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Sociodemographic and Health Correlates of Sleep in U.S. Hispanic Older Adults

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Running head: SLEEP CORRELATES IN U.S. HISPANIC OLDER ADULTS

Sociodemographic and Health Correlates of Sleep in U.S. Hispanic Older Adults

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### Abstract

This project aims to understand the sociodemographic and health correlates of poor sleep in U.S. Hispanic<sup>1</sup> older adults. Data from the National Social Life, Health, and Aging Project (NSHAP): Wave 2 were analyzed to understand the prevalence of poor sleep among Hispanic older adults, sociodemographic predictors of sleep patterns, and the association between sleep quality and chronic disease. Only the data from Hispanic participants ( $n= 345$ ) were used in the present study. Self-reported demographic, self-reported and actigraphy-measured sleep, and self-report health measures were used. Results of regression analyses indicated that self-reported restless sleep significantly predicted self-rated physical and mental health, hypertension, pain, and self-rated general happiness. Feeling rested was significantly associated with self-rated physical health and mental health, pain, and self-rated happiness. Neither restless sleep nor feeling rested were significant predictors of diabetes. Actigraphy-measured sleep duration was not significantly associated with health outcomes. While sleep deprivation has serious physical and mental health consequences for Hispanics, sleep disorders in Hispanic older adults have been overlooked in research. This study sheds some light on the associations between sleep and health in Hispanic older adults. Examination of potential mechanisms linking poor sleep with mental and physical health in Hispanic older adults is a critical next step.

**Word count = 245/250**

**Keywords:** sleep, older adults, aging, Hispanic, health disparities

### Public Significance Statement

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<sup>1</sup> The term “Hispanic” refers to people who speak Spanish and/or are descended from Spanish-speaking populations. The term Hispanic was used in this manuscript as it best aligns with the demographic question used in the main study from which this study is derived.

This secondary data analysis is the first to investigate a range of sociodemographic factors that may be associated with sleep disturbances in U.S. Hispanic older adults, and how these sleep disturbances may predict poor physical and mental health outcomes. Findings from this study can orient researchers and clinicians toward a deeper understanding of sleep disturbances in Hispanic older adults and novel ways to treat them. Future research should explore potential mechanisms linking sociodemographic factors with sleep and sleep disturbances with health in Hispanic older adults.

Sleep disorders are some of the most common complaints among older adults (Lauderdale et al., 2014; Neikrug & Ancoli-Israel, 2010; Smagula et al., 2016). Sleep disturbances have both short-term and long-term health consequences (Hirshkowitz et al., 2015). Among older adults, it is difficult to find a domain of mental or physical health that is unrelated to sleep. Research shows that, among older adults, sleep disturbances are positively associated with adverse mental health outcomes such as depression and self-reports of pain, and cardiometabolic outcomes like hypertension and diabetes (Hall et al., 2015). Despite reports indicating that over 50% of older adults suffer from sleep disturbances (Dzierzewski, Rodriguez Tapia, & Alessi, 2017), the literature has often overlooked sleep disturbances in older adults as symptoms of other ‘primary’ disorders (i.e., as attributable to other health conditions, e.g., depression or restless leg syndrome), as opposed to ‘primary’ disorders worthy of intervention themselves (Dzierzewski & Dautovich, 2018).

The limited sleep research that has been conducted with U.S. older adults has primarily included non-Hispanic Whites. While sleep research with Hispanics is currently growing, it has mostly been limited to middle-aged Hispanics. In middle-aged Hispanics, sleep disturbances are a major contributing factor to many mental and physical health disparities. Research indicates that Hispanics are very short sleepers (3.5 times more likely to sleep less than 5 hours per night than non-Hispanic Whites; Whinnery, Jackson, Rattanaumpawan, & Grandner, 2014) and that Hispanics experience poor sleep quality (Alcántara et al., 2017; Bardwell & Dimsdale, 2001; Loreda et al., 2010; Ng, Dimsdale, Shragg, & Deutsch, 1996; Ng, Rollnik, & Shapiro, 1996). Research also shows that middle-aged Hispanics are more likely to have persistent, severe, and under-diagnosed sleep disorders than non-Hispanic Whites (Alcántara et al., 2017; Bardwell & Dimsdale, 2001; Loreda et al., 2010; Ng et al., 1996a; Ng et al., 1996b); thus, sleep disturbances

in U.S. Hispanic older adults warrant attention.

