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Co-occurrence of attention-deficit hyperactivity disorder symptoms with other psychopathology in young adults: parenting style as a moderator

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Abstract

The extent to which parenting styles can influence secondary psychiatric symptoms among young adults with ADHD symptoms is unknown. This issue was investigated in a sample of 2284 incoming college students (male, 50.6%), who completed standardized questionnaires about adult ADHD symptoms, other DSM-IV symptoms, and their parents' parenting styles before their ages of 16. Among them, 2.8% and 22.8% were classified as having ADHD symptoms and sub-threshold ADHD symptoms, respectively. Logistic regression was used to compare the comorbid rates of psychiatric symptoms among the ADHD, sub-threshold ADHD and non-ADHD groups while multiple linear regressions were used to examine the moderating role of gender and parenting styles over the associations between ADHD and other psychiatric symptoms. Both ADHD groups were significantly more likely than other incoming students to have other DSM-IV symptoms. Parental care was negatively associated and parental overprotection/control positively associated with these psychiatric symptoms. Furthermore, significant interactions were found of parenting style with both threshold and sub-threshold ADHD in predicting wide-ranging comorbid symptoms. Specifically, the associations of ADHD with some externalizing symptoms were inversely related to level of paternal care, while associations of ADHD and sub-threshold ADHD with wide-ranging comorbid symptoms were positively related to level of maternal and paternal overprotection/control. These results suggest that parenting styles may modify the effects of ADHD on the risk of a wide range of temporally secondary DSM-IV symptoms among incoming college students, although other causal dynamics might be at work that need to be investigated in longitudinal studies.
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1. Introduction

Attention-deficit/hyperactivity disorder (ADHD) is a common childhood-onset disorder, with 5%–10% prevalence in western countries [1] and 7.5% in Taiwan [2]. Prevalence of DSM-IV ADHD in adulthood has been estimated to be 4.4% in the U.S. [3], which is broadly consistent with projections from childhood prevalence estimates based on the findings in longitudinal studies that 30%–60% of children with ADHD persist in having ADHD in adulthood [4–6].

1.1. ADHD and comorbidity

Numerous studies have demonstrated high psychiatric comorbidity in children and adolescents with ADHD [2,7–9]. High comorbidity has also been found for adult ADHD with anxiety disorders [3], major depression [10], bipolar disorders [11], mood disorders [8] and substance use disorders [3,12] in both cross-sectional [3,13,14] and longitudinal [8,15] studies. Moreover, adolescent–adult ADHD has been found to be associated with borderline [16] and antisocial [8,15,17,18] personality disorders. As ADHD has a very early age of onset, the vast majority of these comorbid disorders are likely to be temporally secondary, in which case ADHD can be seen as a powerful risk marker for the subsequent onset of these other disorders [19].

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1.2. Sub-threshold ADHD and comorbidity

Sub-threshold ADHD has also received increasing attention in recent years in studies conducted both during childhood–adolescence [20,21] and adulthood [22,23]. These studies showed that sub-thereshold ADHD was associated with elevated rates of psychiatric comorbidies [21,24] and role impairments [20,23] compared to unaffected adults, although the rates of comorbidity and role impairment in sub-threshold ADHD were less than those found among adults with full ADHD [22,23,25]. These studies were limited, though, by clinical samples.

1.3. Parenting, ADHD and psychiatric comorbidities

Parenting practice is known to influence the development and maintenance of psychiatric problems in childhood and adolescence [26,27]. For example, parental rejection and psychological control are linked with more child shyness and increased risk of anxiety disorders [28], depression [29,30] and delinquency [31] while high level of harsh and inconsistent discipline and low level of warmth and involvement have been found to predict later conduct problems [32,33]. The relationship between parenting and child behaviors may be coercive. Over time, both the children and mothers are reinforced for their maladaptive behaviors which strengthen and escalate the coercive cycle [34].

Previous studies have shown that parents of children with ADHD diagnosis/symptoms engage in more inappropriate parenting styles than other parents [24,35] and have lower parental care and higher parental overprotection than other parents [36–38]. Besides, children's ADHD symptoms can influence parents' parenting style [39] while inappropriate parenting style may further exacerbate ADHD symptoms [40]. Moreover, previous studies also found the association between inappropriate parenting style and psychiatric comorbid conditions in ADHD such as oppositional defiant disorder/conduct disorder (ODD/CD) [41–43], anxiety disorders [44] and major depressive disorder [45,46].

However, previous studies discussing the association of parenting style and psychiatric comorbid conditions in ADHD were limited to childhood and adolescence. So far, the association of parenting style in childhood and adolescence and co-occurring psychiatric symptoms or personality traits with ADHD symptoms in adulthood is not clear.

1.4. Gender, ADHD and psychiatric comorbidities

Pervasive evidence exists for gender differences in psychiatric symptoms and disorders among adolescents [2,47–49] and adults [50,51], with externalizing disorders such as ADHD to be male dominant and internalizing disorders female dominant [49]. However, no consistent gender difference has been found in comorbid conditions of ADHD with other psychiatric symptoms/disorders. Some studies in both community-based [52–54] and clinic-based [55] samples, but not others [7,20,56], have shown gender differences in ADHD comorbid conditions. Furthermore, despite evidence of significant associations of ADHD with borderline [16] and antisocial [15,17] personality disorders, only a single recent study suggested that ADHD might be more strongly associated with antisocial personality disorder among men and with borderline personality disorder among women [57].

In view of the above findings, and given the considerable public health importance of ADHD as a risk marker for wide-ranging comorbid conditions, we carried out a survey of the extent to which the associations of ADHD with comorbid conditions vary as a function of childhood exposure to different parenting styles in a sample of incoming college students in Taiwan. The study had three objectives: (1) to replicate previous studies in documenting significant comorbid conditions between ADHD (both threshold and sub-threshold) and a wide range of other Axis I and Axis II psychiatric symptoms; (2) to examine the associations of parenting styles, as retrospectively reported by students, with these symptoms; and (3) to determine the extent to which the associations of ADHD with other symptoms vary as a joint function of gender and childhood exposure to different parenting styles.

2. Material and methods

2.1. Participants and procedures

The study was carried out among incoming freshman at National Taiwan University, Taipei, Taiwan. Recruitment began with a letter describing the purposes and procedures of the study that was mailed to all 3756 incoming students after they were accepted by the university. There were no data about the proportion of eligible students receiving the invitation letter. The students were informed that participation was completely voluntary and that responses would be confidential. These consent procedures were approved by the Research Ethics Committee of National Taiwan University Hospital before study implementation. These pre-designated respondents were then given an opportunity to complete the self-administered questionnaire at school during the week before the fall semester in conjunction with a routine physical and laboratory examination. A total of 2284 students (1156 men, 50.7%), representing 60.8% of those eligible for the survey, completed the questionnaires, which were checked by trained research assistants promptly to minimize missing data.

2.2. Instruments

2.2.1. Adult ADHD Self-Report Scale (ASRS)

The ASRS [58] is a validated 18-question scale that was developed in conjunction with revision of the World Health Organization Composite International Diagnostic Interview [30]. The ASRS includes questions about the nine inattention and nine hyperactivity–impulsivity Criterion A symptoms of ADHD in the *DSM-IV*, each question asking respondents how often a given symptom occurred over the past six

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