Sleep problems as a mediator of the association between parental education levels, perceived family economy and poor mental health in children

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ARTICLE INFO

Article history:
Revised 25 May 2012
Received in revised form 11 September 2012
Accepted 16 September 2012
Available online xxxx

Keywords:
Sleep
SES
SDQ
Bergen Child Study
BCS

ABSTRACT

Objective: The aim of this study was to investigate the association between familial socioeconomic status (SES) and children’s sleep problems, and the role of sleep problems as a mediator between familial SES and childhood mental health problems.

Methods: Participants were 5781 11–13 year old children from the Bergen Child Study. Data were collected on family economy, parental education, and children’s difficulties initiating and/or maintaining sleep (DIMS), time in bed (TIB) and self-reported mental health problems using the Strengths and Difficulties Questionnaire (SDQ).

Results: Sleep problems were significantly more common in children from lower SES families. Children from families with poor and average perceived family economy had significantly higher odds of reporting DIMS compared to children from families with very good economy (ORs = 3.5 and 1.7, respectively). The odds were reduced by 12–36% adjusting for poor parental health and single parenting, but remained significant. Children from families with a poor economy had increased odds of a short TIB, both in the crude model (OR = 1.9) and adjusted for parental characteristics (OR = 2.2). Maternal education level was significantly associated with short TIB. Path analysis was conducted to investigate the potential mediating role of DIMS in the relationship between SES and mental health. The significant direct association between perceived family economy and SDQ total problems score was partially mediated by a significant indirect effect of sleep problems.

Conclusion: Sleep problems are common among children from families with a lower SES and may be a potential mechanism through which low SES is translated into mental health problems.

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Introduction

Sleep problems are common during childhood and adolescence [1] and are related to learning, memory and school performance [2] as well as emotional and behavioral difficulties [3], possibly acting through hormonal, neuronal and psychological pathways [4]. Sleep problems are known to be more common in adults with lower socioeconomic status (SES) [5]. In studies of children, however, some find an association between low familial SES and childhood sleep problems [6,7], while others have failed to confirm this association [8,9].

In one of the studies that explored sleep and SES in children, 309 mothers completed a questionnaire about sleep problems in their school aged children [6]. It was found that children in the lowest social classes had higher rates of sleep problems, such as daytime drowsiness and awakenings during the night, than children from higher social classes [6]. In a study including both subjective and objective sleep measures, it was found that high parental SES was related to higher sleep efficiency and longer sleep duration measured with actigraphy, and fewer parent reported sleep problems on the Children’s Sleep Habits Questionnaire [7]. Further evidence for a SES-sleep association was found in a study where high SES was associated with lower levels of self-reported sleep problems on the sleep habits survey and longer sleep duration in 166 8–9 year olds [10]. There have also been studies that have found a lack of, or only a minor, association between SES and sleep problems. Guerin et al. [8] did not find parental SES to be related to sleep problems measured by sleep logs in 95 10 years old children, and in a study of 472 4–12 year olds, SES was not found to be associated with insomnia [9]. In a separate publication from the same sample referred to earlier [10], SES was found to be unrelated to measures of sleep duration, sleep efficiency and wake after sleep onset derived from actigraphy [11]. There is also one study suggesting a reverse association between SES and sleep duration. Zhang et al. [12] found that children aged 6–12 from families with a higher SES spent a shorter time in bed than children with lower SES. This association is in contrasts with previous findings, and the authors suggest...
that it may either be due to high SES-parents having higher academic expectations for their children, thereby curtailing their TIB, or that the children’s TIB is directly influenced by parental sleep/wake patterns.

Although several of the studies reviewed suggest that lower family SES is associated with more childhood sleep problems, comparisons and conclusions across studies are difficult because of the wide age ranges, small samples as well as methodological differences between the studies. Furthermore, SES has not been the main objective in most of these studies, and hence the relation has often not been analyzed nor discussed in detail, and there has typically been a lack of control of possible confounding variables. Several pathways have been proposed to account for the adverse influence of poor SES on children’s sleep. Different characteristics that relate to SES, for example family structure and parental health, may account for some of the association between SES and sleep [13,14]. Child features, such as high body mass index should be controlled for, as it is associated with both SES and sleep problems [15].

