Reducing Sleep Deficiencies Within Low-Income Populations in the United States

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Introduction

The National Institutes of Health (2022) estimates a total of fifty to seventy million cases of sleep deficiency in the United States. In addition, they define a sleep deficiency as any condition in which the individual is deprived of sleep, falls asleep throughout the day, cannot sleep efficiently, or has a sleep disorder that lowers sleep quality and/or duration. The Centers for Disease Control and Prevention (2022) reported one-third of Americans as not sleeping sufficiently each day. For adults, the average recommended sleep duration is seven to eight hours each night (Institute of Medicine, 2006). Sleep was identified as a health behavior by Healthy People 2020-2030 and getting adequate amounts has been established as an objective for public health improvement since then. In an article published by the CDC (Perry et al., 2013) researchers found lack of sleep so detrimental to one's health that its core elements, down to its scheduled timing, length, and quality were all to be identified as determinants of health. The consequences of sleep deprivation and sleep deficiency affect all age groups and has been linked to life-threatening health conditions associated with cardiovascular morbidity, metabolic disorders, obesity, diabetes, cardiovascular disease, and hypertension (Colten & Altevogt, 2006). Individuals with sleeping disorders are also at an increased risk of contracting and dying from coronary heart disease and stroke (Cooper et al., 2011).

Income, social status and networking, education, and employment have been considered social determinants of health that impact the quality of the people's lives, and in turn have major influences on health inequities (American Medical Association, 2022). Social determinants of health are closely related to an individual's or a group's socioeconomic status (SES) which considers their income, type and stability of employment, and level of education. Some literature

has found lower prevalence rates of sleep disorders and chronic diseases in individuals with higher socioeconomic status while higher rates were more common in non-whites, low-income, and lower educated populations (Williams et al., 2015).

Theory

A theory can be described as a set of ideas, concepts, and connections that attempt to explain the meaning behind a situation or event of which cannot be linearly defined (Glanz & Rimer, 1995). Theories are organized by their constructs, concepts, variables, and models (Glanz & Rimer, 1995). When theories are applied to health promotion, they depend on the knowledge of several different fields of science including psychology, sociology, anthropology, consumer behavior, and marketing to aid healthcare professionals in their understanding of health behavior (Glanz & Rimer, 1995). The goal of comprehending theory is to give healthcare professionals an explanation as to why individuals make certain decisions where their health is concerned. In addition, theory facilitates the planning of efficient and successful intervention programs designed with the intent to help individuals make better, health-conscious choices (Glanz & Rimer, 1995).

Theory of Planned Behavior

The Theory of Planned Behavior suggests that an individual's behavior is the direct result of their attitude, perceived social importance, intent, and ability to control the health behavior they are participating in (Ajzen, 1991; Fishbein & Ajzen, 2011). It is a direct expansion of the researched Theory of Reasoned Action which hypothesizes a relationship between behavior and intent (Ajzen, 1991). The Theory of Planned Behavior implements the concept of perceived behavioral control to describe an individual's belief in their ability to control their behavior, as well as control the environment that induces it, under a specific set of circumstances (Fishbein &

Ajzen, 2011). In other words, if an individual has a positive attitude, believes that this behavior is what others would like for them to perform, and trusts in their ability to control the behavior, then they will likely intend to perform the behavior themselves (Ajzen, 1991; Fishbein & Ajzen, 2011).

A research team used the Theory of Planned Behavior to study sleep patterns, amongst a sample of moderately healthy college students, with the goal of defining the changes in sleep behavior from person-to-person or under different circumstances within one person's life, a core concept of sleep opportunity (Mead & Irish, 2022). The Theory of Planned Behavior has been applied to the study of sleep behavior before, but research found a general hypothesized link between an individual's intent and predicted behavior taken when going to sleep (Stanko, 2013; Robbins & Niederdeppe, 2013). These previous studies investigated the relationship between intent and sleep behavior in the context of sleep duration, consequentially disregarding sleep opportunity. In the Theory of Planned Behavior, there are essential variables to consider when defining behavior such as the context, timing, goal, and action development of the behavior being performed (Fishbein & Ajzen, 2011). Mead and Irish (2022) identified this limitation present within several studies and pursued research to examine "intra-individual variability in sleep attitudes" under the context of perceived behavioral control, intent, and perceived subjective norms, as described in the Theory of Planned Behavior.