Yet, little is known about the sleep quality of Hispanic older adults or its association with chronic health outcomes. The Census Bureau estimates that, by 2025, one in six elderly Americans will be Latino (Colby & Ortman, 2015). Given that research has shown that (1) poor sleep is linked to a host of negative mental and physical health outcomes in non-Hispanic Whites and (2) Hispanics are disproportionately impacted by sleep-related health disparities compared to non-Hispanic Whites, this project seeks to understand the health correlates of poor sleep in U.S. Hispanic older adults. Data from the National Social Life, Health, and Aging Project (NSHAP): Wave 2 (Waite et al., 2018), were analyzed to estimate the prevalence of poor sleep among Hispanic older adults (ages 62 to 85), to understand sociodemographic factors associated with sleep patterns, and to understand the association between sleep quality and chronic disease.

## METHODS

### Sample

The National Social Life, Health and Aging Project (NSHAP) was the first population-based study of health and social factors on a national scale, aiming to understand the well-being of older, community-dwelling Americans by examining the interactions among physical health, illness, medication use, cognitive function, emotional health, sensory function, health behaviors, and social connectedness. It was designed to supply health providers, policy makers, and individuals with useful information and insights into these factors. To date, there are three waves of NSHAP data available to researchers.

During 2005-2006, the National Opinion Research Center and Principal Investigators at the University of Chicago interviewed more than 3,000 adults aged 57 to 85 (Wave 1). Wave 2 interviews were conducted from August 2010 through May 2011, during which Wave 1

respondents were re-interviewed. Wave 2 data, specifically Datasets 1 (demographic information and well-being) and 9 (sleep), were used in the present study.

Only NSHAP Wave 2 Hispanic participants ( $n = 345$ ) were selected for this study. The study did not include any further information on the participants' ethnic background. Age ranged from 62 to 90 years old ( $M = 72.39$ ,  $SD = 6.97$ ). Of the participants, 174 (50.4%) self-identified as female and 171 (49.6%) as male. Over half reported less than a high school education ( $n = 188$ , 54.5%), and only 11.3% had a bachelor's degree or more ( $n = 39$ ). In terms of annual household income, the vast majority (81.4%) of participants were from a low to middle income background (under \$49,999/year). Most (72.2%) participants were either married or living with a partner. Of the participants who reported being separated, divorced, widowed, or never married, 91.7% reported not having a romantic, intimate, or sexual partner. See Table 1 for additional demographic information.

One third of the Wave 2 participants were randomly selected to participate in the Sleep Module (Dataset 9). Of the 345 self-identified Hispanic adults that were included in the NSHAP Project, only 81 completed the Sleep Module (Dataset 9). All 81 participants identified as non-Black Hispanic. The mean age of these 81 participants was 72.4 years. Of these participants, 38 (46.9%) self-identified as female and 43 (53.1%) self-identified male. Regarding the highest level of education achieved, these participants reported: less than high school ( $n = 47$ , 58.0%), high school or equivalent ( $n = 6$ , 7.4%), vocational certificate/some college/associate degree ( $n = 21$ , 25.9%), and bachelor or more ( $n = 7$ , 8.6%). In terms of annual household income, the vast majority (81.8%) of these participants were from a low to middle income background.

## Measures

All measures in Dataset 1 were self-report. Dataset 9 included subjective (survey question) and objective measures of sleep (actigraph data); of these measures, actigraphy-measured sleep duration was used (the survey question was not available for secondary analyses). This study included the following measures: (1) Demographic (i.e., age, gender, income, highest level of education achieved), (2) Sleep (i.e., self-reported restless sleep, feeling rested, frequency of sharing a bed with a partner, sleep duration in hours, and actigraphy-measured sleep duration, use of sleep medication), and (3) Health (i.e., self-rated physical health, history of hypertension, history of diabetes, pain in the last 4 weeks, self-rated mental health, self-rated general happiness).

