

Review

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Review

Comparing Health Disparities in Australia and New Zealand: A Systematic Review of Sleep Literature

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Abstract: Sleep disorders have become a public health problem for many reasons. The aim of this systematic review is to describe social, economic, and environmental determinants of sleep disturbances in Australia and New Zealand. A total of 22 studies, 14 from Australia and 8 from New Zealand involving children, adolescents and adults are included in the review. In summary, we found that sleep health disparities among children and adolescents in both countries are strongly associated to parental SES. Overall, lower family SES such as low parental income, low parental education, low SES area index are associated with higher sleep disturbances among children and adolescents. In adults, results revealed that SES determinants such as low income, lower education, unemployment, and night work were associated with sleep disturbances. Specifically, unemployment was associated with poor sleep quality, insomnia, and increased likelihood of suboptimal sleep efficiency. Low income and lower education were associated with high risk of OSA, longer sleep duration, insomnia, higher odds of suboptimal sleep duration and sleep onset latency.

Keywords: sleep; public health; Australia; New Zealand; socioeconomic status; social determinants of health; systematic review

1. Introduction

Sleep disorders have become a public health problem for many reasons. One major reason is that a significant proportion of the population experiences sleep disorders, such as insomnia, sleep apnea and excessive daytime sleepiness [1–7]. These conditions can interfere with the quality and quantity of sleep, leading to daytime fatigue, reduced productivity and an increased risk of accidents. Besides that, modern lifestyles have created a culture of sleep deprivation, where people often prioritize work, socializing and other activities over getting enough sleep [8–10]. This is compounded by the use of electronic devices, such as smartphones and tablets, which emit blue light that can disrupt the body's natural sleep-wake cycle. The consequences of insufficient sleep can be serious, including an increased risk of chronic health conditions, such as obesity, diabetes, cardiovascular disease and depression [11–13]. As a result, the medical community and public health officials have recognized the importance of promoting healthy sleep habits and addressing sleep disorders as a critical public health issue.

In addition of that, socioeconomic status (SES) influence on health disparities remains for vulnerable populations such as black people and immigrants, whose are both considered low SES individuals [14]. Health disparities can significantly impact sleep disturbances, contributing to variations in sleep quality and duration among different populations. These disparities are often linked to a complex interplay of social, economic, cultural and environmental factors [15–19]. Disparities in access to healthcare services can impact the diagnosis and management of underlying health conditions that may contribute to sleep disturbances. Individuals with limited access to healthcare may face delays in addressing issues such as sleep apnea, insomnia or other sleep-related

disorders [20,21]. Lower socioeconomic status is associated with increased rates of sleep disturbances [15,16,22–29]. Economic disparities may lead to stressful living conditions, job insecurity, and limited access to resources that promote healthy sleep such as comfortable bedding or quiet living environments. This situation is worse in rich countries like Australia and New Zealand where, despite the high living conditions of their population, prevalence and incidence of sleep disturbances are increasing [2,30].

Addressing health disparities through improved access to healthcare, socioeconomic support and culturally competent interventions, can positively impact sleep outcomes. Integrating a comprehensive understanding of the social determinants of health into sleep medicine practices is crucial for developing effective strategies to mitigate sleep disturbances across diverse populations. While many studies investigated physiological mechanisms behind sleep, very few analysed the influence of social and environmental determinants of sleep disturbances [31–34]. The aim of this systematic review is to describe social, economic and environmental determinants of sleep disturbances in Australia and New Zealand; and compare sleep health disparities between these two countries.

2. Methods

2.1. Literature Search and Study Selection

We performed a search in PubMed/MEDLINE, Web Of Science and Scopus databases to identify relevant studies testing the association between SES and various sleep indices. The following key terms were used: “socioeconomic”, “social”, “social status”, “social position”, “social class”, “social rank”, “education”, “income”, “occupation”, “employment”, “employed”, “asset” and “sleep”, “insomnia”, “circadian”, “parasomnia”, “restless leg”, “periodic leg movement”, “bruxism”, “hypersomnia”, “somnambulism”, and “sleepiness”. Additional search was performed through Google Scholar to make sure to not miss any peer reviewed articles. Eligible studies were validated by two reviewers and selected following inclusion and exclusion criteria, in accordance with Prisma guidelines [35].

