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Prediction of childhood ADHD symptoms to quality of life in young adults: Adult ADHD and anxiety/depression as mediators

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ABSTRACT

Childhood attention-deficit/hyperactivity disorder (ADHD) symptoms may persist, co-occur with anxiety and depression (ANX/DEP), and influence quality of life (QoL) in later life. However, the information about whether these persistent ADHD and ANX/DEP mediate the influence of childhood ADHD on adverse QoL in adulthood is lacking. This study aimed to determine whether adult ADHD symptoms and/or ANX/DEP mediated the association between childhood ADHD and QoL. We assessed 1382 young men aged 19–30 years in Taiwan using self-administered questionnaires for retrospective recall of ADHD symptoms at ages 6–12, and assessment of current ADHD and ANX/DEP symptoms, and QoL. We conducted mediation analyses and compared the values of mediation ratio (P_M) by adding mediators (adult ADHD and ANX/DEP), individually and simultaneously into a regression model with childhood ADHD as an independent variable and QoL as a dependent variable. Our results showed that both adult ADHD and ANX/DEP symptoms significantly mediated the association between childhood ADHD and QoL ($P_M = 0.71$ for ANX/DEP, $P_M = 0.78$ for adult ADHD symptoms, and $P_M = 0.91$ for both). The significance of negative correlations between childhood ADHD and four domains of adult QoL disappeared after adding these two mediators in the model. Our findings suggested that the strong relationship between childhood ADHD and adult life quality can be explained by the presence of persistent ADHD symptoms and co-occurring ANX/DEP. These two mediators are recommended to be included in the assessment and intervention for ADHD to offset the potential adverse life quality outcome in ADHD.

1. Introduction

Attention deficit/hyperactivity disorder (ADHD) is a common neuropsychiatric disorder, characterized by early onset, persistent and pervasive patterns of developmentally inappropriate inattention, overactivity and impulsivity (Biederman et al., 1998; Ingram, Hechtman, & Morgenstern, 1999; Mannuzza & Klein, 2000; Wilens & Dodson, 2004), with high

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prevalence of 5–10% of school age children (Faraone, Sergeant, Gillberg, & Biederman, 2003; Gau, Chong, Chen, & Cheng, 2005; Skounti, Philalithis, & Galanakis, 2007) and 2–4% of adults (Fayyad et al., 2007; Kessler et al., 2005a, 2006; Simon, Czobor, Bálint, Mészáros, & Bitter, 2009). ADHD accounts for 30% to 50% of child referrals to mental health services (MTA Cooperative Group, 1999), leads to substantial functional impairment in wide-ranging domains, especially in educational (Harpin, 2005), family, and peer domains (Bagwell, Molina, Pelham, & Hoza, 2001; Hoza, 2007; Wilson & Marcotte, 1996), and influences quality of life (Wehmeier, Schacht, & Barkley, 2010; Klassen, Miller, & Fine, 2004; Matza, Secnik, Mannix, & Sallee, 2005; Pongwilairat, Louthrenoo, Charnsil, & Witoonchart, 2005; Sawyer et al., 2002; Topolski et al., 2004; Varni & Burwinkle, 2006) among individuals with this disorder. While several researchers have reported that persistent ADHD (Bagwell et al., 2001; Friedman et al., 2003) and co-occurring other psychiatric conditions (Murphy & Barkley, 1996) are associated with these adverse social outcomes in adolescence and adulthood, limited research has examined their relation with quality of life.

