Addictive Behaviors 33 (2008) 1432–1440

Contents lists available at ScienceDirect

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Intergenerational transmission of chronic physical disease via chronic mental disorders: The potential role of addictive behaviors

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ARTICLE INFO

Keywords:
Nicotine dependence
Anxiety
Depression
Child
Cigarette
Asthma

ABSTRACT

There has been growing evidence of a link between chronic respiratory diseases, asthma in particular, and mental disorders among youth. The mechanism for this link remains unknown. Several studies have empirically addressed the question of this pathway, and accumulating results may shed new light on the nature of this association. The goal of the current paper is to provide an integrative summary of the literature to date and to present a new interdisciplinary hypothesis for one possible mechanism explaining the link between asthma and anxiety/depression among youth. This hypothesis posits that comorbid anxiety/depression and nicotine dependence among adults, may be one pathway leading to the comorbidity of asthma and anxiety/depression among youth. We propose this mechanism operates via exposure to environmental tobacco smoke and/or prenatal tobacco use, which confers an increased risk for asthma, and parental anxiety/depression which confers increased risk of anxiety/depression among offspring via familial transmission. We predict that further testing of this hypothesis will help to reveal the largely neglected problem of nicotine dependence especially among women — and the far-reaching impact of this addiction on the health of children.

1. Introduction

Anxiety disorders, depression, and asthma are the most common and arguably among the most pressing public health problems among youth in the United States and worldwide. The etiologies of anxiety disorders, depression, and asthma are not known and there are no known cures. Improved insight into their etiologies, including potentially shared etiologies, would ultimately help to significantly reduce impairment and disability over the lifespan of millions of people.

1.1. The problem of asthma among youth

Asthma is a pulmonary inflammatory condition, which most often begins in childhood. The clinical phenomena associated with asthma include paroxysmal wheezing, shortness of breath, and cough that accompanies airway hyperreactivity. Cumulative prevalence of asthma range from 14% in inner city U.S. children 17 or younger (Weiland et al., 2004), 25.9% in British school children aged 12–14 (Anderson et al., 2004), and 9.5% and 10.4% among Italian youth, aged 6–7 and 13–14, respectively (Galassi et al., 2006). Unlike other childhood-onset chronic illnesses (e.g., Type I diabetes mellitus), evidence suggests many cases of childhood asthma could be largely prevented and the course vastly improved. Documented risk factors for childhood-onset asthma include family

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0306-4603/$ – see front matter © 2008 Elsevier Ltd. All rights reserved.
doi:10.1016/j.addbeh.2008.05.011

history of asthma, having allergies, cockroach allergen, exposure to prenatal smoking and exposure to environmental tobacco smoke (Becklake & Ernst, 1997; Sporik, Holgate, & Cogswell et al., 1991).

1.2. The problem of anxiety disorders among youth

Anxiety disorders are the most common mental disorders among youth and adults in the community. Prevalence data on anxiety disorders in the community suggest prevalence rates ranging from 5–13% of youth under 17 (e.g., Costello et al., 1996; Garland et al., 2001). One-year and lifetime prevalence of anxiety disorders has been estimated to be approximately 18.1% and 28.8% among adults, respectively (e.g., Kessler et al., 2005). Onset of anxiety disorders is most common during childhood and early adolescence. Anxiety disorders often persist for decades, and early-onset of anxiety disorder is a strong predictor of subsequent onset of affective and substance use disorders (e.g., Regier, Rae, Narrow, Kaelber, & Schatzberg, 1998) and of persistent and chronic anxiety disorders across the lifespan (Kendall, Safford, Flannery-Schroeder, & Webb, 2004). Previous data also suggest that childhood anxiety disorders are associated with social and school-related impairment, suicidal ideation, and suicide attempt (Gould et al., 1998; Straus et al., 1987). Epidemiologic studies have found risk factors for anxiety disorders, yet etiologic determinants have not been conclusively identified.

