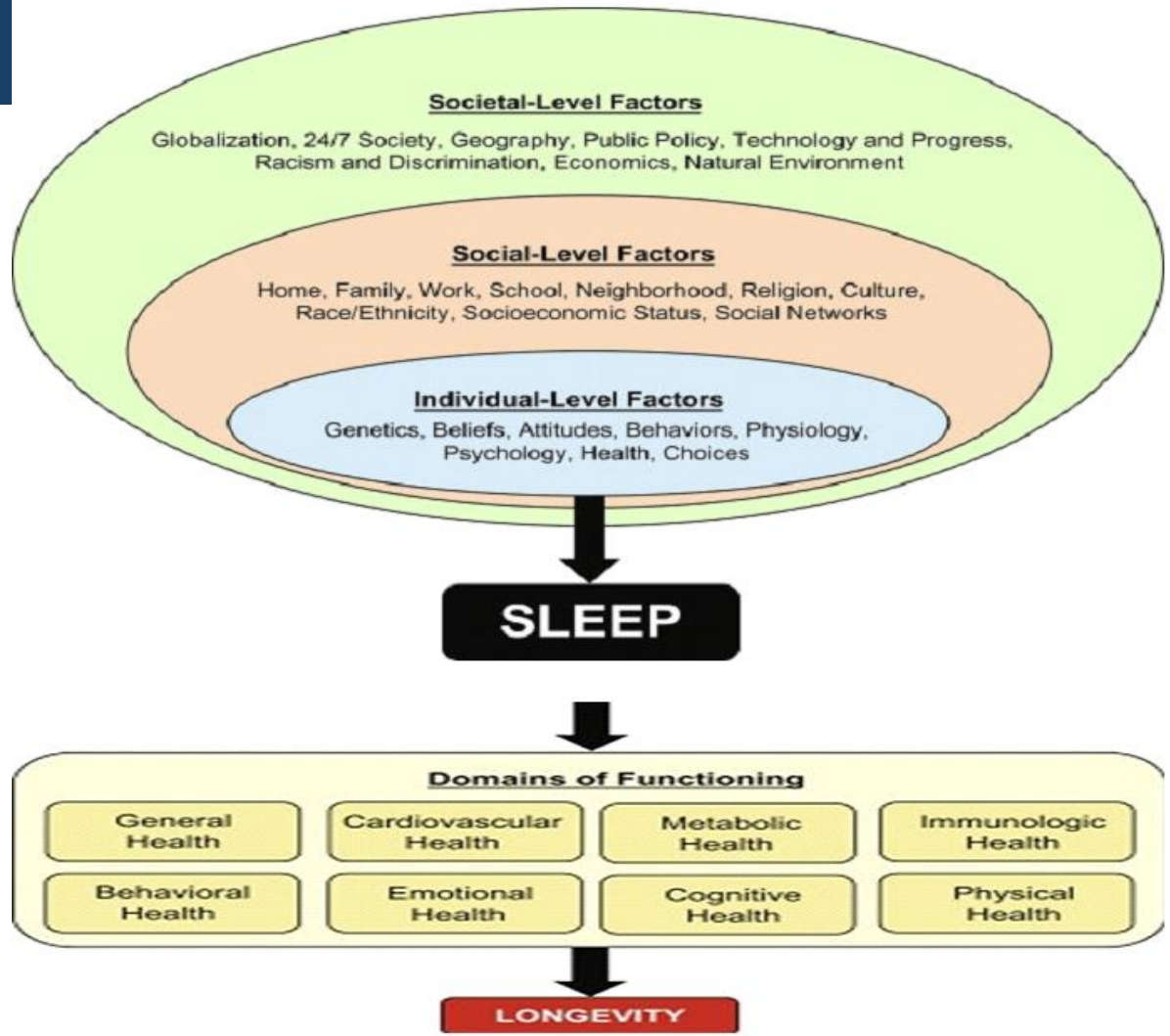
- Patterns, predictors, role in management of hypertension

8 Li et al., 2019. 9 Grandner et al., 2018. 10 Cabeza et al., 2019. 11 Okunowo et al., 2019. 12 Yadav et al., 2017. 13 Matthews et al., 2018. 14 Guo et. al., 2016