Studies of sleep and SES have mostly investigated their direct relationship, but sleep problems may also be a pathway through which low SES is associated with mental health problems. Children who grow up in families with a lower SES have increased risks of developing emotional and behavioral problems [16,17], and the magnitude of these problems vary as a function of socioeconomic deprivation, a pattern referred to as a social gradient [18,19]. In societies, such as the Nordic countries, where welfare is high, social gradients still appear [20]. This was confirmed in a previous study using the same sample as the current, where poorer family economy and lower parental education levels were associated with increased symptoms of conduct-, emotional-, hyperactivity-/inattention- and peer problems in children [21]. Knowledge that SES is related to both sleep and emotional and behavioral problems, and that sleep problems is a known predictor of emotional and behavioral problems, it is plausible that sleep problems may act as a mediator of the association between SES and poor health [22]. This hypothesis was supported in a study of adults, where higher income was related to better sleep quality which in turn was associated with lower psychological distress, even after controlling for age, gender, ethnicity and prior health status [23]. No studies have assessed whether these mechanisms operate similarly in children.

In sum, several studies suggest that childhood sleep problems are more common in families with a lower SES. However, we do not know if there exists a social gradient in sleep problems in populations that are generally healthy and where the majority may be described as having a relatively high SES. This has been observed for emotional and behavioral problems. Furthermore, findings suggest that sleep problems may mediate the association between SES and mental health problems, but to our knowledge, this hypothesis has not been tested in large community samples of school-aged children. Based on these results, the aims of the current study were to (1) assess the frequency of sleep problems across different indicators of SES, (2) to investigate the confounding effect of particular family and demographic factors associated with socioeconomic status, and (3) to assess the role of sleep problems as a mediating factor of the association between SES and poor mental health in childhood. We hypothesized that sleep problems would be more common among those with lower SES, that some of the association between SES and sleep problems would be explained by family and demographic factors, and that the association between SES and mental health problems would be mediated by sleep problems.

**Methods**

**Participants**

Data stem from the second wave of the Bergen Child Study (BCS), carried out in 2006. The BCS is a population-based study of children in all public and private schools in the municipality of Bergen, Norway. Bergen is the second largest city in Norway, and the total population is around 230,000. Ethnic diversity is small, with about 6.4% of the population being immigrants (out of which 4.4% had non-western origin) [24].

In 2002, a target population of 9430 primary school children (7–9 years) was included in the first wave of the study. Informed consents were received from 7007 parents. The second wave was conducted in 2006 when the children were in their fifth to seventh grades (11–13 years, mean age 11.8, SD = 0.8). Information about 5781 children was obtained. Compared to wave one, the wave two sample had somewhat lower symptom scores on teacher and parent reported SDQ total difficulties score, but the differences were small to moderate (results not shown). The study was approved by The National Committee for Medical and Health Research Ethics in Western Norway and the National Data Inspectorate. For more information about the BCS and related publications, see [http://helse.unic.no/barnbergen](http://helse.unic.no/barnbergen). Further details of the protocol and population have been published previously [25–27].

**Instruments**

**Socioeconomic status**

The present study defined SES from parent information about family economy and parental education. The parents were asked to describe their family economy on a five-point scale according to the categories: very good, good, average, bad, and very bad. The economy-categories bad and very bad were combined due to a small number of participants in the very bad category (n = 19). Information about taxable monetary income was obtained from a subsample of 642 participants and found to correlate reasonably well (r = .586, P < .001) with described family economy.

Regarding education, parents were asked to report the highest educational level completed by both mother and father, with the following options given: Elementary school; Vocational upper secondary school; General upper secondary school; College/University less than four years; or College/University, exceeding four years. Based on this, three categories of education were created: elementary (elementary school), high school (high school vocational and high school general) and college/university. Information about maternal education levels was provided by mothers (70.1%), fathers (10%), both (19.4%) or others (0.6%), whereas information about paternal education was provided by mothers (68.7%), fathers (10.8%), both (20%) or others (0.5%). Family economy and maternal (r = .215, P < .001) and paternal (r = .258, P < .001) education levels were weakly correlated, while the correlation between maternal and paternal education levels was moderate (r = .447, P < .001).