*Sleep Measures.* Three survey (i.e., self-report) sleep quality questions, from Dataset 1, were used. As part of the depression instrument (CESD), respondents were asked about the frequency of several conditions, including “My sleep was restless.” This question was rated on a 4-point Likert scale (1= rarely or none of the time, and 4= most of the time). Participants were also asked the question, “How often do you feel really rested when you wake up in the morning?” that was rated on a 4-point Likert scale (0= never and 3= most of the time). Finally, individuals with spouses or romantic partners were asked how often they slept in the same bed as that person during the past month. Responses were rated on a 5-point Likert scale (0= never to 4= all the time). These responses were recoded (1 = never/rarely, 2= some/most of the time, and 3= all of the time). To facilitate meeting the multinomial regression assumption of expected cell size values of five or higher in the multinomial analyses, these 3 sleep questions and other variables below (i.e., self-rated physical health, self-rated mental health, and happy) were consolidated and recoded (in this case, 1= never/rarely, 2= sometimes, and 3= most of the time).



Finally, use of sleep medication was assessed by a dichotomous (yes/no) response question, which asked participants, “In the past two weeks, have you taken any medications or used other treatments to help you sleep?” Participants were also asked if these medications were prescribed by a doctor (yes/no).

To assess sleep duration, 81 participants (out of the 345 total participants) wore a wrist actigraph for 72 hours (Dataset 9). For the purpose of the present study, and in line with prior research using this dataset, actigraph-measured sleep duration was recoded as a categorical variable with 3 groups: less than 7 hours of sleep, 7-9 hours of sleep, and more than 9 hours of sleep (Lauderdale et al., 2014).

*Health Measures.* To assess dimensions of health, participants were asked to rate their physical and mental health on a 5-point Likert scale (1= poor and 5= excellent). The physical and mental health variables were recoded into three categories to simplify the analysis and interpretation (1 = poor/fair, 2= good, 3= very good/excellent). Pain was assessed by a dichotomous (yes/no) response question, which asked participants, “In the past four weeks, have you had pain?” Hypertension and diabetes were also assessed by a dichotomous (yes/no) response question, which asked participants: “Has your doctor ever told you that you have hypertension?” and “Has your doctor ever told you that you have diabetes?” Finally, participants were asked to consider their life in general and rate their happiness or unhappiness. Responses were on a 5-point Likert scale (1= unhappy usually to 5= extremely happy). These responses were also recoded into three categories (1 = unhappy usually/sometimes, 2= pretty happy, 3= very/extremely happy).

### **Statistical Analyses**

Descriptive analyses were used to understand the frequency of subjective and objective measures of sleep quality and quantity of the sample. Additionally, to assess the relationships between the predictor variables (i.e., the sociodemographic factors and sleep measures) and the dependent variables (i.e., the health measures), logistic and multinomial regression analyses were conducted. When necessary, Pearson chi-square Tests of Independence analyses were conducted to assess the associative relationship between the variables using a cross tabulation in lieu of a regression. This method helped determine whether there was an association between the two variables by comparing observed versus expected patterns of responses if the variables were truly independent of each other and provided an option when cell counts were not sufficient to conduct a logistic or multinomial regression.

## RESULTS

### **Sleep Quality and Quantity in U.S. Hispanic Older Adults**

Analyses were conducted using SPSS v25. Most participants (66.4%) reported feeling rested in the morning most of the time, while 20% reported their sleep was restless occasionally or most of the time. Additionally, over one third (34.2%) of the participants in the sample shared a bed with a partner all of the time. Actigraph-measured average sleep duration was 7.35 hours. About 16% of participants reported using medications for sleep, with 73% of them saying the medications had been prescribed by a doctor. See Table 2 for sleep descriptive statistics.