The study by Mead and Irish (2022) identified daily intent and perceived behavioral control as major contributors to predicting sleep behavior and future sleep health intentions by acknowledging the factors that influence sleep. The researchers found that the Theory of Planned Behavior could be used in developing programs that aid sleep opportunities.

Intrapersonal Factors

On the intrapersonal level of the Social Ecological Model, factors such as the extent of an individual's knowledge, cognitions influenced by past experiences, attitudes, and beliefs all have the potential to influence behavior (Bronfenbrenner, 1979). When applied to sleep, factors that can cause an individual to attempt to sleep earlier, longer, and for an extended time include: having an educational experience where they learn about the benefits of sleep, as well as the consequences; seeing their friends or family members happier after implementing better sleep schedules; being verbally supported by respected members of the community who believe in their ability to change. In contrast, when individuals lack the knowledge, have no support, and surround themselves with people who participate in making similar sleeping decisions, they are less likely to change. This is a result of the power of social influence, as described by the Social Ecological Model (Bronfenbrenner, 1979)

Sleeping less than the recommended amount as well as having easily interrupted sleep has been shown to have a strong prevalence amongst impoverished, racially/ethnically diverse populations (Stamatakis et al., 2007; Chen et al., 2015). In a community study focused on identifying the barriers to sleep within racially/ethnically diverse populations, researchers predicted that advising individuals on how to effectively develop good sleep habits would make them more likely to attempt personal improvement (Rottapel et al., 2020). In addition, the researchers believed that individuals outside of the study would model this behavior if the intervention they implemented considered financial barriers, ethnic diversity, and cultural beliefs (Rottapel et al., 2020). This study found that although participants understood the importance of sleep and acknowledged its benefits, they could not fully make the transition into developing better sleep habits due to several obstacles imposed by their job schedules, accumulated stress, and a lack of emotional support (Rottapel et al., 2020). Feeling overwhelmed by stress was

identified as a "key barrier" to the participants' ability to get sufficient, high-quality sleep daily (Rottapel et al., 2020). Many of the participants to this study were caregivers to their families and friends, so one of the suggested intervention strategies was based on previous sleep research amongst low-income African American mothers (Zambrano et al., 2016), which drew focus upon taking a family-based approach that would benefit the sleeping schedule of entire households though behavior modeling (Rottapel et al., 2020)

Interpersonal Factors

The Social Ecological Model defines interpersonal factors as social relationships individuals have with families, friends, and peers while considering their impact on one's health (McLeroy et al., 1988). Many studies have found the practice of maintaining good social health beneficial to a person's risk for chronic diseases and mortality (Holt-Lunstad et al., 2010; House et al., 1988; De Vogli et al., 2007). When individuals feel their interpersonal relationships are strained or in jeopardy of dissolving, they are more likely to have lower-quality sleep (Brummett et al., 2006). In a study by Ailshire and Burgard (year), individuals who had strong social support when it came to decision-making, emotional stability, and daily conversation fell asleep longer and woke up less throughout the night. They also reported having very few problems with sleep behavior (Ailshire & Burgard, 2012). In the same study, those in conflict with their peers, isolated by location, and with very few friends or acquaintances self-reported having problems with sleep regularly (Ailshire & Burgard, 2012). In addition to social support and lack thereof contributing to sleep quality and duration, individuals with depression who felt mentally and physically secluded from social circles had many instances where they could not fall asleep, despite being tired, nor could stay asleep long enough to reach their recommended hours

(Ailshire & Burgard, 2012). Their findings agreed with previous studies researching the link depression and sleep disorders (Riemann et al., 2001; Nutt et al., 2008).

Organizational, Community, Environmental, and Policy Factors

The amount of sleep low-income individuals are able to receive each night varies on account of several contributing factors arising from the environment in which they reside, study, or work, as well as the communities they take part in. There are even governmental policies implemented to further influence the decisions Americans take when applicable to their sleep.

