**Table 1: Summary of longitudinal and cross-sectional observational studies included in the systematic review (Etindele Sosso FA and Al. Preprint 2018)**

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| **References** | **Aims** | **Population** | **Materials and Methods** | **Variables/Measures** | **Main Conclusions** |
| Hoggard and Hill, 20161 | To examine the involvement of components of perseverative cognition in the association between ethnicity and subjectivesleep quality. | 68 self-identified African American college students (55.9%female; Mean age = 20.18, SD = 2.93) were recruited at a large predominantly white public university inthe Midwest. | * recurrent patterns of reflexion were tested with the Ruminative Responses Scale.
* socioeconomic and ethnic discrimination were measured with the Perceived Ethnic Discrimination Questionnaire
* sleep was measured with the Pittsburgh Sleep Quality Index
* socio-economic and pathological concerns were measured with the Penn State Worry Questionnaire
 | * negative thoughts
* SES
* racial discrimination
* quality and duration of sleep
* financial concern and pathological concern
* perseverative cognition
 | Ethnic discrimination and poor sleep quality are strongly associated with metabolic and cardiovascular diseases, as well as with mood disorders. Addressing those diseases in addition to coping strategies may reduceracial disparities in health. |
| Green et al, 20142 | This study investigated how the prospective patterning of distress over 20 years was associated with insomnia over that period. | 999 respondents divided in three cohorts (born around 1932, 1952, and 1972) were followed for20 years | * psychiatric distress was measured using the General Health Questionnaire at baseline and at 20-year follow-up.
* gender and social class were assessed at baseline.
* insomnia symptoms were assessed every five years.
 | * insomnia
* depression
* anxiety
* stress
* social class
* SES
* well being
* psychological health
* sleep habits
 | sex and socioeconomic disparities in psychiatric distress are strongly linked with disparities in insomnia symptoms. |
| Okun et al, 20143 | To evaluate the effect of socioeconomic status on measures of sleep quality, continuity, and quantity in a large cohort of pregnant women. | One hundred and seventy pregnant women at 10-20 weeks gestation. | * sleep was assessed with the Pittsburgh Sleep Quality Index and actigraphy at 10-12, 14-16, and 18-20 weeks gestation.
* SES was defined by self-reported annual household income.
* mood disorders were assessed with the Inventory for Depressive Symptoms
* perceived stress was measured with The Perceived Stress Scale
 | * sleep quality and sleep duration
* household income
* annual income
* marital status
* body mass index
* depression
* stress
* quality of life
* stressing events
* perceived stress
* race/ethnicity
 | Low SES was associated with poorer sleep quality and fragmented sleep. Perceived stress and financial support reduce the associations of SES with sleep. |
| Chen et al, 20134 | To assess the psychological and socioeconomic health status of community-dwelling older adults in Taiwan, and to compare the psychological and socioeconomic health inequalities among people of different age, gender, marital status, and exercise habits. | 384 Taiwanese community-dwelling older adults aged 65 years old and more | * sleep measured with the Pittsburgh Sleep Quality Index
* financial status
* social support
* emotional health measured with The Taiwanese Depression Questionnaire
* the cognitive functioning measure with The Short Portable Mental Status Questionnaire
* health promotion behaviors
* social engagement
 | * sleep quality
* living expenses
* income
* level of satisfaction
* duration and frequency of physical activity
* cognition
* functional autonomy
* lifestyle
* social engagement
 | The major psychological and socio-economic health concerns were sleep disturbances and financial burden. Younger old adults had better psychological and sociological health. |
| Karlamangla et al, 20135 | To identify disparities in the usual daytime cortisol rhythm by age, SES, and race/ethnicity | A final sample of 1693 participants (from1409 families) recruited through MIDUS (Midlife in the UnitedStates Study) aged 25 to 74 years old. | * socio-demographic and socio-economic characteristics (age,

race / ethnicity, gender, highest level of educational attainment, and annual household income) were self-reported with the MIDUS questionnaire* salivary collection kit to measure cortisol on waking, 30 min after waking, before lunch and before bed for seven days
* average sleep time was assessed by way of the MIDUS questionnaire
* physical and mental conditions were assessed by way of the MIDUS questionnaire
 | * SES (income, occupation, living area)
* the daily rate of cortisol
* quality and duration of sleep
* smoking
* depression
* anxiety
* body mass index
* age
* sex
* the ethnic group
* physical activity
* medications
* cardiovascular and metabolic diseases
 | Daytime cortisol levels are higher in older people and in men compared to women. Daytime cortisol rhythm is flatter in less privileged social classes, confirming that social stressors lead to poorhealth outcomes. |
| Stawski et al, 20136 | To assess the daily association between recurrent stressors and salivary cortisol levels. | 1694 adults (mean age 57 years-old, range 33-84; 44% male) | * interviews by phone for eight successive days
* The Daily Inventory of Stressful Events questionnaire assessed stressors
* The negative mood scale used in MIDUS to measure the negative effects of stressors and the emotions associated with them.