### **Sociodemographic Factors and Sleep Properties**

To understand the relationship between the sociodemographic factors and sleep variables, logistic and multinomial regressions were conducted. The continuous variable, age, was recoded using a median split based on the distribution of the age data ( $Mdn = 72.39$ ) in order to avoid issues with linearity in the logit. Individually, age, education level, being U.S. born, income, or

being married were not associated with feeling rested, restless sleep, sharing a bed with a partner all of the time. Actigraph-measured sleep quantity was also not related to age, education level, being U.S. born, or income. Linearity in the logit issues resulted in unreliable estimates for sleep quantity and marriage as well as income actigraph-measured sleep quantity (see Table 3). Gender had a statistically significant relationship with sharing a bed ( $\chi^2(2) = 9.43, p = .01$ ) with males having a greater likelihood to having a partner in bed all of the time. Gender was not significantly associated with feeling rested, restless sleep, or actigraph-measured sleep quantity. When all demographic variables were combined, the sharing a bed model was statistically significant ( $\chi^2(18) = 30.77, p = .03$ ) where males were more likely than females to report sharing a bed with a partner all of the time. Taking meds was also statistically significant ( $\chi^2(9) = 3.75, p < .001$ ) with males less likely than females to report taking sleep medications. The other two sleep variables, feeling rested and restless sleep, combined with all the demographic variables did not have statistically significant models.

### **Sleep Properties and Chronic Disease**

Results from logistic and multinomial regression models and health measures (see Table 4 for descriptive statistics) showed that being less rested in the morning was associated with higher odds of reporting diabetes (OR = .627, 95% CI [.441, .893]) and pain (OR = .478, 95% CI [.305, .749]). Not feeling rested was related to higher likelihood of lower overall physical health ( $\chi^2(4) = 30.05, p < .001$ ), mental health ( $\chi^2(4) = 18.97, p = .001$ ), and happiness ( $\chi^2(4) = 31.99, p = .001$ ).

Similarly, participants reporting more restless sleep had higher odds of exhibiting hypertension (OR = 1.324, 95% CI [1.046, 1.675]), diabetes (OR = 1.248, 95% CI [1.003, 1.550]), and pain (OR = 1.762, 95% CI [1.326, 2.341]) than those reporting less restless sleep.

As with feeling rested, more restful sleep was related to higher likelihoods of better physical health ( $\chi^2(6) = 20.03, p = .003$ ), mental health ( $\chi^2(4) = 18.97, p = .001$ ), and happiness ( $\chi^2(6) = 34.4, p < .001$ ). Furthermore, a rare restless night of sleep was related to a higher likelihood of a very/extremely happy self-rating.

Having taken sleep medications over the last two weeks was not related to hypertension ( $p = .30$ ), diabetes ( $p = .08$ ), or to self-ratings of physical health ( $p = .41$ ) but was related to having pain (OR = 2.456, 95% CI [1.178, 5.120]). Those not taking medications were more likely to report very good/excellent than poor/fair levels of mental health ( $\chi^2(2) = 9.30, p = .01$ ) and happiness ( $\chi^2(2) = 10.952, p = .004$ ).

There were no statistically significant relationships between sharing a bed and hypertension ( $p = .41$ ), diabetes ( $p = .79$ ), having pain ( $p = .07$ ), physical health ( $p = .07$ ), or mental health ( $p = .52$ ). Among the health-related variables, only happiness showed a statistically significant relationship; individuals were more likely to indicate that they are usually/sometimes unhappy if they reported never/rarely sharing a bed ( $\chi^2(4) = 13.41, p = .009$ ). There were no significant relationships between the actigraph-measured sleep and any of the health measures except happiness which could not be assessed due to linearity in the logit issues.

## DISCUSSION

Sleep is one of the most important well-being and health-promoting behaviors (Hall et al., 2015; Hirshkowitz et al., 2015; Lo et al., 2016). This study is novel in that it provides a first assessment of the link between sleep quality and health in a nationally representative sample of community-dwelling Hispanic older adults, a population that has been understudied. This project aimed to: (1) estimate the prevalence of poor sleep, (2) understand sociodemographic factors for sleep patterns, and (3) understand the association between sleep quality and chronic disease

among Hispanic older adults. This work adds to the prior literature on older adult sleep, which has primarily focused on non-Hispanic White older adults, and prior literature on Hispanic sleep, which has primarily focused on middle-aged Hispanics.

