

Family Conflict in Childhood: A Predictor of Later Insomnia

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Study Objectives: To examine the association between childhood exposure to family conflict and insomnia at 18 years of age.

Design: Longitudinal prospective data on an entire birth cohort were obtained. Parents completed the Conflict subscale of the Moos Family Environment Scale when the study members were 7, 9, 13, and 15 years of age. Insomnia was examined in a standardized interview when the participants were aged 18 years.

Setting: Participants were born in Dunedin, New Zealand, and were interviewed at this location.

Patients or Participants: One thousand thirty-seven children born between April 1, 1972, and March 31, 1973, enrolled in the study (52% male). At age 18 years, 993 (97% of living cohort members) provided data.

Interventions: N/A.

Measurements and Results: The mean level of family conflict at age 7

to 15 years predicted insomnia at 18 years after controlling for sex, socioeconomic status, sleep problems at 9 years, and self-reported health (odds ratio [95% confidence interval] = 1.42 [1.17-1.73], $p < .001$). There was a dose-response relationship, whereby the more assessments at which families scored in the top 25% for conflict, the greater the young person's likelihood of developing insomnia at age 18 years. This association was present even after controlling for depression at 18 years.

Conclusions: This study demonstrates a modest but robust longitudinal link between family conflict during childhood and insomnia experienced at 18 years of age. Future work needs to replicate this finding in different populations and to elucidate the mechanisms underlying this association.

Keywords: Insomnia, family environment, conflict

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INTRODUCTION

BETWEEN APPROXIMATELY 9% AND 15% OF THE POPULATION EXPERIENCES INSOMNIA SYMPTOMS WITH DAYTIME CONSEQUENCES (FOR A REVIEW ON the epidemiology of insomnia see reference 1). The widespread nature of this problem underscores the need to examine the development of insomnia using longitudinal prospective designs. Previous research has consistently highlighted the possibility of concurrent associations between sleep problems and relationship difficulties within the family.²⁻⁴ However, longitudinal associations have not been reported, and such associations can be thought of as a preliminary step in establishing causal links.⁵ This prospective study examines the longitudinal association between family conflict in childhood and insomnia at 18 years of age.

Troubled family relationships cause children a great deal of distress and have been linked to a variety of difficulties. For example, in comparison with other children, those of parents experiencing marital conflict are more likely to show signs of internalizing and externalizing problems, as well as difficulties with social and cognitive functioning.⁶ Marital conflict has also been linked to poor parent-child relationships.⁷ When the latter involve conflict, this is associated with child distress⁸ and is considered a vulnerability factor for child maladjustment.⁹

Troubled family relationships and stress in childhood and adolescence have also been linked to sleep difficulties.^{2-4,10-12} For ex-

ample, in a sample of Chinese school children, it was found that poor relationships between parents were associated with childhood sleep difficulties.³ A further study of more than 100,000 Japanese adolescents revealed that distant relationships with parents were linked to a range of sleep problems, including difficulties initiating sleep and short sleep duration.⁴ Other reports have highlighted links between parental separation or divorce,² attachment and abuse,¹⁰ and childhood sleep difficulties. A wide range of relationship difficulties and stressors in adults have also been linked to adults' own sleep difficulties, and it is well-established that being separated, divorced, or widowed is a risk indicator of insomnia.¹

Previous studies examining links between family conflict and sleep problems have been cross-sectional in nature, which makes it difficult to draw conclusions about the direction of effects. Longitudinal data, which to the best of our knowledge have not yet been reported, are important for at least 3 reasons. First, evidence of longitudinal links begins the process of elucidating the likely complex mechanisms underlying the development of insomnia. Second, longitudinal data allow testing of the hypothesis that family conflict during childhood is a risk factor for later insomnia. Third, these data can increase the understanding of a possible causal role for family conflict in the etiology of insomnia.

This study, making use of data from a prospective longitudinal study, tests the hypothesis that family conflict during childhood is a risk indicator for the later development of insomnia. Concurrent health problems, socioeconomic status (SES), depression, and earlier sleep problems are included as covariates in the analyses because of possible links between these factors and both family conflict and sleep problems.