2.2. Inclusion Criteria

It was considered cross-sectional, prospective or retrospective cohort, longitudinal, quasi-experimental, and every empirical study that evaluated socioeconomic and environmental determinants of sleep in the general population, regardless of participant’s age, ethnicity and gender. We considered several objective SES measures, including education, income, occupation, employment status, wealth, and composite score, as well as subjective SES as assessed by participants. We also included variables such as access to health insurance and entitlement to public benefits in composite categories. Although they are objective, they can be related to multiple key SES (income, employment, or wealth) indicators. Subjective categories included variables measured based on participants' assessment of their own social class (usually relative to others) or economic situation (financial hardship, food security, etc.). A surrogate measure of SES (neighborhood or residential deprivation index) was included when individual data were not available. In studies investigating children or adolescents, the SES (parents' education and occupation, household income/wealth) parental measure was used instead. The final category, called composite sleep disturbances, composite measures of the above variables, usually in the form of validated scales, overall satisfaction and general sleep quality as assessed by the questionnaire itself. Sleep variables can be continuous or categorical, with cut-off values already defined in each article.

2.3. Exclusion Criteria

Peer reviewed articles were excluded based on the following criteria: they were not presenting original research, they were in non-English and/or French languages, the full text was not accessible, they recruited participants that already presented specific conditions at baseline (i.e. depression, pregnancy, diabetes).

2.4. Data Extraction and Quality Assessment

We extracted the following data from the included studies: author name, study location, type of participant, type of study, SES determinants, sleep instrument, and authors' conclusions. To assess the quality of the included studies, we used the National Heart, Lung and Blood Institute Quality Assessment Tool for Observational Cohort and Cross-sectional Studies. Evaluation of exposure and evaluation of results for each article were subject to objectivity. Studies using subjective or local SES measures, self-reported clinical sleep components, or non-diagnostic symptoms/signs of sleep disorders (International Classification of Sleep Disorders-3 or Diagnostic and Statistical of Psychiatric Disorders Manual) were downgraded according to diagnostic criteria). Blinding of outcome raters was not applied to self-reported outcomes. For the overall quality rating, we calculated the percentage of positive ratings in the sum of applicable criteria. Studies with less than 50% positive ratings were rated as low quality, >65% as high quality, and the rest as moderate quality.

3. Results

3.1. Sleep Health Disparities in Australia

3.1.1. Characteristics of Included Studies

Studies characteristics are presented in Table 1. Concerning Australia, 14 studies published between 1991 and 2020 were included [2,36–48] in the systematic review. Six studies were performed across all Australia [2,36,38,39,41,46], 7 studies were conducted in specific locations of Australia such as South Australia [47,48], Queensland [45], South-East Queensland [42], Adelaide [44], Melbourne [43], New South Wales [40] and 1 study was multicenter conducted in Australia, South Africa, China, South Korea, and United Kingdom [37]. Of the 14 included studies, 12 were cross-sectional studies [2,37–45,47,48] and 2 were longitudinal studies [36,46]. Seven studies included adults from general population [2,37–39,43,47,48], 4 involved infant and /or children [36,40,44,46], whereas 3 studies [41,42,45] have women as participants. The sample size ranged from 322 to 10090, for a total of 63193 participants. The socioeconomic determinants used for SES measurement were education [2,37–39,43,45,47], income [39,42,43,45,47,48], employment status/occupation [2,38,39,41–43,45], area SES index [40,44] and composites SES indices [36,39,46]. The most reported sleep disturbance was sleeping duration [2,38–41,44] and sleep disturbances [36,42,46,48]. In addition, other sleep disturbances such as insomnia [37], sleep quality [45], obstructive sleep apnea (OSA) [47], excessive day time sleepiness (EDS) [43], and the combination of sleep duration, sleep latency and sleep efficiency was also reported [2].

Table 1. Characteristics of sleep health disparities studies in Australia.