Findings from this study suggest that most Hispanic older adults have restful sleep and feel rested in the morning. This coincides with prior research done with the entire NSHAP Wave 1 sample, which showed that most participants felt rested in the morning and relatively few participants reported that their sleep was restless most of the time (Lauderdale et al., 2014). Mean sleep duration (7.35 hours), as measured by the actigraph, also aligned with existing literature on the mean sleep duration of NSHAP Wave 2 overall sample that states that short sleepers and long sleepers are relatively rare among older adults (Kurina, Thisted, Chen, McClintock, Waite, Lauderdale, 2015; Lauderdale et al., 2014). While this study's data aligns with the results of other literature that exists on the NSHAP study (including all participants, and not just Hispanics), it runs somewhat counter to the literature that exists on middle-aged Hispanics, which suggests that they are either very short or very long sleepers (Chen, Wang, Zee, Lutsey, Javaheri, & Alcántara, 2015; Ertel, Berkman, & Buxton, 2011; Jackson, Redline, & Emmons, 2015; Whinnery et al., 2014; Williams et al., 2015). It is possible that the Hispanics with more serious sleep disturbances are the ones who also reported taking sleep medications (~16%). Research is very preliminary, and exact rates of sleep disturbances among Hispanics of all ages warrant further research (Patel et al., 2015).

Age, education level, being U.S. born, and income were not associated with having restful sleep, feeling rested, or sharing a bed. Gender was associated with sharing a bed (with males sharing their bed more than females) but not with restful sleep or feeling rested. These

results are in line with NSHAP Wave 1 sample results (with the overall sample), where males reported more bed-sharing than females (Lauderdale et al., 2014).

In terms of health consequences of poor sleep quality, our cross-sectional data suggest that restless sleep and not feeling rested are associated with chronic health outcomes such as diabetes and pain, in addition to lower physical and mental health and lower happiness. Restless sleep is also associated with hypertension. Participants reporting more restless sleep also had higher odds of exhibiting hypertension. This confirms prior literature that shows an association between sleep disturbances and poor health outcomes, including diabetes, cardiovascular disease, mental health conditions like depression and anxiety, and even premature mortality (Chen et al., 2015; Hall, Brindle, & Buysse, 2018; Grandner et al., 2013; Marshall & Stranges, 2010; National Institute of Health, 2011; Pandi-Perumal et al., 2017; Piccolo, Yang, Bliwise, Yaggi, & Araujo, 2013; Wassertheil-Smoller et al., 2014; Williams et al., 2015). These physical and health conditions are prevalent among Hispanics. The emergence of Hispanic older adults as a fast growing minority group in the US suggests that research regarding and interventions targeting their sleep habits and health needs should be conducted (Benuto, 2017; Buxton & Marcelli, 2010; Patel et al., 2015). Results showed no significant relationship between actigraph-measured sleep and any of the health measures. It may be that sleep quality is more strongly related to health outcomes than actual duration. This result, however, may also be a function of the limited power to conduct the analysis (only 81 Hispanic participants completed the sleep module and work the actigraph).

### **Limitations**

Although this study has a number of strengths, including the use of objective measures of sleep in a nationally representative sample of Hispanics, it also has a number of limitations worth

considering. First, given that not all of the invited individuals agreed to take part in the sleep sub-study, external validity questions (i.e., is the sample representative of overall Hispanic older adults?) emerge. A priori, the overall 345 participant sample and the smaller subset who completed the sleep module do not appear to be significantly different based on ANOVA analyses.

Second, it is possible that some of the results of this study may be due to the very small sample of Hispanic individuals ( $n= 81$ ) who completed the sleep module. Thus, it is worth exploring whether the relationship between actigraph-measured sleep duration is significant in a larger sample of Hispanic individuals (as it has been in other larger studies with middle-aged Hispanics; Patel et al., 2015).

An additional limitation of this study is that participants only wore the actigraph for 3 nights, when more would be ideal. Night-to-night variability exists in actigraph-measured sleep, and a longer duration would allow for a more accurate estimation of actual patterns.

### **Conclusion**

This study provides strong preliminary data for the continued exploration of sleep patterns in Hispanic older adults. Additionally, these results contribute to the body of literature highlighting the need to examine the sleep patterns of Hispanic older adults and how these patterns may be linked to the specific physical and mental health disparities experienced by this population. It is evident that more research is needed to understand the fundamental ways in which sleep and health may be related in this population in order to design interventions seeking to improve sleep among older Hispanics adults, and thus improve their physical and mental health.