A global self-assessment measure of parental health was obtained using a single item where the parents were asked to describe their own health using the response options very good, Good, average, poor and very poor. From this we created a variable which distinguished between those with average/ good/very good health and those with poor/very poor health. Parents also reported “with whom the child currently lives” with the response options being Mother, Father, Mother’s new partner, Father’s new partner or Others. This information was used to create a variable identifying whether the children came from single parent or two-parent families.

**Sleep and sleep problems**

Our study included multiple indicators of sleep problems. Parents reported whether their child had “difficulties initiating and/or maintaining sleep” (DIMS) with response options being not true, somewhat true, and certainly true. Both the children and their parents were asked when the child usually went to bed and when they usually got up in the morning on weekdays. From this, we created a “time in bed” (TIB) variable serving as a proxy measure for sleep duration. Parent- and self-reported TIB were moderately correlated (r = 0.569, P < .001), and we therefore used the parent reported TIB in the analyses.
to avoid issues with mono-informant bias with mental health problems self-reported by the children (see below).

As sleep duration changes with age and may be influenced by pubertal development, TIB was converted into a z-score for age and gender (zTIB), similar to what has been done in previous publications from the BCS [3,15]. In order to aid interpretation, children were divided into three groups according to the standard deviations of their age-and gender adjusted sleep duration (≤ 2, −2 to ≤ 1, −1 to + 1).

**Mental health problems**

Mental health problems were defined according to scores on the Strengths and Difficulties Questionnaire [SDQ; 28] completed by the children. The SDQ is a screening questionnaire for children aged 4–16 years, comprising 25 items describing positive and negative attributes of children. The current study used the SDQ total problem score as an indication of mental health problems. The total problem score is based on the sum of 20 items, measuring symptoms of emotional, conduct, hyperactivity-inattention and peer relationship problems. Each item is scored on a three-point scale: not true, somewhat true, and certainly true. The total problems scale has a range from 0 to 40.

The SDQ has been extensively validated in various countries [29–31]. A recent review of 48 studies (including a total sample of 131,223 participants) found the psychometric properties of the SDQ to be strong and recommended its continued use as a screening instrument [32]. The reliability of the SDQ total problems score in the current sample was acceptable (Cronbach’s α = .754).

**Statistical analyses**

Pearson chi-square tests and ANOVAs were used to examine differences on demographics and sleep variables across SES indicators. Logistic regression analyses were conducted to assess the association between SES indicators and sleep problems. Firstly, we conducted crude analyses to evaluate the association between each SES indicator and sleep problems (step one), and then analyses controlling for BMI (step two) and poor parental health and single parenting status (step three). Dichotomized DIMS (0 = not true, 1 = somewhat true/certainly true) and TIB (0 = zTIB + 1 to −1 SD, 1 = zTIB ≤ 1 SD) were used as dependent variables in each of the logistic regression models. Independent variables were SES indicators (one indicator entered per model) with “high” education levels and a “very good” perceived family economy as reference, and in the adjusted analyses, parental health (0 = average/good/very good, 1 = poor/very poor) and single parenting status (0 = cohabiting, 1 = single parenting) and BMI. Preliminary analyses showed that BMI was unrelated to sleep problems and was therefore excluded in the final adjusted model, with each SES indicator in step one and poor parental health and single parenting status in step two. Missing values were handled by listwise deletion in the regression analyses. Multicollinearity among the predictors was assessed by standard methods (variance inflation factor, tolerance and condition number [33]), none of which suggested any problems.