Studies including only children and/or adolescents < 18 years old								
Study	Location	Participants	Sample size	Type of study	SES determinant	Type of sleep disturbances	Sleep measurement tool	Author's conclusions
Nicholson [46]	2012 All Australia	Infants 0-1 year Children 4-5 years	10090	2-years longitudinal study	Composite variable (family annual income, years of parental education, parental occupational status) divided in quintiles	Sleep disturbances	Two or more parent-reported sleep problems (difficulty getting to sleep, not happy sleeping alone, waking during the night, and restless sleep), four or more nights per week	Lower SES was associated with increased odds for parent-reported sleep problems
Biggs 2013 [44]	Adelaide	Children 5-10 years from 32 primary schools	1845	Cross-sectional study	Area SES index based on postal code (low, mid, high)	Sleep duration	Parent-reported sleep duration	Children from low SES areas reported later bedtimes and reduced sleep opportunity than children from higher SES areas
Hardy 2017 [40]	New South Wales	Children aged 5-16 years	7555	Cross-sectional study	Area index (based on post codes and divided in tertiles)	Sleep duration	Self-reported sleep duration (adherence to recommendation according to age)	There was no difference in adherence between high and low SES children

Williamson 2019 [36]	All Australia	Infants from general population aged 0-1 year	4517	10-year longitudinal cohort study	Socioeconomic risk index (average of financial hardship score and composite SES score [derived from income, education, and occupational prestige])	Sleep disturbances	Parent-reported sleep problems trajectories (single question; no sleep problems, mild sleep problems over time, increased middle childhood sleep problems, limited infant/preschool sleep problems, persistent sleep problems through middle childhood)	Higher socioeconomic risks increased the odds for all sleep problem trajectories compared to no sleep problems
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Studies including adult participants ≥ 18 years old

Study	Location	Participants	Sample size	Type of study	SES determinant	Type of sleep disturbances	Sleep measurement tool	Author's conclusions
Moffitt 1991 [48]	South Australia	Adults from the general population	1765	Cross-sectional study	Annual household income	Sleep disturbances	Sleep subscale of the Nottingham health profile	Low income was associated with more sleep problems
Adams 2012 [47]	South Australia	Adults from the general population	3007	Cross-sectional study	Education (high school or less, still studying, trade/diploma, university degree or higher) Household income (\$<30000, 30–60000, 60–100000, >100000)	OSA	High risk OSA (STOP-BANG questionnaire)	High risk for OSA was associated with less education and lower income

Soltani 2012 [45]	Queensland	Adults women from an established cohort	3655	Cross-sectional study	Family income per week (>\$1,000, \$700-\$1000, \$400-\$700, <\$400) Highest level of education (tertiary, complete high school, incomplete high school) Housing tenure (own, rent) Employment status (employed, home duties, unemployed/economically inactive)	Sleep quality	PSQI global score (0-5, 5-10, >10)	Women with poor sleep quality were more likely to have not completed high school, to be either unemployed or to be undertaking home duties and to be renting their current home
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Liviya NG 2014 [43]	Melbourne	Adults from general population	707	Cross-sectional study	Education (nontertiary vs tertiary) Occupation (manager, professional, associate professional, clerical, or service) Income per week (≥\$2000, \$1600-\$1999, \$1000-\$1599, \$0-\$999)	EDS	Excessive daytime sleepiness (ESS score >10)	There was no association between SES and EDS
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Studies including adult participants ≥ 18 years old

Study	Location	Participants	Sample size	Type of study	SES determinant	Type of sleep disturbances	Sleep measurement tool	Author's conclusions
Seib 2014 [42]	South-East Queensland	Women from general population aged 60-70 years	322	Cross-sectional study	Employment status (employed, domestic duties, unemployed/disability pension, retired)	Sleep disturbances	Sleep disturbance (General Sleep Disturbance Scale)	Women who were unemployed or on a disability support pension

					Income (<20000 AUD, 20000-80000 AUD, >80000 AUD)			reported more sleep disturbance
Clark 2017 [41]	All Australia	Women from one cohort aged 31-36 years. Women from another cohort aged 59-64 years	7835	Cross-sectional study	Occupation (manager/professional, clerical/sales, trades/production/labourer)	Sleep duration vs >6h/day	Sleep duration vs >6h/day Short sleep (≤ 6 h/day) Long sleep (≥ 8 h/day vs <8h/day)	In the young cohort, trades/production/labourers slept less than other occupational categories
Perales 2017 [39]	All Australia	Adults from general population aged 20-70 years	9181	Cross-sectional study	Education (degree or higher, professional qualification or secondary school, below secondary school) Employment status (full-time, part-time, self-employed, unemployed, full-time student) House tenure (owned outright, mortgage, rental) Material deprivation (yes vs no) Lack of prosperity (poor/very poor vs other) Financial worsening (one of last year's major life events)	Sleep duration	Sleep duration	Lower education, material deprivation and lack of prosperity were associated with shorter sleep duration, while unemployment with longer sleep duration