METHOD

Participants

Participants are members of the Dunedin Multidisciplinary Health and Development Study, a longitudinal investigation of

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the health and behavior of a complete birth cohort. One thousand thirty-seven children born between April 1, 1972, and March 31, 1973, in Dunedin, New Zealand (91% of eligible births; 52% male) initially participated at age 3 years. Cohort families are primarily white and represent the full range of SES in the general population of New Zealand's South Island. Follow-up studies have been carried out at ages 5, 7, 9, 11, 13, 15, 18, 21, and 26, and most recently, at 32 years of age ($n = 972$; 96% of the living cohort members). At each assessment, participants (including overseas emigrants) are brought back to the research unit within 60 days of their birthday for a full day of data collection. At each assessment, the study protocol is approved by the Otago Ethics Committee. Study members give informed consent before participating. This paper focuses on family conflict at between 7 and 15 years of age and on symptoms of insomnia that were last assessed at 18 years of age.

MEASURES

Family Conflict

Mothers reported on family conflict at the 7-, 9-, 13-, and 15-year assessments by completing the Conflict subscale of the Moos Family Environment Scale,¹³ which has been shown to demonstrate good reliability and validity.¹⁴ The Conflict subscale examines openly expressed anger, aggression, and conflict among family members. This subscale comprises 9 items, each rated true or false, including "In our family, we believe you don't ever get anywhere by raising your voice" and "Family members sometimes hit each other." In addition to calculating a family-conflict score at each age, we calculated a mean family-conflict score from 7 to 15 years of age. A further variable examined the number of assessments (0, 1, 2, or 3+) at which families scored in the top 25% for conflict. The Moos Family Environment Scale was not administered to the study members prior to the 7-year assessment.

Socioeconomic Status

SES was included as a covariate in the analyses. The SES of the study members' families was measured on a 6-point scale that assessed parents' self-reported occupational status and allocates each occupation to 1 of 6 categories (1 = unskilled laborer, 6 = professional) on the basis of the education levels and income associated with that occupation in data from the New Zealand census.¹⁵ The variable used in our analyses, childhood SES, is the average of the highest SES level of either parent, assessed repeatedly during the study member's first 15 years. The variable of childhood SES thus reflects the socioeconomic conditions experienced by study members as they grew up. This scale has good reliability ($\alpha = .92$).

Childhood Sleep Problems

A dichotomous scale was developed assessing sleep problems at 9 years (the age at which sleep difficulties were most thoroughly assessed during childhood). Children were considered to have a sleep problem if parents reported that they had recently "had trouble falling asleep," "woken up during the night and not been able to get back to sleep," or "woken up early in the morning." For each of these 3 items, parents had to report whether the problem did not occur or specify the number of weeks for which the problem had lasted. Children were classified with a sleep problem

(and given a score of 1) if their parents reported that they had experienced at least 1 of these difficulties for 4 or more weeks. Using this definition, 82 children (9%) were considered to have a sleep problem. Mean family conflict during childhood was not significantly greater in children with sleep problems (mean = 3.66, $SD = 1.77$) than in those without sleep problems (mean = 3.42, $SD = 1.65$; $t^{909} = 1.22$, $p = .22$).

Global Health Rating at 18 Years

A further covariate included in analyses was self-reported global health, which was assessed at 18 years (1 = poor, 4 = very good). Most participants ($n = 852$, 91%) reported good or very good health. A minority ($n = 84$, 9%) reported poor or not-too-good health.

Depression at 18 Years

Depression was examined in private standardized interviews at 18 years by means of the Diagnostic Interview Schedule.^{16,17} Diagnoses of major depressive episode in the previous 12 months were made following criteria outlined by the then-current Diagnostic and Statistical Manual of Mental Disorders-Version 3-Revised.¹⁸ Depressive episodes had been experienced by 161 (17%) of the study members in the last 12 months.

