



# Association between family socioeconomic status and depressive symptoms among Chinese adolescents: Evidence from a national household survey



Qin Zhou<sup>a,\*</sup>, Libo Fan<sup>b,1</sup>, Zhichao Yin<sup>c,2</sup>

<sup>a</sup> School of Public Administration, University of International Business and Economics, Beijing, China

<sup>b</sup> Business School, University of International Business and Economics, Beijing, China

<sup>c</sup> The School of Finance, Capital University of Economics and Business, Beijing, China

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## ABSTRACT

Depression is a common mental disorder due to high risk of the adolescence development stage. Few studies discussed the association between family socioeconomic status (SES) and depression and its mechanism. We aimed to provide a national view of depressive symptoms among Chinese adolescents to explore the relationship between family SES and depressive symptoms. We used the data from the Chinese Family Panel Studies (CFPS). Family SES include family income and parents' educational attainment. Depressive symptoms were measured by the Center for Epidemiological Study Depression. Family SES was found to be significantly associated with adolescents' depressive symptoms. The study indicated that adolescents were more likely to have depressive symptoms when family income decreased. Poor self-confidence, mathematics performance, and physical health were associated with high risk for depressive symptoms. The presence of these factors greatly weakened the association between family SES and depressive symptoms. Therefore, adolescents' mental health is vulnerable and connected to family SES. Physical health, school performance, and self-confidence might be important mediators in the pathways of family SES affecting depressive symptoms. Prevention and intervention programs are important and necessary to improve the mental health of Chinese adolescents, and the effect of family SES should be considered in these programs.

## 1. Introduction

Depression is a common mental disorder in adolescents (Allgood-Merten et al., 1990; Rutter, 1991). It has been increasingly recognized by scholars that depression often begins in adolescence (Kim-Cohen et al., 2003; Hankin, 2006). The global prevalence rate of depression in adolescents has shown rapid growth (Brendgen et al., 2005; Costello et al., 2008; Elgar et al., 2015). According to Kessler and Walters (1998), the 12-month prevalence rates of major depression and minor depression were approximately 12.4% and 7.1% respectively. In a study by the World Health Organization, weekly depressive symptoms were found in 49% of adolescent females and 34% of males among 15-year-olds (Scheidt et al., 2000). Therefore, adolescence is a critical period for the identification, prevention, and intervention of depression. Therefore, identifying factors associated with depressive symptoms and depression among adolescents is essential for effective intervention programs.

Factors underlying depressive symptoms have received much

attention. Some studies revealed that the prevalence rates of depressive symptoms varied among differing age, gender, and race groups (Kubik et al., 2003; Wight et al., 2005). Research findings showed that resilience factors, such as self-awareness and self-efficacy played important roles in the relationship between negative life events and depression (Zhang et al., 2013). Hesketh et al. (2010) indicated a competitive and punitive educational environment lead towards high levels of stress and psychosomatic symptoms for adolescents. Hence, Socioeconomic Status (SES) is an important contributor of depression in adults, adolescents and children (Reiss, 2013; Rajmil et al., 2014). Najman et al. (2004) found that children from socioeconomically disadvantaged families began their life with poorer health. McLaughlin et al. (2012) studied the association between socioeconomic status and mental disorders among American adolescents. The results indicated that subjective social status was significantly associated with mental disorders. Using a Norwegian sample of children, Boe et al. (2011) found that low family income consistently predicted mental health problems, while parental educational attainment predicted that externalizing disorders were stronger

\* Correspondence to: Ning yuan Building, No. 10 Huixin Dongjie, Chaoyang District, Beijing 100029, China.

E-mail addresses: [zhouqin@uibe.edu.cn](mailto:zhouqin@uibe.edu.cn) (Q. Zhou), [lbfan@263.net](mailto:lbfan@263.net) (L. Fan), [yzc@cueb.edu.cn](mailto:yzc@cueb.edu.cn) (Z. Yin).

<sup>1</sup> Address: Ning yuan Building, No. 10 Huixin Dongjie, Chaoyang District, Beijing 100029, China.

<sup>2</sup> Address: No. 121 Zhangjialukou, Flower-Town, Fengtai Beijing 100070, China.

than internalizing disorders. Elgar et al. (2015) examined secular trends in socioeconomic inequality and adolescent health using a time-series analysis of data in 34 North American and European countries. Their findings indicated that socioeconomic inequality increased disparity in many domains of adolescent health.

Although a large number of studies have discussed the association between SES and mental health, the relationship might vary across countries, races, and cultural backgrounds (Seaton et al., 2010). Auerbach et al. (2010) found that Chinese adolescents report higher level of depressive symptoms than those from Canada due to cultures and beliefs. China has experienced rapid economic growth and entered a new transforming period of economy and society, causing numerous protective factors of depressive symptoms such as strong social support and a filial culture to change or disappear within the past two decades (Yu et al., 2012; Li et al., 2014).

Studies have been conducted on the prevalence rate of depression among Chinese adolescents. Risk factors from biological, psychosocial, and cultural aspects were discussed among scholars (Kim et al., 2009; Zhang et al., 2012; Andrew et al., 2015; Niu et al., 2016). However, most of these studies were based on data from regional surveys using different measures of depression and depressive symptoms, which made it impossible to reach to a consistent conclusion across the country (Pan et al., 2008). In addition, few studies examined the pathway through which family SES influence mental health among Chinese adolescents. Therefore, there is a strong need for more comprehensive studies of depression among Chinese adolescents using nationally representative data. In this study, we utilized a national representative data of Chinese Family Panel Studies (CFPS) to provide a national view of depressive symptoms among Chinese adolescents, and to explore the relationship between depressive symptoms and family SES.