Income poverty (annual income below 60% of the sample median)

Studies including adult participants ≥ 18 years old

Study	Location	Participants	Sample size	Type of study	SES determinant	Type of sleep disturbances	Sleep measurement tool	Author's conclusions
Gordon 2019 [38]	All Australia	Adults from general population	2211	Cross-sectional study	Education (primary/secondary school, TAFE/technical college, university) Occupation (manager/professional, white collar, blue collar, retired/pension, unemployed/student)	Sleep duration	Perceived sleep insufficiency frequency in past month (0-13 vs 14-30 days)	There were no statistically significant associations between frequent perceived insufficient sleep and education or occupation
Hartescu 2019 [37]	Australia, South Africa, China, South Korea, and UK	Adults from South Africa, Australia, China, South Korea and UK recruited through social media and websites	9238	Multi-site Cross-sectional study	Education (less than primary/primary/lower secondary; upper secondary/post-secondary nontertiary; tertiary) Employment status (yes vs no)	Insomnia	Insomnia (DSM-5 criteria)	Lower education and unemployment were associated with insomnia diagnosis
Metse 2020 [2]	All Australia	Adults from general population	1265	Cross-sectional study	Education (up to secondary school vs technical/tertiary) Employment status (employed vs unemployed)	Sleep duration Sleep latency Sleep efficiency	Self-reported sleep duration, sleep onset latency, number of awakenings, WASO, and	Lower education was associated with higher odds of suboptimal

sleep efficiency sleep duration and
(suboptimal vs sleep onset
appropriate according to latency.
age-related cut-offs) Unemployment
was associated
with an increased
likelihood of
suboptimal sleep
efficiency.

SES = socio-economic status; PSQI = Pittsburgh Sleep Quality Index; DSM = Diagnostic and Statistical Manual of Mental Disorders; SDB = sleep-disordered breathing; ESS = Epworth Sleepiness Scale; EDS = excessive daytime sleepiness; WASO = wake after sleep onset; RLS = restless legs syndrome; OSA = obstructive sleep apnea; ICD = International Statistical Classification of Diseases and Related Health Problems; ASPD = advanced sleep phase disorder; DSPD = delayed sleep phase disorder; WHO = World Health Organization; REM = rapid eye movement; RBD = REM sleep behaviour disorder; ISI = Insomnia Severity Index; ODI = oxygen desaturation index.

3.1.2. Synthesis of the Main Results

The narrative synthesis described the findings of the studies based on the conclusions of the individual studies on sleep disparities. Details of individual studies in the descriptive synthesis are presented in Table 1.

Sleep disturbances. Four studies including 2 longitudinal [36,46] and 2 cross-sectional designs [42,48] evaluated the relation between SES and sleep disturbances. The 2 longitudinal studies used parent-reported sleep problem as sleep measurement, whereas the 2 cross-sectional studies used Sleep subscale of Nottingham health profile [48] and the General Sleep Disturbance Scale [42] to measure sleep disturbances. Among longitudinal studies, one was conducted with infants (0-1 year old) and children (4-5 years old) [46], and the other involved infant from general population (0-1 year old) [36]. The 2 sectional studies were focused on adults [48] and women (60-70 years old) [42] from general population. Overall, the 4 studies concluded that the lower SES was associated with the sleep disturbances. Specifically, low income and unemployment were associated with more sleep problem in adults participants cross-sectional studies [46,48]. In addition, the longitudinal studies of infant and children found that family lower SES and higher socioeconomic risks was associated with increased odds for sleep problem [36,46].

Sleep duration. Five studies, all with a cross-sectional design addressed relation between SES and sleep duration [38–41,44]. Of these, 2 studies were conducted with adults participants from general population (20-70 years old) [38,39], 2 studies were of children aged 5-16 years old [40,44] and one was performed with women from cohorts (31-64 years old) [41]. Three studies concluded that lower SES was associated with shorter sleep duration [39,41,44]. Specifically, lower education, material deprivation and lack of prosperity were associated with shorter sleep duration [39]. One study on adults reported that trades/production/labourers slept less than other occupational categories [41]. In addition, one study found that children from low SES areas had later bedtimes and reduced sleep opportunity than those from higher SES areas [44]. Finally, 2 cross-sectional studies (one focusing on children and one on adults) reported no association between SES and sleep duration [38,40].