Insomnia at 18 Years

Finally, insomnia was also examined in private standardized interviews during which the Diagnostic Interview Schedule was administered. Adult insomnia was only examined at 18 years of age. Participants were asked if they had difficulties falling asleep, woke at night and were unable to fall back to sleep, or woke up too early. Each of these 3 items was rated on a 3-point scale (0 = never; 1 = sometimes; 2 = problem occurs 3 or more times per week). If participants reported sleep difficulties, they were asked about the duration of the problem (in weeks) and its interference (1 = slight to 5 = much). Participants were considered to suffer from insomnia if they reported having at least 1 of the 3 sleep difficulties 3 or more times a week. The difficulty must have lasted 4 or more weeks and have caused at least some interference. This definition is largely consistent with the Diagnostic and Statistical Manual of Mental Disorders-Version 4 (DSM-IV¹⁹) criteria for insomnia (see discussion for further information).

There were insomnia data for 936 (51% male) participants at 18 years. Fifteen percent of the participants ($n = 138$) were considered to suffer from insomnia. A greater proportion of females (19%, $n = 87$) suffered than of males (11%, $n = 51$; $\chi^2 = 13.10$, $df = 1$, $p < .001$). Study members with insomnia at 18 years came from lower SES groups (mean = 3.57, $SD = 1.10$) than non-insomniacs (mean = 3.83, $SD = 1.12$; $t^{930} = 2.45$, $p = .014$). Those participants in poor or not-too-good health were more likely to report insomnia (32%, $n = 27$) than those in good or very good health (13%, $n = 111$; $\chi^2 = 22.23$, $df = 1$, $p < .001$). There was a significant link between concurrent insomnia and depression (insomnia suffered by 31%, $n = 50$ vs. 11%, $n = 85$ of those with and without depression, respectively, $\chi^2 = 42.93$, $df = 1$, $p < .001$). Children with sleep problems at 9 years were not significantly more likely than those without sleep problems at 9 years to have insomnia at 18 years (16% vs. 15% for those with and without sleep problems at 9 years respectively, $\chi^2 = 0.08$, $df = 1$, $p = .78$).

Table 1—Risk Indicators for Insomnia at 18 Years of Age

| Model | Variable | β | SE | p | OR | 95% CI |
|-------|----------------------------------|---------|-----|------|------|-----------|
| 1 | Family conflict during childhood | .36 | .10 | .001 | 1.43 | 1.19-1.72 |
| 2 | Sex | -.63 | .21 | .002 | .53 | .36-.80 |
| | SES | -.15 | .09 | .105 | .86 | .72-1.03 |
| | Health at 18 years | -.49 | .15 | .001 | .62 | .46-.83 |
| | Childhood insomnia | .18 | .34 | .600 | 1.20 | .61-2.34 |
| | Family conflict during childhood | .35 | .10 | .001 | 1.42 | 1.17-1.73 |

Model 1 provides the unadjusted odds ratio (OR) for mean family conflict at 7 to 15 years predicting adulthood insomnia. Model 2 provides the OR for mean family conflict at 7 to 15 years predicting adulthood insomnia after controlling for sex, socioeconomic status (SES), sleep problems at 9 years and health problems at 18 years. β = coefficient; SE = standard error of β ; p = significance level; CI = confidence interval. Sex: 0 = female; 1 = male.