## 2. Methods

### 2.1. Data

Data was derived from the CFPS. This data was designed after the Panel Study of Income Dynamics (PSID) in the US (Lei et al., 2015). The CFPS was a biennial survey collecting data from 25 provinces of China covering 95% of the Chinese population.<sup>3</sup> The baseline survey was conducted in 2010, using a multi-stage stratified sampling method. In the first and second stage, 144 counties and 640 villages/communities were randomly selected. In the third stage, 14,798 households were selected according to the probability proportional to size (PPS) sampling method. The CFPS collected information of four modules, namely, communities, households, adults, and adolescents/children. Household and individual level survey contained detailed demographic, economic, educational, and health attributes.

In this study, we used data from the 2012 round of CFPS survey that for the first time included the standard Center for Epidemiological Studies Depression Scale (CES-D). We restricted the study population to adolescents between 10 and 15 years old, for a total of 3056 observations. As we aimed to estimate both the effects of fathers' and mothers' educational attainment on adolescents' depressive symptoms, we kept observations with information of fathers' and mothers' educational attainments. After excluding observations with missing information on demographic and socioeconomic variables, we received 2018 observations from 1796 households for the analyses. We used the official sampling weights to adjust all of the empirical results in this article.

### 2.2. Measures

The 2012 CFPS questionnaire employed the standard CES-D to

assess depressive symptoms, which is one of the most widely used self-evaluation scales originally developed by Radloff (1977, 1991). Of the twenty items in the CES-D, 16 measured negative feelings (e.g. "I feel lonely") and four measured positive feelings (e.g. "I am confident in the future"). The participants were asked to assess their moods in the past seven days, and chose one response from the four proposed answers: "little or no (< 1 days)," "not too many (1–2 days)," "sometimes half the time (3–4 days)," and "most of the time (5–7 days)." The responses in the items of negative feelings were assigned to an index value of 0, 1, 2, 3, and those to the four items on positive feelings were coded as 3, 2, 1, 0, which in total made up an overall CES-D score ranging from 0 to 60, with higher scores indicating greater depressive symptoms. The CES-D classification of depressive symptoms might vary across countries and population groups. Radloff (1991) suggested a score of 16 or the 80th percentile point as the cutoff point for depressive symptoms. Chen et al. (2009) reported that the score of 16 as the threshold was too low among Chinese adolescents. Therefore, we used the 80th percentile point of CES-D total score (score of 18) as the cut-off point for depressive symptoms in this study. In addition, we used the score of 16 as the cutoff point for robust check.

Demographic information of adolescents collected in the 2012 CFPS survey included: age, gender, race (Han or others), and residence (urban or rural area). Information on adolescents' self-reported physical health (grouped as "excellent" or "not excellent"), Chinese and mathematics performances (grouped as "good" or "median or below"), and self-confidence (grouped as "excellent", "good", "fair", or "not confident") were also recorded. Family income was requested and grouped as the top 20%, the higher 20%, the middle 20%, the lower 20%, or the lowest 20%. Information on parents' educational attainment was obtained.

### 2.3. Statistical analysis

We used the Binary Choice Model to analyze the association between the probability of depressive symptoms and family SES, individual demographic, and geographic characteristics. The model was specified as follows:

$$D_i^* = S_i\beta + I_i\delta + C_i\eta + \mu_i \quad (1)$$

$$\Pr(D_i = 1|S, I, C) = P_r(D_i^* > 0|S, I, C) = G(S_i\beta + I_i\delta + C_i\eta + \mu_i) \quad (2)$$

Where  $D_i$  was a dummy variable, taking a value of 0 (mentally healthy) or 1 (depressive symptom).  $D_i^*$  denoted a latent variable measuring continuous mental health status of adolescent  $i$ . The realization of  $D_i$  depended on  $D_i^*$ . We observed  $D_i$  valued 1 when  $D_i^*$  was larger than 0, otherwise  $D_i$  valued 0.  $S_i$  denoted family SES, including fathers' and mothers' educational attainments, and family income levels.  $I_i$  represented individual characteristics, including age, gender, race, and residential status. We added county dummies ( $C_i$ ) to control the omitted location attributes. We assumed residual term followed the standard normal distribution, and used a Probit model to estimate the above model. It should be noted that the coefficients estimates in the above model cannot be used to explain the marginal effect of covariates on the probability of depressive symptoms. We reported the marginal coefficients in all of the tables by using a method of marginal effect at mean.

In the above model, variables of family SES and individual characteristics were considered as exogenous measures. Therefore, we could capture the causal association between family SES variables and depressive symptoms of adolescents. In the next step, we successively conducted additional complex models in which further additional covariates were added to examine the correlation of other covariates with adolescents' depressive symptoms, as well as how the coefficients of family SES variables changed. The final model included all indicators simultaneously. The added covariates included adolescents' self-reported physical health, school performance (measured by scores on Chinese and mathematics), and self-confidence. Since the added

<sup>3</sup> The excluded provincial-level regions include Hong Kong, Macao, Xinjiang, Qinghai, Inner Mongolia, Ningxia and Hainan.

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