The other sleep disturbances. The other sleep disturbances including insomnia, sleep quality, OSA, EDS, sleep latency and sleep efficiency were reported by 5 cross-sectional studies, all conducted in adult participants [2,37,43,45,47]. Globally, 4 studies reported an association between lower SES these sleep disturbances [2,37,43,47]. Among these, 3 studies found that lower education, lower income, and/or unemployment were associated with high risk of OSA [47], with insomnia diagnosis [37], higher odds of suboptimal sleep duration and increased sleep efficiency [2]. Moreover, one study involving adults women from an established cohort reported that women with poor sleep quality were more likely to have not completed high school, to be either unemployed or to be undertaking home duties and to be renting their current home [43]. Only one study found no association between SES and EDS [45].

3.2. Sleep Health Disparities in New Zealand

3.2.1. Characteristics of Included Studies

Table 2 presents the characteristics of included studies. Regarding New Zealand, a total of 8 studies, all with a cross-sectional design, published between 2004 and 2020 were included [30,49–54] in this systematic review. Most studies were conducted across all the country [30,49–52,54] except one study which was conducted in the location of Wellington [49]. The studies involved a total of 25040 participants, with samples sizes ranging from 115 to 10369. Five studies included adult participants from the general population [51–54] and the remaining 3 studies involved children [30,49,50], with ages ranging from 2 to 12 years old for children and ranging from 20 to 59 years old for adults. The SES measures presented in the studies were employment/work status [51,54,55], education [30,49,53], income [52,54] and the maternal socioeconomic deprivation [30]. The main sleep disturbances reported were insomnia [54,55], sleep duration [30,53], excessive daytime sleepiness

[52], advanced sleep phase disorder [51] and sleep-related breathing disorder [50]. Moreover, 1 study combined sleep duration, sleep latency and sleep disturbances as type of sleep disturbances [49].

Table 2. Characteristics of sleep health disparities studies in New Zealand.

Studies including only children and/or adolescents < 18 years old									
Study	Location	Participants	Sample size	Type of study	SES determinant	Type of sleep disturbances	Sleep measurement tool	Author's conclusions	
McDowall 2017 [49]	Wellington	children 2-12y attending inpatient or day wards of a children's hospital	115	Cross-sectional study	Parental education (6 levels) Household income (5 levels)	Sleep duration Sleep latency Sleep problems	Parent-reported sleep latency, sleep duration, and sleep problems (Children's Sleep Habits Questionnaire score)	Parents from homes with higher annual income were more likely to report shorter sleep latencies and fewer sleep problems. Parents with higher education reported shorter weekday sleep latencies.	
Muller 2019 [30]	All the country	Preschoolers 3-4y from a birth cohort	910	Cross-sectional study	Maternal socioeconomic deprivation (composite score from yes/no responses to various deprivation characteristics)	Sleep duration	Mother-reported sleep duration (<10h vs 10-13h)	Preschoolers whose mothers experienced high individual deprivation were twice as likely as children of mothers reporting no deprivation characteristics to have short sleep on the weekend but not on weekdays	
Harding 2020 [50]	All the country	Children 6-10y whose parents completed an online survey	1205	Cross-sectional Study	Parental education (secondary or below vs tertiary or above)	Sleep Related Breathing Disorder	High risk for SDB (Sleep Related Breathing Disorder Scale of the Pediatric Sleep Questionnaire score ≥ 0.33)	Parental education was not associated with high risk for SDB	

Studies including adult participants ≥ 18 years old									
Study	Location	Participants	Sample size	Type of study	SES determinant	Type of sleep disturbances	Sleep measurement tool	Author's conclusions	
Paine 2004 [51]	All the country	Adults 20-59 y from the general population	2670	Cross-sectional Study	Employment status (unemployed vs employed)	Insomnia	Insomnia symptoms (difficulty falling asleep, frequency of nocturnal awakenings, difficulty getting back to sleep, waking too early, wake feeling refreshed)	Being unemployed increased the risk of reporting having difficulty falling asleep and waking 3 or more times during the night.	