Statistical Analyses

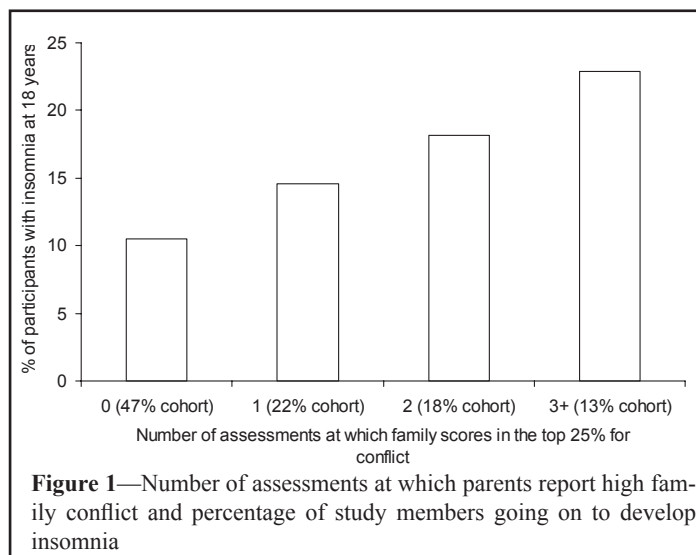
The link between family conflict and later insomnia was examined using a 2-tailed t-test. The prediction of insomnia at 18 years from family conflict at 9 to 15 years was established by logistic regression. Two different models examined the prediction of insomnia. Model 1 examined the unadjusted odds ratio (OR) for family conflict predicting insomnia. Model 2 examined the OR for family conflict predicting insomnia, after controlling for the effects of sex, SES, sleep problems at 9 years, and self-reported health. Insomnia at 18 years was also predicted from family conflict at each of ages 7, 9, 13, and 15 years (results of model 2 are presented below). In these regression analyses, family conflict scores were standardized for interpretation ease. The dose-response relationship between family conflict and insomnia was established by means of logistic regression with dummy variables corresponding to reports of high levels of family conflict at 1, 2, and 3/4 assessments (see below for the results of model 2). In order to rule out the possibility that an association between family conflict and later insomnia could be an artifact of the link between both of these variables and depression, the final logistic-regression analysis was repeated with an additional control for concurrent depression.

RESULTS

Study members with insomnia at 18 years experienced greater levels of family conflict at 7 to 15 years (mean = 3.98, SD = 1.80) than did those without insomnia (mean = 3.38, SD = 1.63, $t^{897} = 3.83$, $p < .001$). Logistic regression analyses (Table 1) demonstrate that family conflict at 7 to 15 years predicts insomnia at 18 years after controlling for sex, SES, sleep problems at 9 years, and self-reported health at 18 years (OR [95% confidence interval: 95% CI] = 1.42 [1.17-1.73], $p < .001$).

Of note, when different time points were examined separately, insomnia at 18 years was predicted by family conflict at each assessment (7 years: OR [95% CI] = 1.22 [1.00-1.49], $p = .054$; 9 years: OR [95% CI] = 1.24 [1.02-1.52], $p = .030$; 13 years: OR [95% CI] = 1.37 [1.11-1.68], $p = .003$; and 15 years: OR [95% CI] = 1.45 [1.19-1.77], $p < .001$) - all independently of sex, SES, sleep problems at 9 years, and self-reported health at 18 years.

Further analyses revealed that the greater the number of assessments at which a participant's family scored in the top 25% for conflict, the higher the likelihood that the participant went on to experience insomnia at 18 years (see Figure 1). After controlling for sex, SES, sleep problems at 9 years, and self-reported health at 18 years, logistic regression using 3 dummy variables (see previ-



ously) demonstrated a clear dose-response relationship. Using 0 reports of high family conflict as a reference point, reports of high family conflict at a greater number of assessments were associated with a higher probability of insomnia at 18 years (OR [95% CI] = 1.39 [.81-2.37], $p = .233$; OR [95% CI] = 1.72 [.99-2.97], $p = .054$; OR [95% CI] = 2.40 [1.36-4.21], $p = .002$, for 1, 2, and 3+ reports of high family conflict, respectively). A similar pattern of results was found after additionally controlling for concurrent depression at 18 years (OR [95% CI] = 1.35 [.78-2.33], $p = .282$; OR [95% CI] = 1.71 [.98-2.99], $p = .060$; OR [95% CI] = 2.32 [1.30-4.14], $p = .004$, for 1, 2, and 3+ reports of high family conflict, respectively).

DISCUSSION

The results of this study suggest a longitudinal link between level of family conflict experienced during childhood and insomnia reported at 18 years. There was also a dose-response relationship, whereby the greater the number of assessments at which a participant's family reported high levels of conflict, the more likely that individual was to develop insomnia later in life. Although these data do not provide evidence for a causal link between family conflict and later insomnia, they constitute a preliminary stage in demonstrating causality.⁵ Incidentally, this study supported previous research demonstrating that insomnia is a complaint frequently associated with sex, SES, health, and depression.¹ Furthermore, these results complement studies of children and adolescents documenting links between other psychosocial factors (such as ethnicity, parental education, and school

demands) and sleep problems.^{2,20,21} Possible mechanisms underlying the association between family conflict and later insomnia are proposed followed by a summary of the study's limitations.