In order to assess the mediation effect of sleep on the relationship between SES and mental health problems, path analysis was conducted using Mplus for Windows [version 6; 34]. There were 473 cases with missing on all values resulting in 5311 observations included in the path analysis. The robust mean and variance-adjusted weighted least squares (WLSMV) procedure was used for estimation as this estimator is preferred when modeling categorical data [35]. Socioeconomic status indicators were entered as separate correlated predictors, non-dichotomized DIMS as a mediator variable and self-reported SDQ total problems score as the outcome variable. Model testing was conducted by first fitting a saturated model including all paths between SES indicators and DIMS and SDQ total problems, then proceeding by removing nonsignificant paths and testing the reduced model. This resulted in a model where the paths from parental education levels to DIMS were excluded.

Preliminary analysis revealed a weak negative correlation between the age-adjusted z-transformed continuous measure of TIB (zTIB) and SDQ total problems score (r = −0.29, P < .05), but zTIB was not associated with any of the SES indicators. Path analysis was therefore not run on zTIB.

**Results**

**Demographic and clinical characteristics**

There were slightly fewer boys (47.8%) than girls in our sample with approximately equal numbers of children from each school grade sampled (34.7% 5th grade, 34.8% 6th grade, 30.5% 7th grade). The majority of the participants (68.1%) described their perceived family economy as good or very good, compared to 29% as average and 2.8% as poor. More than 50% reported a high education level, compared to 8% reporting basic education level.

Younger children spent more time in bed than older children (5th graders: M = 10 h, 2 min, SD = 29 min; 6th graders: M = 9 h, 44 min, SD = 31 min; 7th graders: M = 9 h, 26 min, SD = 33 min), and the average SDQ score for the sample as a whole was 6.41 (± 4.87 SD). Across all three indicators, families with lower SES were characterized by a higher rate of poor parental health and single parenting, as well as higher levels of child emotional and behavioral problems (see Table 1 for details).

**Sleep problems and SES**

The distribution of reported sleep difficulties across SES indicators is detailed in Table 2. DIMS were more common in families with a poor economy (27.7%) compared to families with a very good economy (9.8%). The proportion of children with short TIB was highest in children with lower levels of perceived family economy. Similar patterns were found for both maternal and paternal education (see Table 2 for details).

**Sleep, SES and the role of parental characteristics**

To explore potential confounding effects of parent characteristics, we conducted a series of logistic regression analyses on the association between SES and sleep problems (see details in Table 3). Children from families with Poor and Average perceived family economy had significantly higher odds of reporting DIMS compared to children from families with very good economy (ORs = 3.5 and 1.6, respectively). The odds were reduced by 12–36% when adjusting for poor parental health and single parenting, but remained significant (ORs = 2.6 and 1.6, respectively). Children from families with a poor economy also had increased odds of a short TIB, both in the crude analysis (OR = 1.9) and when adjusting for parental characteristics (OR = 2.2). No significant associations were found between DIMS and parental educational levels, but maternal education was significantly associated with short TIB in both the crude and adjusted analyses.

**Sleep as a mediator between SES and mental health**

To investigate the potential mediating role of sleep problems in the relationship between SES and mental health, a path analysis was conducted including all the three SES indicators as exogenous variables, DIMS as a mediator and SDQ total problems score as the outcome variable. The path model can be seen in Fig. 1. The reduced model fitted the data well (χ² [2] = 2.461, P = .2921, CFI = 1.0, RMSEA = 0.0007), and explained 13.5% (R² = 0.135, P < .001) of the variation in SDQ total problems score, and 1.8% (R² = 0.018, P < .002) of the variance in DIMS. The significant total direct effect from perceived family economy to self-reported SDQ total problems score (−0.127, SE = 0.014, P < .001) was partially mediated by a significant specific indirect effect of sleep problems (−0.042, SE = 0.007, P < .001) thereby accounting for approximately one-third of the total direct effect.

**Discussion**

In the current population based study, DIMS was more frequent among children from families with a poorer economy, whereas short TIB was more common in children from families with a lower SES. This was true across all SES indicators. The association between poorer family economy and DIMS was somewhat attenuated by family factors, but such factors had minor influence on the association between family economy and maternal education levels and TIB. Furthermore, it was found that DIMS partially mediated the association between low SES and self-reported mental health problems in children.