Studies including adult participants ≥ 18 years old									
Study	Location	Participants	Sample size	Type of study	SES determinant	Type of sleep disturbances	Sleep measurement tool	Author's conclusions	
Gander 2005 [52]	All the country	Adults 30-60 y from the general population	5441	Cross-sectional study	Eligibility for community services card (yes vs no)	Excessive Daytime Sleepiness	EDS (Epworth Sleepiness Scale score >10)	Eligibility for a community services card was not associated with EDS	

Paine 2016a [53]	All the country	Adults 20-59 y from the general population	4330	Cross-sectional study	Employment status (employed with no night work, employed with night work, unemployed)	Sleep duration	Self-reported sleep duration: short sleep (<7 h), long sleep (>8 h), insufficient sleep (extension of sleep duration by >2 hours on free days compared with scheduled days)	The odds of reporting insufficient sleep were higher for those employed in night work and lower for the unemployed. The odds of reporting short sleep were higher for night workers and unemployed. The likelihood of reporting long sleep was higher for unemployed.	
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Paine 2016b [54]	All the country	Adults from the general population	10369	Cross-sectional study	Education (tertiary, some secondary, no secondary qualification) Equivalized household income (low, middle, high tertiles)	Insomnia	Difficulty falling asleep, frequent nocturnal awakenings, early morning awakenings (all/most of the time vs a good bit/some/a little/none of the time)	Difficulty falling asleep and frequent nocturnal awakenings were more likely among those with less than a secondary school education. Being in the highest household income tertile was associated with a lower likelihood of reporting early morning awakenings.
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SES = socio-economic status; PSQI = Pittsburgh Sleep Quality Index; DSM = Diagnostic and Statistical Manual of Mental Disorders; SDB = sleep-disordered breathing; BMI = body mass index; ESS = Epworth Sleepiness Scale; EDS = excessive daytime sleepiness; WASO = wake after sleep onset; OSA = obstructive sleep apnea; PSG = polysomnography; AHI = apnea-hypopnea index; AIS = Athens Insomnia Scale; DIMS = difficulty initiating or maintaining sleep; TIB = time in bed; ASPD = advanced sleep phase disorder; DSPD = delayed sleep phase disorder.

3.2.2. Synthesis of the Main Results

Details of individual studies in the descriptive synthesis are presented in Table 2.

Insomnia. Two studies focusing on adult participants evaluated the relation between SES and insomnia [51–55]. The symptoms such as: difficulty falling asleep, frequency of nighttime awakenings, difficulty going back to sleep, waking up too early, feeling cool upon waking were used to measure insomnia in participants. The studies have concluded that unemployment increased the risk of having difficulty falling asleep and waking up 3 or more times during the night [55] and that higher household income was also associated with a lower likelihood of early morning awakenings [53]. Moreover, the study by Paine et al. [53] concluded that participants with lower levels of education (less than a secondary school) have a difficulty falling asleep and have frequent nocturnal awakenings.

Sleep duration. Two studies assessed the relation between SES and sleep duration [30,54]. One was conducted with children (pre-schoolers aged 3-4 years old) [30] and the other with adults (aged 20-59 years old) [54]. The sleep duration was measured by self-reported for the study that involved adult participants and by mother-reported for the children study. In children, the study concluded that the pre-schoolers whose mothers experienced high deprivation were twice as likely as children of mothers reporting no deprivation characteristics to have short sleep on the weekend but not on weekdays [30]. The adults study reported that the odds of reporting insufficient sleep were higher for those employed in night work (e.g., night workers) and lower for the unemployed (who reported long sleep duration) [54]. On the other hand, it was reported that the odds of reporting short sleep were higher for night workers and unemployed [54].

The other sleep disturbances. Apart of insomnia and sleep duration, other sleep disorders including excessive daytime sleepiness, advanced sleep phase and sleep-related breathing disorders, and sleep latency have been reported by 4 studies [49–52]. These studies addressed the relation between SES and the previously mentioned sleep disorders. Two studies were conducted with adult participants, in which sleep disorders were measured by the Epworth Sleepiness Scale score [52] and the Munich Chronotype Questionnaire [51]. The 2 other studies were focused on children aged between 2 and 12 years [49,50]. In these studies, sleep disorders in children were reported by their parents using questionnaires such as Children's Sleep Habits Questionnaire [49] and Pediatric Sleep Questionnaire [50]. Two studies found an association between SES and sleep disorders. In adults, 1 study concluded that night work was associated with reporting both ASPD and DSPD. In addition, among children, 1 study also reported that parents from homes with higher annual income were more likely to report shorter sleep latencies, shorter weekday sleep latencies and fewer sleep disturbances [49]. In contrast, the 2 other studies did not find an association between SES and sleep disorders. The study by Harding et al. [50] concluded that parental education was not associated with high risk for SDB. Moreover, Gander et al. [52] also reported that eligibility for a community services card was not associated with EDS [52].