1.3. The problem of depression among youth

Large-scale population research has indicated that, at any given time, 10–15% of children and adolescents in the United States suffer from depression or a similar serious mental disorder that affects mood, energy, interest, sleep, and overall functioning (Smucker, Craighead, Craighead, & Green, 1986; US DHHS, 1999). The symptoms of depression are persistent, can interfere with one's ability to function on a daily basis, and may be chronic. Epidemiologic and clinical research have documented that the age of first onset of major depression is commonly during adolescence, and prepubertal onsets, though less frequent, do occur (Lewinsohn, Clark, Seeley, & Rohde, 1994).

1.4. The asthma epidemic in children

Available data from various population samples within the US and other countries suggest that childhood asthma has increased up to six fold in some areas from 1950 to the present time (e.g., Kabesh & Von Mutius, 2002; Wood, 2002), though the reason for the rise in childhood asthma remains unknown. Previous studies also suggest that the prevalence of asthma varies widely by geographic and demographic characteristics.

Population-level genetic changes cannot explain the recent asthma epidemic, as a population's gene pool takes a much longer period of time to exhibit such changes. Currently, the Hygiene Hypothesis is the main theory that purports to explain this phenomenon, positing that increasingly sanitized conditions in Westernized countries have resulted in changes to individuals' immune systems, which have increased the risk of allergies and thereby led to the rise of asthma in industrialized (i.e., more sanitized) countries as compared to third-world countries (Stratchan, 1989). Thus, under the Hygiene Hypothesis, asthma is characterized as a disease of the affluent. Skepticism about the usefulness of this hypothesis is increasing though, as it fails to explain some of the recent trends in asthma. Importantly, the Hygiene Hypothesis is unable to explain the epidemiology of childhood asthma within Westernized countries where rates are substantially higher in inner-city, lower socioeconomic segments of the population compared to suburban, rural, and more affluent segments of the population (e.g., Akinbami, Rhodes, & Lara, 2005; Beckett, Belanger, Gent, Holford, & Leaderer, 1996). A goal of the current study is to propose one alternative hypothesis to partially explain the epidemic of childhood asthma.

1.5. Association between asthma and mental health problems among youth

Evidence to date suggesting an association between asthma and mental disorders among youth has come mainly from four sources. First, data from clinical samples show higher levels of behavioral problems, as well as depression and anxiety symptoms, in pediatric asthma patients with moderate-to-severe asthma compared to controls and pediatric patients with other medical illnesses (e.g., Feldman, Ortega, McQuaid, & Canino, 2006; Fritz, Rubinstein, & Lewiston, 1987; Wamboldt, Fritz, Mansell, McQuaid, & Klein, 1998). Similarly, data from pediatric patients in psychiatric treatment settings show higher than expected levels of asthma among youth with anxiety disorders (e.g., Koltek, Wilkes, & Atkinson, 1998; McQuaid, Kopel, & Nassau, 2001). A second line of evidence comes from epidemiologic data which have shown an association between asthma and anxiety disorders among youth in community samples (e.g., Goodwin, Fergusson, & Horwood, 2004; Ortega, Huertas, Canino, Ramirez, Rubio-Stipec, 2002). Specifically, several studies have found higher rates of anxiety disorders (e.g., separation anxiety disorder, overanxious disorder, phobia, panic) among youth with asthma in community samples compared to those with diabetes and other chronic illnesses (e.g, Ortega et al., 2002) and compared with those without asthma (e.g., Craske, Poulton, Tsao, & Plotkin, 2001; Goodwin, Fergusson, & Horwood, 2004). Findings on the link between respiratory disease and depression among youth in the community have been mixed, with some showing a link (Goodwin, Fergusson, & Horwood, 2004), while others have not (Ortega et al., 2002). Third, there is evidence of a familial association between panic disorder and respiratory disease, with data showing higher than expected rates of panic disorder among relatives of patients with severe respiratory disease (van Beek, Schruers, & Griez, 2005), as well as evidence of a relationship between severity of psychiatric problems in family members and severity of asthma in pediatric patients (Wamboldt, Weintraub, Krafchick, & Wamboldt, 1996). Results from a three-generation study show parental depression is