Whereas it is well known that sleep problems are common in school aged children [e.g., 14,36], the current study expands on previous findings by demonstrating how the frequency of such problems varies across different levels of familial SES. Comparisons across studies are complicated by methodological differences, such as the use of composite measures including different components of SES and different..
Table 1
Bivariate associations between indicators of SES, gender, parental health, single parenting status and SDQ total problems scores.

<table>
<thead>
<tr>
<th>Family economy</th>
<th>Maternal education</th>
<th>Paternal education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor</td>
<td>Average</td>
<td>Good</td>
</tr>
<tr>
<td>Male % (n)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>47.5% (66)</td>
<td>49.0% (705)</td>
<td>46.8% (1214)</td>
</tr>
<tr>
<td>Poor maternal health % (n)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19.6% (27)</td>
<td>4.6% (65)</td>
<td>1.1% (29)</td>
</tr>
<tr>
<td>Poor paternal health % (n)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.0% (20)</td>
<td>3.8% (51)</td>
<td>1.1% (28)</td>
</tr>
<tr>
<td>Single parenting % (n)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>62.3% (86)</td>
<td>27.5% (394)</td>
<td>9.9% (257)</td>
</tr>
<tr>
<td>SDQ total, M (SD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.76 (5.67)</td>
<td>7.20 (5.13)</td>
<td>6.02 (4.66)</td>
</tr>
</tbody>
</table>

* Group differences assessed with t-test, other comparisons carried out with Chi-square tests.

* P<.05.
** P<.01.
*** P<.001.

Table 2
Distribution of reported sleep difficulties across SES indicators.

<table>
<thead>
<tr>
<th>Family economy % (N)</th>
<th>Maternal education % (N)</th>
<th>Paternal education % (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor</td>
<td>Average</td>
<td>Good</td>
</tr>
<tr>
<td>DIMS</td>
<td>Time in bed</td>
<td></td>
</tr>
<tr>
<td>27.7% (38)</td>
<td>6.1% (8)</td>
<td>10.4% (268)</td>
</tr>
<tr>
<td>Time in bed ≤2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.1% (8)</td>
<td>4.3% (59)</td>
<td>2.6% (65)</td>
</tr>
<tr>
<td>−2 to ≤1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.0% (21)</td>
<td>12.9% (177)</td>
<td>12.2% (304)</td>
</tr>
<tr>
<td>−1 to +1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>64.1% (84)</td>
<td>73.5% (1007)</td>
<td>76.7% (1913)</td>
</tr>
</tbody>
</table>

DIMS = difficulties initiating and/or maintaining sleep. Family economy: DIMS $X^2(3, N = 4916) = 55.84, P<.001$, TIB; $X^2 (12, N = 4730) = 3.57, P>.001$; Time in bed: paternal education $P=.024$, other $Ps<.001$; $X^2$. 

Please cite this article as: T. Bøe et al., Sleep problems as a mediator of the association between parental education levels, perceived family economy and poor mental health, Journal of Psychosomatic Research (2012), http://dx.doi.org/10.1016/j.jpsychores.2012.09.008
conceptualizations of sleep problems. Still, our results generally support earlier findings of a close association between lower SES and sleep problems [e.g., 6, 7]. In addition, our findings suggest that there may be differential associations between particular facets of SES and certain types of sleep problems, which may be one reason for the inconsistencies between findings in earlier studies.

Perceived family economy was found to influence both difficulties initiating and/or maintaining sleep as well as the time children spent in bed. The specific association between poor family economy and children’s sleep problems has to our knowledge not been investigated previously, although it has been found that growing up in a family with a good economy reduces the risk of inadequate sleep [14].

The current study showed that at least part of the association between poor family economy and sleep problems was explained by poor parental health, but we were unable to determine to which extent this was associated with the quality of parent–child interactions or by other factors. Single parenting did also explain some of the association between poor perceived family economy and sleep problems. This is in accordance with previous studies that have found that family structure do influence children’s sleep habits [13], and

Table 3
SES indicators and sleep problems.