4. Discussion

4.1. Main Findings of This Study

The aim of this systematic review is to describe social, economic, and environmental determinants of sleep disturbances in Australia and New Zealand. A total of 22 studies, 14 from Australia and 8 from New Zealand involving children, adolescents and adults are included in the review. In summary, we found that sleep health disparities among children and adolescents in both countries are strongly associated to parental SES. Overall, lower family SES such as low parental income, low parental education, low SES area index are associated with higher sleep disturbances among children and adolescents. In adults, results revealed that SES determinants such as low income, lower education, unemployment, and night work were associated with sleep disturbances. Specifically, unemployment was associated with poor sleep quality, insomnia, and increased likelihood of suboptimal sleep efficiency. Low income

and lower education were associated with high risk of OSA, longer sleep duration, insomnia, higher odds of suboptimal sleep duration and sleep onset latency.

4.2. What Is Already Known on This Topic?

Our results are in accordance with similar research stating the correlation between SES determinant and sleep worldwide, regarding individual health status [56]. Socioeconomic status can have a significant impact on sleep quality and duration. People with lower socioeconomic status tend to have more sleep disturbances compared to those with higher socioeconomic status [31–33]. This can be due to a number of factors like stress, housing conditions, shift work, health conditions and lack of access to resources. People with lower socioeconomic status often face high levels of stress and anxiety due to financial and work-related issues [1,57,58]. This can lead to difficulties in falling and staying asleep. Individuals with lower socioeconomic status are more likely to live in substandard housing conditions, such as overcrowded or noisy living environments, which can negatively impact sleep [59]. Those with lower socioeconomic status are more likely to work non-traditional hours, such as evening and overnight shifts, which can disrupt the body's natural sleep-wake cycle [29,60,61]. People with lower socioeconomic status are more likely to suffer from chronic health conditions that can affect sleep, such as obesity and cardiovascular disease [11,12]. Finally, individuals with lower socioeconomic status may not have access to quality bedding, comfortable sleep environments, or sleep-related treatments and therapies, making it difficult for them to get a good night's sleep. Overall, the relationship between socioeconomic status and sleep is complex, but it is clear that those with lower socioeconomic status face a greater number of sleep-related challenges.

4.3. What This Study Adds

Public health disparities seem to follow similar trends worldwide, from Canada [23] to Africa [62] including Latin American countries [63] and middle east countries [64]. Addressing health disparities is integral to global health security [65,66]. By ensuring that all populations have access to necessary healthcare services by reducing systemic barriers related to social disadvantages of vulnerable subgroups of populations; a coordinated action could contribute to a more robust defense against global health threats, such as sleep disturbances. The relationship between SES and sleep health variables is confirmed with these findings, in accordance with previous conceptual frameworks published recently [27,31,33,67,68].

4.4. Limitations of This Study

This review has few limitations. The diversity of SES measures and the different levels of each SES index in the included studies led to considerable heterogeneity and prevented meta-analyses from being performed. Votes counting is an acceptable method of consolidation but is limited by the fact that each study contributes equally to consolidation, regardless of sample size. We strongly recommend the use of validated composite SES scores, validated sleep questionnaires, sleep diaries and objective sleep assessments (actigraphy or PSG) in future studies. Moreover, the cross-sectional design of most studies cannot be safely used to infer causality. Establishing a sleep disorder-free cohort at baseline and prospective long-term follow-up over multiple courses of SES provides more reliable evidence.

5. Conclusions

There exists a social gradient in sleep health in individuals both in developed and developing societies and across all ages. Developing a program to reduce health disparities holds numerous benefits for public health and decision-making on a global scale. A worldwide program targeting sleep health disparities can lead to improved health outcomes across diverse populations. In summary, a worldwide program to reduce sleep disturbances is not only a moral imperative but also a strategic investment in the well-being of global populations. Improving the sleep health of

populations worldwide has economic benefits. Healthy populations are more productive, leading to increased economic growth.

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