Research Aims

- **Study aim 1:**
  - Identify factors associated with habitual sleep duration among US adults with hypertension
- **Study aim 2:**
  - Examine the association between habitual sleep duration and hypertension control among US adults with hypertension

Conceptual Framework for the Study



Socioecological Model of Sleep and Health (Grandner, 2019)

Study Design, Data Source & Sample

Design

- Secondary analysis of data

Data source: National Health and Nutrition Examination Survey (NHANES) database

- Estimates health and nutritional status of civilian noninstitutionalized US population
- Cross-sectional
- Data collection – interviews, physical examination, laboratory tests

Combined data from 2015-2016 and 2017-2018 survey waves

https://wwwn.cdc.gov/nchs/nhanes/

Study sample

Data of adults (≥18 years) with hypertension

Inclusion criteria [1]

- Ever been told by a doctor or other healthcare professional that one has hypertension & currently taking BP-lowering medications

OR

- A mean systolic BP ≥130mmHg or diastolic BP ≥80mmHg

[1] Whelton et al., 2018

Aim 1: Identify factors associated with habitual sleep duration among US adults with hypertension - METHODS

Sample: *n=5660*

Outcome: Habitual sleep duration

- self-reported hours of sleep in a night or main sleep period
- Short (<7 hours), Long (>9 hours), Adequate (7 – 9 hours)

Predictors:

- Individual-level: gender, age, body mass index, help-seeking for sleeping difficulty, depressive symptoms, chronic health conditions, cigarette smoking, alcohol intake, and physical activity
- Social-level - race/ethnicity, nativity status, education level, income to poverty ratio, employment status, health insurance, and marital status

Data analysis: Multivariable multinomial logistic regression

- **Relative risk of having short or long sleep duration compared to adequate sleep duration [7 – 9 hours])**

Aim 1: factors associated with habitual sleep duration among US adults with hypertension - RESULTS

History of seeking help for sleeping difficulty

- **25% ↑ short sleep duration**

Gender

- **women 30% ↓ short sleep duration & 24% ↑ long sleep duration**

Age

- **≥65 years 37% ↓ short sleep duration** (compared to 18–44-year-olds)

Moderate to severe depressive symptoms

- **62-89% ↑ long sleep duration**

Chronic kidney disease

- **48% ↑ long sleep duration**

Race/ethnicity: (compared to Non-Hispanic White) -

- **Non-Hispanic Black 2× ↑ short sleep**

Employment status: (compared to 35 – 44 hours/week) -

- **Working ≥45 hours/week 86% ↑ short sleep**
- **Not currently working 3 - 4× ↑ long sleep**

No significant associations noted:

- Comorbidities: diabetes, chronic obstructive pulmonary disease (COPD), heart disease, stroke, arthritis
- BMI, alcohol intake, cigarette smoking, physical activity
- Education level, income, nativity, health insurance, and marital status

Aim 2: Examine the association between habitual sleep duration and hypertension control among US adults with hypertension: METHODS

Sample, *n*=5,163

Outcome: Hypertension control status

- Controlled: <130/80mmHg
- Uncontrolled ≥130/80mmHg (reference)

Main predictor: Habitual sleep duration

- <6, 6 – <7, 7 – 9 (reference group), and >9 hours/night or main sleep period

Data analysis – Multivariable logistic regression

- Adjusted for sociodemographic characteristics, other sleep characteristics, number of healthcare visits in the past year, health characteristics, and health behaviors

Aim 2: Examine the association between habitual sleep duration and hypertension control among US adults with hypertension: RESULTS

<6 hours of sleep: 34% less likely to have hypertension control than those with a sleep duration of 7 – 9 hours

- OR = 0.66, 95% CI: 0.46 – 0.95, *P* = 0.027).

No significant differences were noted in hypertension control between the reference group (7 -9 hours) and the 6 - <7 hours or >9 hours group

Conclusion & Implications

A significant relationship between habitual sleep duration & hypertension control

- **At risk group: Sleep duration of <6 hours**

Strategies to promote adequate sleep duration as one of the crucial components in hypertension control

Factors associated with short habitual sleep duration – e.g., **race/ethnicity and employment status**

- Tailored approaches for promoting adequate sleep duration in those with hypertension

Deepest Gratitude

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  - **Sheryl L. Catz Ph.D.,** Dissertation Chair
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  - **Julie Bidwell, Ph.D., RN**.
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Thank you

Questions & Answers