1.1. The importance of quality of life on ADHD

Youths with ADHD are at a heightened risk for social, emotional, and adaptive difficulties (August, Braswell, & Thuras, 1998; Hoza, 2007; Nijmeijer et al., 2008; Wilson & Marcotte, 1996), which predict adverse psychosocial outcomes in later life. Since ADHD is more persistent than previous thought and is associated with impairment and comorbidities over the life span (Wilens & Dodson, 2004), data from longitudinal follow-up studies from childhood to adulthood are crucial to advance our understanding of the trajectories of ADHD impact (Ingram et al., 1999). In addition to many long-term follow-up studies of ADHD that focused on different domains of functional impairment, including academic underachievement (Wilson & Marcotte, 1996), reduced vocational opportunities (Barkley, Fischer, Smallish, & Fletcher, 2006) and social maladjustment (Bagwell et al., 2001; Greene, Biederman, Faraone, Sienna, & Garcia-Jetton, 1997), the concept of well-being and quality of life has emerged as an important outcome measure in observation studies (Graetz, Sawyer, Hazell, Arney, & Baghurst, 2001; Sawyer et al., 2002) and clinical trials (Perwien et al., 2004; Yang, Hsu, Chiou, & Chao, 2007) in ADHD as well as other mental disorders (Bastiaansen, Koot, Ferdinand, & Verhulst, 2004; Hays, Wells, Sherbourne, Rogers, & Spritzer, 1995; Mendlowicz & Stein, 2000).

The concept of quality of life has been defined in many ways. A relatively well-accepted definition provided by Leidy, Revicki, and Genesté (1999) is that quality of life is an individual's subjective perception of the impact of health status (e.g., disease and treatment) on physical, psychological, and social functioning. Quality of life encompasses more than simply symptom levels and can be distinguished from psychopathology measurement quite well, because it addresses several aspects concerning a person's functional adaptation in his or her everyday life (Bastiaansen, Koot, & Ferdinand, 2005). Although there is an overlap on several parts between instruments designed to measure quality of life and those used to measure functional impairment, the key distinction is that quality of life measures subjectively against an internally rather than externally generated standard (Danckaerts et al., 2010). Functional impairment is usually rated by the clinicians but quality of life is rated by the patients. Functional impairment is integral to the illness, whereas quality of life is a broader assessment of the impact of illness (Sawyer et al., 2002). The main goal of healthcare is to improve patients' perceptions of their health and the extent to which health problems interfere with their quality of life (Spitzer et al., 1995). Assessment of the quality of life can assist the clinicians to identify areas of life that are particularly difficult for the patients (Danckaerts et al., 2010). Appropriate support and intervention based on the assessment can therefore be engaged (Danckaerts et al., 2010).

Recent western literature documents that significantly lower quality of life in youths with ADHD than healthy controls in several domains such as psycho-social, achievement and self-evaluation domains (Hakkaart-van Roijen et al., 2007; Klassen et al., 2004; Matza et al., 2005; Pongwilairat et al., 2005; Sawyer et al., 2002; Topolski et al., 2004; Varni & Burwinkle, 2006). The degree of adverse life quality outcome was significantly correlated with the severity of ADHD symptoms (Klassen et al., 2004; Matza et al., 2004). Among the three ADHD subtypes, defined according to the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV): predominantly inattentive type (ADHD-I), predominantly hyperactive/impulsive type (ADHD-HI), and combined type (ADHD-C), individuals with ADHD-C were consistently rated the most impaired (Graetz et al., 2001; Landgraf, Rich, & Rappaport, 2002) and individuals with ADHD-I were reported to have low self-esteem and social and school-related problems (Graetz et al., 2001), but fewer externalizing problems than individuals with ADHD-C or ADHD-HI (Graetz et al., 2001). However, little is known about quality of life in individuals with ADHD in Asian population (Chao et al., 2008).

1.2. ADHD in adulthood related to quality of life

ADHD symptoms, particularly inattention, commonly persist to adolescence even to adulthood (Biederman, Mick, & Faraone, 2000; Gau et al., 2010a; Hart, Lahey, Loeber, Applegate, & Frick, 1995). A majority of individuals with childhood ADHD continue to struggle with a substantial number of ADHD symptoms (Wilens, Faraone, & Biederman, 2004) and high levels of dysfunction despite a sizeable rate of syndromatic remission in young and middle-aged adults (Biederman et al., 2000; Das, Cherbuin, Butterworth, Anstey, & Easteal, 2012). ADHD symptoms in adulthood are considered to increase the likelihood of vocational underachievement, substance abuse and antisocial and delinquent behaviors (Barkley et al., 2006; Biederman et al., 1998; Kessler et al., 2005a; Torgersen, Gjervan, & Rasmussen, 2006).