ORGANIZATIONAL

Organizational factors that can contribute to an individual's sleeping behavior include institutional or occupational regulations requiring students and workers to come in early each day, use electronic devices for all assignments, and leave late on most or all days of the week. If students and workers suffer from insufficient, low-quality nighttime sleep, they are more vulnerable to falling asleep frequently during the day, poor performance, difficulties paying attention (Gruber et al., 2010; Michaelsen et al., 2012), and on some occasion drowsy driving and tardiness (Swanson et al., 2012).

COMMUNITY

Community factors are those that place people in categories or groups of similar interests, geographical locations, or beliefs. People who are in similar community organizations tend to make similar decisions, regardless of whether or not they are healthy for them. In a study conducted by the National Sleep Foundation (2020), researchers found that individuals were equipped with a general understanding of sleep hygiene and appreciated its worth. When the extent of the participants' knowledge was evaluated, researchers found that the individuals recognized the importance but could not elaborate on the rationale. In other words, they were

unaware of the potential for major health deterioration caused by insufficient sleep, such as high blood pressure, mental illness, obesity, depression, and an increased chance of injury (National Institute of Health, 2022). When offered to be educated in sleep behavior, participants expressed most interest in joining informative sessions in groups derived from people with similar sleeping habits, in addition to requesting these meetings be instructed by an expert in the field (Rottapel et al., 2020). Participants explained their rationale led in the comfort of knowing they were not alone in poor decision-making regarding their sleeping schedules. Researchers proposed educating individuals on the negative impact of long-term sleep deficiency, the appropriate use and dosage of caffeine, effective techniques to combat noise, the advantages of sleeping in a cool setting, as well as the importance of diet and exercise consistency (Rottapel et al., 2020). Despite previous research supporting the idea of education influencing health behaviors (Irish et al., 2014), the researchers of this study depended on previous studies that found more success in helping individuals develop better decision-making skills and stress management (Michie et al., 2011; Handley et al., 2016), to establish a more effective community intervention. A previous study identified one barrier to a restful night being family time management (Zambrano et al., 2015). The National Sleep foundation suggested that targeting this specific barrier through the implementation of a family-based program may aid parents in developing better sleeping habits and learn to prioritize it (Rottapel et al., 2020).

ENVIRONMENTAL

In the social ecological model, environmental factors are the physical contributors that can indirectly or directly impact a person's health. These can include the quality and presence of danger in a person or group’s housemates’ behaviors, housing infrastructure, air, and neighborhood. In a study by Wilson and colleagues (2014), found children living in low

socioeconomic status households and children of minorities were sleep deprived and spent less time asleep each night, irregularities in the times they started and ended their sleep, and trouble staying asleep for the entire night. The preschool students were reported to have been sleeping in environments that were too noisy, too bright-lighted, or too hectic (Wilson et al., 2014).

POLICY

Policies that are put in place for the public can either help people make healthier or less healthy behavioral decisions. These policies can be regulations implemented at the local, state and federal level. Insufficient sleep, amongst adolescents, has shown to be a major reason for motor vehicle crashes in the United States (Meltzer et al., 2022) Several studies have demonstrated the danger of drowsy driving, rivaling that of impaired driving (AAA Foundation for Traffic Safety, 2002). In South Carolina, as in the other forty-seven states in America, there are no laws that specifically target individuals who drive while tired (Governors Highway Safety Association, 2022). Instead, there are state laws that charge drivers with a federal offense if their drowsy driving kills another human being. Maggie's Law is a National Drowsy Driving Act that was passed in 2003, authorizing the federal government to charge drivers with vehicular homicide if the driver has gone more than one day without sleeping (Congress, 2022).

Suggestions for Intervention

Recent attempts at applying interventions to reduce sleep deficiencies within low-income populations in the United States have focused on programs that directly approach family and home environments. In one study conducted by the *Journal of Clinical Sleep Medicine* (Williamson et al., 2022), approached individuals on the community level and developed the *Sleep Well!* intervention program focused on targeting childhood insomnia and sleep deficiency in low-income families who visited urban primary care facilities. Researchers compiled a variety

of strategic methods to implement psychoeducation, developing sleep hygiene, applying reinforcements for bedtime misbehavior, and promoting sleep independence within children (Williamson et al., 2022). Researchers identified a strong link between a child's sleeping habits and a caregiver's perception of sleep health (Williamson et al., 2022). The intervention strategies applied in this study witnessed a reduction in sleep latency as well as decreased frequency and duration of late-night awakenings in children, which in turn displayed improvements in their daytime abilities (Williamson et al., 2022). This intervention study, however, did not show statistically significant increased sleep durations.