* a checklist of 25 physical symptoms to measure daily physical symptoms
* salivary collection kit to measure cortisol on waking, 30 min after waking, before lunch and before bed for four days.
* state of sleep
 | * elements causing stress in the living environment (work, family)
* daily cortisol levels
* negative daily effect of stressors
* physical symptoms
* emotions
 | People with successive stressful days show a growing increase in cortisol levels and a decrease in the quality of their sleep. |
| Tom and Berenson, 20137 | To investigate the associations between sleep quality andpsychosocial stress with obesity in reproductive-age white, black, and Hispanic women oflower SES. | 927 women aged 16-40 years | * Sleep was assessed with the Pittsburgh Sleep Quality Index
* SES was measured by way of education, household income, profession
* mood disorders were assessed with the Beck Depression Inventory
* perceived stress was measured with The Perceived Stress Scale
* lifestyle
* health habits
* obesity
 | * sleep quality
* sleep medications
* sleep latency
* sleep duration
* education
* income
* profession
* depression
* stress levels
* perceived stress
* body mass index
* weight
* alcohol consumption
* smoking status
* physical activity
* race/ethnicity
 | Even if they were common in reproductive-aged women of lower SES, poor sleep quality and psychosocial stressors were not linked with variation of weight. |
| Green et al, 20128 | To describe longitudinal patterns of insomnia symptoms as people age and examines how they vary according to genderand profession. | One cohort approximately 36-57 years of age at baseline (n = 1,444), and another aging from 56-76 years (n = 1,551). | * sleep latency and the ability to stay asleep were measured with the Pittsburgh Sleep Quality Index
* SES was measured with the household reference rank that takes into account the highest profession of the couple and material resources
* three cohorts of different times of birth (1932, 1952 and 1972) were followed for 20 years with four interviews (1987/1988, 1990/1992, 1995/1997, 2000/2004, 2007/2008)
 | * quality of sleep
* SES
* sex
* age
 | Chronic symptoms expressed by difficulties in maintaining and initiating sleep are influenced by social factors. |
| Lo and Lee, 20129 | To explore sleep disorders amongseniors by investigating the prevalence of poor sleep quality, the relationship between sleep quality andhealth-related quality of life, and associated factors of good sleepers in different age groups. | Older community-dwelling individuals (n = 301) aged 60 years and more. | * a validated questionnaire collected socioeconomics and sociodemographic data
* the state and quality of sleep are measured with the Pittsburgh Sleep Quality Index
* Quality of life is measured with the Medical Outcomes Study 36-item Short Form Health Survey.
 | * sleep (quality, duration, number of awakenings, depth)
* demographic variables (age, gender, occupation, level of education, marital status, income, area and type of dwelling)
* state of health related to quality of life
 | There is a strong negative association between poor quality and short-term sleep with a healthy quality of life, and it worsens with aging. |
| Gureje et al, 201110 | To determine the incidence and risk factors for insomnia in a population of older people in sub-Saharan Africa. | A cohort of community-dwelling 1307 seniors, aged 65 years old and over, followed for 1 year | * insomnia and depression were measured with version 3 of the Composite International Diagnostic Interview
* Dementia was measured with the 10-Word Delayed Recall Test, which is a memory test
* Functional capacity was measured with the Clinician Home-based Interview, which is a 10-item questionnaire measuring the cognitive function of the senior and his knowledge of daily basic tasks to be performed.