<table>
<thead>
<tr>
<th></th>
<th>DIMS Model 1 (95% CI)</th>
<th>DIMS Model 2 (95% CI)</th>
<th>Short TIB Model 1 (95% CI)</th>
<th>Short TIB Model 2 (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Family economy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very good is reference</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Good</td>
<td>1.06 (0.81–1.39)</td>
<td>1.07 (0.81–1.41)</td>
<td>1.05 (0.83–1.34)</td>
<td>1.02 (0.80–1.29)</td>
</tr>
<tr>
<td>Average</td>
<td>1.66 (1.26–2.19)</td>
<td>1.58 (1.18–2.12)</td>
<td>1.28 (0.80–1.65)</td>
<td>1.19 (0.91–1.55)</td>
</tr>
<tr>
<td>Poor</td>
<td>3.53 (2.26–5.49)</td>
<td>2.61 (1.54–4.43)</td>
<td>1.88 (1.72–3.02)</td>
<td>2.18 (1.28–3.72)</td>
</tr>
<tr>
<td>N</td>
<td>4916</td>
<td>4630</td>
<td>4317</td>
<td>3472</td>
</tr>
<tr>
<td><strong>Maternal education level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High is reference</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Intermediate</td>
<td>0.99 (0.82–1.19)</td>
<td>0.93 (0.77–1.12)</td>
<td>1.26 (1.06–1.49)</td>
<td>1.23 (1.03–1.47)</td>
</tr>
<tr>
<td>Basic</td>
<td>0.93 (0.68–1.29)</td>
<td>0.82 (0.57–1.17)</td>
<td>2.05 (1.57–2.68)</td>
<td>2.06 (1.55–2.74)</td>
</tr>
<tr>
<td>N</td>
<td>4887</td>
<td>4617</td>
<td>4288</td>
<td>3463</td>
</tr>
<tr>
<td><strong>Paternal education level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High is reference</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Intermediate</td>
<td>1.29 (0.96–1.75)</td>
<td>0.98 (0.81–1.19)</td>
<td>1.05 (0.89–1.25)</td>
<td>1.16 (0.86–1.57)</td>
</tr>
<tr>
<td>Basic</td>
<td>1.01 (0.84–1.22)</td>
<td>1.14 (0.82–1.57)</td>
<td>1.26 (0.95–1.68)</td>
<td>1.02 (0.86–1.22)</td>
</tr>
<tr>
<td>N</td>
<td>4742</td>
<td>4549</td>
<td>4166</td>
<td>3410</td>
</tr>
</tbody>
</table>

DIMS = difficulties initiating and/or maintaining sleep, TIB = time in bed. Model 1 = crude, Model 2 = adjusted for poor parental health and single parenting status.

* P < .05.
** P < .01.
*** P < .001.

Fig. 1. Model of paths among socioeconomic status indicators, difficulties initiating and/or maintaining sleep (DIMS) and self-reported SDQ total scores. Dashed lines indicate non-significant paths that were removed in the reduced model. Double headed arrows indicate correlations between the exogenous variables. All estimates shown are standardized results from the reduced model.

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that single parents may be more likely to use maladaptive bedtime routines [37]. Being a single parent has been related to increased strains associated with the parental role [38], with financial hardship and less social support contributing to a poorer parental mental health [39]. All these factors may have negative influences on parenting skills [40] and may have contributed to sleep problems in children.

Lower maternal education levels were associated with short time in bed. The association between low maternal education levels and shorter sleep duration has been found previously [41,42], and Hale et al. [43] found that low maternal education and poverty were related to decreased use of regular bedtime routines and activities that facilitate sleeping. Paternal education levels were not found to be associated with sleep problems. The influence of fathers on psychological well-being of children has received limited attention in previous research [see, [44] for review]. One possible explanation for the current results may be that fathers are less involved in children's sleep routines than mothers, and that their level of involvement is independent of their education level.