References

Ailshire, J. A., & Burgard, S. A. (2012). Family relationships and troubled sleep among U.S. adults: examining the influences of contact frequency and relationship quality. *Journal of health and social behavior*, *53*(2), 248–262. https://doi.org/10.1177/0022146512446642

Ajzen, I. (1991). *The theory of planned behavior*: *Organizational Behavior and Human Decision Processes, 50*(2), 179-211. 10.1016/0749-5978(91)90020-T

Alderson, P. (1998). Theories in Health Care and Research: The Importance of Theories in Health Care. *Bmj, 317*(7164), 1007-1010. 10.1136/bmj.317.7164.1007

American Medical Association. (2022, August 1). *What are social determinants of health?* https://www.ama-assn.org/delivering-care/health-equity/what-are-social-determinants-health

Behavior Theory in Public Health Practice and Research, 2nd Edition (online access included). (2021, , NA. https://link-gale-com.libproxy.clemson.edu/apps/doc/A694934879/AONE?u=clemsonu_main&sid=bookmark-A ONE xid=4c427cd0

Brummett, Babyak, M. A., Siegler, I. C., Vitaliano, P. P., Ballard, E. L., Gwyther, L. P., & Williams, R. B. (2006). Associations Among Perceptions of Social Support, Negative Affect, and Quality of Sleep in Caregivers and Noncaregivers. *Health Psychology,* 25(2), 220–225. https://doi.org/10.1037/0278-6133.25.2.220

Cappuccio, F. P., Cooper, D., D'Elia, L., Strazzullo, P., & Miller, M. A. (2011). Sleep duration predicts cardiovascular outcomes: a systematic review and meta-analysis of prospective studies. *European heart journal*, *32*(12), 1484–1492. https://doi.org/10.1093/eurheartj/ehr007

Castelnovo, A., Ferri, R., Punjabi, N. M., Castronovo, V., Garbazza, C., Zucconi, M., Ferini-Strambi, L., & Manconi, M. (2019). The paradox of paradoxical insomnia: A theoretical review towards a unifying evidence-based definition. *Sleep Medicine Reviews, 44*, 70-82. 10.1016/j.smrv.2018.12.007

Chen, X., Wang, R., Zee, P., Lutsey, P. L., Javaheri, S., Alcántara, C., Jackson, C. L., Williams, M. A., & Redline, S. (2015). Racial/Ethnic Differences in Sleep Disturbances: The Multi-Ethnic Study of Atherosclerosis (MESA). *Sleep (New York, N.Y.); Sleep, 38*(6), 877-888. 10.5665/sleep.4732

Christopher, B. M., David, J. R., Keith, A. J., Lovato, N., Delwyn, J. B., Ronald, R. G., & Christopher, J. G. (2021). Tired and lacking focus? Insomnia increases distractibility. *J Health Psychol, 26*(6), 795-804. 10.1177/1359105319842927

Colten, H. R., Altevogt, B. M., & Institute of Medicine (US) Committee on Sleep Medicine and Research (Eds.). (2006). *Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem*. National Academies Press (US).

De Vogli R, Chandola T, Marmot MG. Negative Aspects of Close Relationships and Heart Disease. *Arch Intern Med.* 2007;167(18):1951–1957. doi:10.1001/archinte.167.18.1951

Fishbein, M., & Ajzen, I. (2009). *Predicting and Changing Behavior : The Reasoned Action Approach*. Taylor & Francis Group.

Grandner, M. A., Williams, N. J., Knutson, K. L., Roberts, D., & Jean-Louis, G. (2016). Sleep disparity, race/ethnicity, and socioeconomic position. *Sleep medicine*, *18*, 7–18. https://doi.org/10.1016/j.sleep.2015.01.020

Gruber, R., Laviolette, R., Deluca, P., Monson, E., Cornish, K., & Carrier, J. (2010). Short sleep duration is associated with poor performance on IQ measures in healthy school-age children. *Sleep medicine*, 11(3), 289–294. https://doi.org/10.1016/j.sleep.2009.09.007