* the stressful events of the last 12 months that require social support and / or caregivers, were measured with the List of Threatening Experiences
* SES was measured by evaluating the neighborhood / type of house and its contents
 | * Insomnia
* SES
* autonomy and lifestyle
* anxious and depressive syndromes
* dementia
* the stressful events of the last 12 months
* the temporal evolution of the association between stressful events and symptoms of insomnia
* the general physical state (body mass index, cardiovascular diseases)
* comorbidities
 | Incidence and chronicity of insomnia are higher in older people. Individuals with chronic health conditions have higher risk of persistent insomnia. |
| Hawkley et al, 201111 | To investigate implications of SES over physiological dysregulation. | A population-based study of 229 older adults (age range 51-69 years old) | * Allostatic Load was computed from 9 markers encompassing cardiovascular system functioning, sympathetic nervous and adrenomedullary system functioning
* central obesity (waist circumference)
* hypothalamic-pituitary-adrenal axis functioning (cortisol)
* risk factors for development of atherosclerosis (high density lipoprotein and total cholesterol), and glucose metabolism (glycated hemoglobin)
* chronic health conditions measured with validated questionnaires
* psychosocial and personality variables
* sleep
* lifestyle
* SES
 | * sleep (quality and duration)
* allostatic load
* stress
* social network
* health behaviors
* coping style
* well-being
* depression
* emotional stability
* spirituality
* education
* household
* income
* neighborhood
* ethnicity
* social support
* alcoholism
* smoking
* nutritional habits
 | The effects of SES are specific to certain systems in a middle to early old-age population, creating and worsening the association between allostatic load and sleep disturbances. |
| Goodin et al, 201012 | To investigate the relation between perceived social status and subjective sleep quality. | 149 college students | * sociodemographic data collected with homemade questionnaire
* Sleep
* SES
* ethnicity
* health conditions
 | * sleep quality
* social class
* race
* quality of life
* perceived SES
 | A low perceived social status has a negative influence on sleep quality for African and Asian Americans. |
| Kumari et al, 201013 | To investigate if dysregulation of the hypothalamic-pituitary-adrenal axis associated with disadvantagedsocial position in working populations also occurs in retired old people. | 3992 participants (mean age 61 years; range 50–74years) from the Whitehall II Study | * salivary rate of cortisol measured six times per day (at waking, 30 minutes, 2.5 hours, 8 hours, 12 hours, and bedtime) with a commercial immunoassay with chemiluminescence detection
* social position assessed by way of the MacArthur subjective social position scale
* health behaviors
* sleep habits
* mood disorders assessed by way of The Center for Epidemiologic Studies Depression Scale
* body mass index
* stress
 | * cortisol
* awakening response
* sleep behaviors (waking up time, insomnia, sleep duration)
* smoking status
* diet/nutrition
* age
* sex
* SES (social position, education, income)
* depression
* blood pressure
* height
* weight
* daily level of stress
 | In men, poorer health, sleep behaviorsand unstable income mediate the effect of occupational status and wealth on cortisol secretion |
| Phelan et al, 201014 | To review how social conditions and their determinants affect global health in the life course. | Population-based study. | * Narrative review of literature
 | * health status
* social class
* SES
* health policies
* consequences of social inequalities
* theory on correlations between social conditions and trajectory of health
 | Without more programs of social management of resources or evaluation of the development of socioeconomic disparities among sick people, many health issues will occur and be costly to citizens. |
| Tomfohr et al, 201015 | To measure the association between SES in childhood and adult sleep, to analyze adult sleep according to race, and whether associations between SES, race and sleep are influenced by factors such as health practices and current social status. | 128 Black and White Adults | * sociodemographic data were collected during interviews
* polysomnography in two successive nights from 9 pm to 6 am
* SES of childhood was classified according to the levels of education of the parents (High SES with a post-high school diploma and Low SES without post-high school diploma)
* SES of the adult was measured with the Hollingshead 2-Factor Index of Social Position (it measures the highest level of education + the profession)