In addition to the direct relationship between aspects of SES and sleep, we investigated the role of sleep as a mediator between perceived family economy and mental health. Studies of adults have confirmed such a mediating effect [23], but to our knowledge, the current study is the first to demonstrate this in a large population-based study of children. Our results suggest that certain sleep problems may constitute a pathway through which poor family economy is translated into mental health problems in children. Whereas the current cross-sectional study is unable to provide any indications of causality between sleep- and mental health problems, findings from a longitudinal study suggest that when controlling for initial mental health status, an early sleep problem is a modest predictor of later increases in behavioural and emotional problems (and not vice versa) [45]. This suggests that sleep problems may be primary, but Gregory and Sadeh [4] have also proposed that the association may be bidirectional. Furthermore, the results from a longitudinal twin study suggest that the association between sleep problems and behavioural and emotional problems is largely mediated by shared environmental (psychosocial) factors and less by heredity and non-shared environment [46]. It is therefore conceivable that psychosocial risk factors associated with lower SES may contribute to the development of sleep problems in children at young age (through mechanisms discussed above), thereby increasing the likelihood that these children will later develop mental health problems.

The results from the current study have clear clinical and public health implications. By paying attention to sleep problems when working with children from families with lower SES, one may not only alleviate the immediate negative consequences of poor sleep, but also contribute to prevent or reduce development of mental health problems in this group of children. It has for example been shown that the risk of depression is reduced substantially for adults with resolved compared to those with persistent insomnia [47]. Several studies have demonstrated positive effects of behavioural interventions for different kinds of childhood sleep problems [see 48 for review], and these could be administered in combination with other interventions targeting the family environment by improving parenting [49], and by teaching stress management and coping skills [50,51].

Another implication of the current study relates to sleep researchers collecting data on SES. Our findings demonstrate that there are differential associations between different SES indicators and sleep problems, suggesting that the use of aggregated SES variables should be limited, in line with general recommendations for conducting SES research [e.g., 52,53]. Analyzing distinct associations between certain aspects of SES and particular sleep problems may give insight into potential mechanisms and areas for intervention which could otherwise be obscured.

Limitations

The results from the study and their interpretations should be considered in the context of several potential limitations. The primary limitation is the use of a cross-sectional sample which precludes insight into the causality between SES, sleep problems and mental health problems. Although the BCS is a longitudinal study, information about SES was not gathered during the first wave of the study. We were therefore presently limited to using data from the second wave in the current analyses.

Another limitation is that we did not obtain objective information about monetary income for all our participants. Although perceived family economy and taxable household income did share some variance, they do not represent identical constructs. Despite differences in operationalization, our results align well with previous studies where family economy has been defined more objectively [6,7,10].

Children's sleep problems, if severe enough, could potentially influence parents' ability to work and study, thereby influencing their SES, although this influence is less likely in the age-group currently studied [54]. Regarding the temporality in the development of sleep- and mental health problems, more longitudinal studies are needed, and data should be gathered from infancy in order to capture the development of sleep problems.

Another limitation was the lack of specific information about the factors that contribute to sleep and mental health problems such as conflict between parents or in parenting styles. In addition, difficulties initiating and/or maintaining sleep is a joint variable, so no distinction could be made between sleep initiation or sleep maintenance problems. Time in bed is also a crude measure of actual sleep time, as parents may have limited information about how long children take to fall asleep once in bed, and similarly how long they lie awake before getting out of bed. Also, our global measure of parental health did not enable us to distinguish between mental and somatic health complaints. Lastly, some have suggested that, when used in community samples, the SDQ may be better at detecting externalizing and certain internalizing problems than others, which would render our results less valid for those types of problems that are likely to go undetected (e.g. phobias and eating disorders) [55].

Conclusion

The results from the current study suggest that children from families with a poor economy and where mothers have lower education levels experience most sleep problems, and that such problems are associated with mental health problems in those families. Clinicians that are working with children from families with a lower SES should be particularly sensitive to potential sleep problems and provide targeted intervention for the sleep problems and evaluate the family environment for potential psychosocial risk factors.

References