Gruber, R., Michaelsen, S., Bergmame, L., Frenette, S., Bruni, O., Fontil, L., & Carrier, J. (2012). Short sleep duration is associated with teacher-reported inattention and cognitive problems in healthy school-aged children. *Nature and science of sleep,* 4, 33–40. https://doi.org/10.2147/NSS.S24607

Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2010). Social relationships and mortality risk: a meta-analytic review. *PLoS medicine*, *7*(7), e1000316. https://doi.org/10.1371/journal.pmed.1000316

House, J. S., Landis, K. R., & Umberson, D. (1988). Social relationships and health. *Science (New York, N.Y.)*, *241*(4865), 540–545. https://doi.org/10.1126/science.3399889

Kumar, K., Roberts, C., Finn, G. M., & Chang, Y. (2022). Using theory in health professions education research: a guide for early career researchers. *BMC Medical Education, 22*(1), 1-601. 10.1186/s12909-022-03660-9

Mead, M. P., & Irish, L. A. (2020). *Application of health behavior theory to sleep health improvement*. Blackwell Science. 10.1111/jsr.12950

Mead, M. P., & Irish, L. A. (2022). *The theory of planned behavior and sleep opportunity: An ecological momentary assessment*. Blackwell Science. 10.1111/jsr.13420

Fishbein, M., & Ajzen, I. (2009). *Predicting and Changing Behavior : The Reasoned Action Approach*. Taylor & Francis Group.

Riemann, D., Berger, M., & Voderholzer, U. (2001). Sleep and depression--results from psychobiological studies: an overview. *Biological psychology*, *57*(1-3), 67–103. https://doi.org/10.1016/s0301-0511(01)00090-4

Robbins, R., & Niederdeppe, J. (2015). Using the Integrative Model of Behavioral Prediction to Identify Promising Message Strategies to Promote Healthy Sleep Behavior Among College Students. *Health Communication; Health Commun, 30*(1), 26-38. 10.1080/10410236.2013.835215

Robbins, R., & Niederdeppe, J. (2015). Using the Integrative Model of Behavioral Prediction to Identify Promising Message Strategies to Promote Healthy Sleep Behavior Among College Students. *Health Communication; Health Commun, 30*(1), 26-38. 10.1080/10410236.2013.835215

Stamatakis KA, Kaplan GA, Roberts RE. *Short sleep duration across income, education, and race/ ethnic groups: population prevalence and growing disparities during 34 years of follow-up.* Ann Epidemiol. 12 2007;17(12):948–955. 10.1016/j.annepidem.2007.07.096 [PubMed: 17855122] 2.

Swanson, L. M., Drake, C., & Arnedt, J. T. (2012). Employment and drowsy driving: a survey of American workers. *Behavioral sleep medicine*, 10(4), 250–257. https://doi.org/10.1080/15402002.2011.624231

Theory at a glance : a guide for health promotion practice (1995). . U.S. Dept. of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute.

Urie Bronfenbrenner. (1979). *The Ecology of Human Development : Experiments by Nature and Design*. Harvard University Press.

Williamson, A. A., Okoroji, C., Cicalese, O., Evans, B. C., Ayala, A., Harvey, B.,Honore, R., Kratchman, A., Beidas, R. S., Fiks, A. G., Power, T. J., & Mindell, J. A. (2022). *Sleep Well!* An adapted behavioral sleep intervention implemented in urban primary care. *Journal of clinical sleep medicine : JCSM : official publication of the American Academy of Sleep Medicine,* 18(4), 1153–1166.

Wilson, K. E., Miller, A. L., Lumeng, J. C., & Chervin, R. D. (2014). Sleep environments and sleep durations in a sample of low-income preschool children. Journal of clinical sleep medicine : JCSM : *official publication of the American Academy of Sleep Medicine,* 10(3), 299–305. https://doi.org/10.5664/jcsm.3534

Zambrano, D. N., Mindell, J. A., Reyes, N. R., Hart, C. N., & Herring, S. J. (2016). "It's Not All About My Baby's Sleep": A Qualitative Study of Factors Influencing Low-Income African American Mothers' Sleep Quality. *Behavioral Sleep Medicine, 14*(5), 489-500. 10.1080/15402002.2015.1028063 https://doi.org/10.5664/jcsm.9822