As with the association between marital conflict and children's adjustment,²² it is likely that there are multiple routes by which family conflict leads to later sleep difficulties. Four separate yet compatible possibilities are proposed.

First, family conflict may affect physiologic functioning,²³⁻²⁵ and physiologic changes may interfere with sleep.²⁶⁻²⁸ Although much of the previous research focuses on concurrent associations between conflict, physiology, and sleep, this physiologic explanation may account for the longitudinal associations and the dose-response relationships found here. For example, psychosocial challenge of longer duration may lead to poorer health, which could explain the dose-response association reported here.²⁹ A caveat is in order, however. We found that family conflict was associated with later insomnia even after controlling for concurrent self-reports of poor health. It is unclear how the proposed physiologic explanation accounts for the association between conflict and insomnia, over and above known associations between these factors and poor health.^{30,31}

Second, feelings of insecurity surrounding family conflict could lead to hypervigilance,²² which may result in insomnia, as sleep is incompatible with vigilance (as defined by awareness and responsiveness to the environment³²). Indeed, it is adaptive for sleep to be restricted in environments that are not perceived to be safe³² and in which high levels of conflict occur. The longitudinal and dose-response associations reported here may result from enduring feelings of danger, which could result in sleep difficulties later in life.

Third, worry and rumination have been shown to play a role in the maintenance of insomnia,^{33,34} and it is plausible that children raised in difficult home environments are particularly susceptible to developing such cognitive styles. Of relevance, the importance of family relationships has been highlighted in explanations of the developmental origins of cognitive vulnerability - although much of this work has focused on depression,³⁵ and our effects were independent of depression.

Finally, the items used to address family conflict in this study (e.g., "In our family, we believe you don't ever get anywhere by raising your voice") could tap into levels of family chaos. A chaotic family environment may be incompatible with good sleep hygiene, which refers to the conditions and practices that promote restful sleep. For example, a lack of routine and inappropriate levels of noise, light, and temperature associated with a chaotic household may not allow effective sleep. In fact, family chaos has previously been associated with sleep problems in children.³⁶ A longitudinal association between family disorganization during childhood and insomnia could occur if children develop inadequate sleep patterns that persist into later life, or live in disorganized households when they become adults. Although the dose-response relationship reported here suggests that family conflict leads to insomnia, the results reported do not conclusively demonstrate a causal link. Rather, it is possible that the 2 difficulties share risk factors.

This study is, to our knowledge, the first to establish a longitudinal link between family conflict during childhood and later insomnia. Further strengths of this study include the use of an entire birth cohort and a low attrition rate. Despite these advantages, there are at least 3 important limitations. First, family con-

flict was established solely by parental report, and additional data would have been informative. However, because insomnia at 18 years was examined by self-report, rater bias is unable to explain the associations reported here. Second, whereas family conflict was addressed at multiple time points, subsequent insomnia was examined only once, limiting our ability to carry out additional internal replications within this study. Finally, although the criteria that we used to establish insomnia were largely consistent with those outlined by the DSM-IV,¹⁹ there were also differences. For example, the DSM-IV excludes sleep disturbances that occur exclusively during the course of another sleep or mental disorder or medical condition. Sleep problems such as sleep apnea and periodic limb movement disorder were not examined here, so this criterion was not met. As well as the need for replications, future research should highlight additional risk indicators for insomnia. Indeed, the magnitude of the effect of family conflict on later insomnia was small, and even participants experiencing high levels of family conflict at each assessment typically did not experience insomnia as adults. Possible mechanisms by which risk indicators have their effect are highly speculative and need to be tested empirically. Given the growing interest in genetic influence on insomnia³⁷ and research demonstrating that genotype can moderate children's sensitivity to environmental insults,³⁸ a possible next step is to explore the origins of insomnia by examining gene-environment interactions. Increased understanding of the mechanisms involved in the development of insomnia may be useful in the development of preventive programs and treatments for what is a common problem.

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