Table 1. *Demographic Characteristics of the Full Hispanic Sample (N= 345)*

Characteristic	N	%
Gender		
Male	171	49.6
Female	174	50.4
Educational Attainment		
< High School	188	54.5
High School/ High School equivalent	46	13.1
Vocational Certificate/Some college/Associate Degree	72	20.9
Bachelors or more	39	11.3
Annual Household Income		
Less than \$24,999	156	45.2
\$25,000- \$49,999	67	19.4
\$50,000 or higher	51	14.8
Relationship Status		
Married	244	70.7
Living with a partner	5	1.4
Separated	8	2.3
Divorced	28	8.1
Widowed	54	15.7
Never Married	6	1.7



Table 1 (cont'd).

Currently have a romantic, intimate, or sexual partner

(for those separated, divorced, widowed, or never married)

Yes	88	91.7
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No	8	8.3
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Born in the US

Yes	116	33.6
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No	164	47.5
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Table 2. *Descriptive Statistics for Sleep Variables*

Characteristic	<i>N</i>	%
Rested in the Morning		
Never/Rarely	25	7.2
Sometimes	90	26.1
Most of the time	229	66.4
Restless Sleep		
Rarely/None of the time	201	58.3
Some of the time	75	21.7
Occasionally	34	9.9
Most of the time	35	10.1
Same Bed		
Never/Rarely	45	13.0
Some/Most of the time	28	8.1
All the time	118	34.2
Taken Sleep Meds		
Yes	289	83.8
No	56	16.2
Actigraph-Sleep ( <i>n</i> = 81)		
< 7 Hours	30	37.0
7-9 Hours	40	49.4
> 9 Hours	11	13.6

Table 3. *Regression Results – Sociodemographic Factors and Sleep Variables*

	Rested	NoSleep	Same Bed	Taken Sleep Meds
AgeHiLo	$\chi^2(2) = .94, n.s.$	$\chi^2(3) = .87, n.s.$	$\chi^2(2) = 2.74,$ <i>n.s.</i>	$\chi^2(1) = 3.81,$ <i>n.s.</i>
Gender	$\chi^2(2) = 1.49,$ <i>n.s.</i>	$\chi^2(3) = 4.88, n.s.$	$\chi^2(2) = 9.27^*$	$\chi^2(1) = 3.93^*$
Education	$\chi^2(6) = 8.75,$ <i>n.s.</i>	$\chi^2(9) = 4.98, n.s.$	$\chi^2(6) = 8.83,$ <i>n.s.</i>	$\chi^2(1) = .178,$ <i>n.s.</i>
Born US	$\chi^2(2) = .79, n.s.$	$\chi^2(3) = 4.39, n.s.$	$\chi^2(2) = 2.27,$ <i>n.s.</i>	$\chi^2(1) = 1.30,$ <i>n.s.</i>
Income	$\chi^2(4) = 2.15,$ <i>n.s.</i>	$\chi^2(6) = 5.13, n.s.$	$\chi^2(4) = 2.91,$ <i>n.s.</i>	$\chi^2(1) = .24, n.s.$
Married	$\chi^2(2) = 6.08^{**}$	$\chi^2(3) = 2.85, n.s.$	$\chi^2(2) = .49, n.s.$	$\chi^2(1) = .04,$ <i>n.s.</i>

\* statistically significant at .01

\*\* statistically significant at .05

Table 4. *Descriptive Statistics for Dependent Variables*

Measure	<i>N</i>	%
Physical Health		
Poor/Fair	140	40.6
Good	174	50.4
Very good/Excellent	92	26.7
Mental Health		
Poor/Fair	69	20.0
Good	131	38.0
Very good/Excellent	145	42.0
Happy		
Unhappy usually/sometimes	35	10.1
Pretty happy	104	30.1
Very/extremely happy	205	59.4
Hypertension		
Yes	219	63.5
No	125	36.2
Diabetes		
Yes	113	32.8
No	231	67.0
Had Pain		
Yes	146	42.3
No	100	29.0

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