* the global SES (position in terms of money + diploma + job respected in the USA) was measured with the MacArthur Scale
* quality of sleep was measured by way of the Pittsburgh Sleep Quality Index
* daytime sleepiness was measured by way of the Epworth Sleepiness Scale
* health practices (alcoholism, smoking) were self-reported and physical activity was measured by way of the Leisure Time Exercise Questionnaire
 | * SES
* the low SES and the high SES
* clinical parameters of sleep ((slow-wave)
* the quality of sleep
* daytime sleepiness
* physical activity
* the social class
* the habits of life
* socio-demographic data (age, sex, years of education, skin color, income, occupation, body mass index)
 | Participants with lower childhood SES spent moretime in Stage 2 sleep and less time in slow-wave sleep than those with higher childhoodSES. Women from low childhood SES had more difficulties to fall asleep compared with women with high SES. Black participants spent less time in slow-wave sleep than White. An interaction Age X Race was identified in the prediction of subjective sleepquality. |
| Friedman et al, 200716 | To test the hypothesis that SES would be associated with objectively measured sleep quality, even after controlling for related covariates (health status, psychosocial features). | 94 women, 61 to 90 years of age | * SES is determined with pre-tax household income
* sleep quality is measured with the Night Cap Sleep System + Pittsburgh Sleep Quality Index
* the state of health is estimated with the objective measures of medical records
* depression is measured with the Center for Epidemiology Disease Scale
* Neuroticism is measured with a subscale of the NEO personality inventory
 | * SES
* health
* quality of sleep
* depressive syndromes
* neuroticism
* lifestyle habits (smoking, alcoholism, caffeine)
 | There are behavioral and biological implications of social ladder and sleep quality in health processes, and a negative association exists among sleep disorders, low SES and chronic morbidities. |
| Adler et al, 200017 | Associations between objective and subjective SES were compared with psychological and physical variables. | 157 healthy white women | * social status measured by the subjective SES scale.
* sleep measured with the Pittsburgh Sleep Quality Index
* biological measures were performed in a laboratory
* psychological variables were measured with the Perceived Stress Scale + the Negative Affect subscale of the Positive and Negative Affectivity Scale + the Life Orientation Test + the Coping Orientation to Problems Experienced
 | * subjective and objective SES
* self-rated health
* body mass index
* body fat distribution
* sleep
* resting physiological responses
* salivary cortisol
* negative affectivity
* pessimism
* coping style
* subjective stress
 | Psychological perceptions of lower social status contribute to the SES-health gradient and have significant relationships with stress, sleep disorders and metabolic diseases. |
| Bromberger and Matthews, 199918 | The authors focused on the first piece of the stress–sleep–health relationship, that is, the impact of the chronic stress of lower SES on subjective sleep complaints | a local cohort of 462 women from the multisite Study of Women’s Health Across the Nation (SWAN). Age range was 41-52 years, 35% were African-American and the remainder were Caucasian | * data were collected from SWAN study
* SES was analyzed
* sleep components were analyzed
* level of stress was computed
* ethnicity
 | * income
* education
* health conditions
* sleep difficulties (insomnia, difficulty falling asleep)
* chronic stress
* ethnicity
* SES
 | poverty is associated with subjective sleep complaints in middle-aged women, irrespective of age, race and education. Chronic stress associated with lower SES mediate the association of poverty with poor sleep. |
| Van Cauter and Spiegel, 199919 | This article discusses the hypothesis that the adverse impact of low SES on health may be partly mediated by decrements in sleep duration and quality. | Young and healthy adults | * Division into two groups: strong SES and weak SES
* Blood test of cortisol, glucose, insulin, markers of orthosympathetic and parasympathetic electrical activity
* Sleep was measured with a mixed method of night-time sleep system + EEG + monitoring of brain waves + the Pittsburgh Sleep Quality Index + the Karolinska somnolence scale
 | * carbohydrates
* metabolism
* endocrine function
* sympatho-vagal balance
* cortisol
* glucose
* insulin
* inhibitory / excitatory electrical activity
 | Chronic sleep debt caused by low SES is partially associated with metabolic diseases that increase comorbidity. |

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