



# Risk Factors for Psychosocial Disorders in Children with Congenital Adrenal Hyperplasia during the COVID-19 Pandemic

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## Abstract

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**BACKGROUND:** Congenital adrenal hyperplasia (CAH) is a chronic disease that requires lifelong medical therapy; thus, it has become a psychosocial stressor associated with mental, emotional, and behavioral disorders in children and adolescents. The COVID-19 pandemic is also an additional stressor in addition to chronic physical illness, biological factors, cognitive factors, environment, age, parental education, parents' occupations, and family income.

**AIM:** Thus, in this study, we aim to analyze the risk factors for psychosocial disorders among children with CAH.

**METHODS:** This research was a cross-sectional study conducted from January to April 2021 at the Pediatric Endocrinology Outpatient Clinic in Dr. Soetomo General Hospital in Surabaya. Data were collected through interviews, questionnaires, and medical records and then analyzed through univariate and bivariate analyzes using Chi-square test (Fisher's exact test).

**RESULTS:** In total, 30 children were enrolled in this study, among which 8 (26.7%) had emotional disorders, 5 (16.7%) had behavioral disorders, and most (83.3%) did not have hyperactivity/attention disorders. It was found that 8 children (26.7%) had problems with peer relationships, whereas most (83.3%) did not experience prosocial disorders. Family income ( $p = 0.032$ ,  $CI = 95\%$ ) and hyperactivity ( $p = 0.019$ ,  $CI = 95\%$ ) were found to be significantly correlated to conduct problems.

**CONCLUSIONS:** Family income, behavioral disorders, and hyperactivity/attention disorders were identified as risk factors for psychosocial disorders in children with CAH during the COVID-19 pandemic.

## Introduction

Congenital adrenal hyperplasia (CAH) is a chronic disease that requires lifelong medical therapy; it can possibly cause psychosocial problems such as cognitive disorders, behavioral problems, depressive tendencies, somatic disorders, and attention disorders [1], [2]. Psychosocial problems in children and adolescents are deemed to be quite serious because they negatively impact their development, productivity, and quality of life [3]. In addition to chronic physical illness, psychosocial problems in children and adolescents are also influenced by biological/physical factors, cognitive factors, environment, parental age, parental education, parental occupation, and family income [4].

During the COVID-19 pandemic, there are massive restrictions on social activities, such as schools being conducted online from home. There is limited access to health services and disruption of medicine distribution, thus making it difficult to visit the hospital and take medication regularly. All of these are additional stressors that may worsen psychosocial

disorders in children with chronic diseases such as CAH [5].

Therefore, in this study, we aim to determine the risk factors for psychosocial disorders in children with CAH during the COVID-19 pandemic. Early detection and intervention for these risk factors have been determined to help prevent psychosocial disorders.

## Materials and Methods

The study population included pediatric patients who had previously been diagnosed with CAH and underwent outpatient treatment at the Pediatric Endocrinology Outpatient Clinic in Dr. Soetomo General Hospital during the COVID-19 pandemic from January 1 to April 30, 2021. The sampling method used was simple random sampling. Sample size was calculated using Rosner with  $\alpha$  of 5% [6]. The questionnaire used was strength and difficulties

questionnaire (SDQ) which developed by Goodman with sensitivity of 85% and specificity 80% [7]. The SDQ was validated into Indonesian language by Tjhin Wiguna and Yohana Hestyanti in 2005, which consisted of 25 points subdivided in five domains: Emotional symptoms, prosocial behavior, interpersonal relationships, conduct problem symptoms, and hyperactivity [8]. Ethical clearance was obtained from Ethical Committee Board of Dr Soetomo Hospital. Before participating in this study, all respondents given the information for consent orally and in writing. Informed consent was signed by parents who approved to participate in the study and return to researchers. The inclusion criteria in this research were patients aged 3–17 years. The exclusion criteria were CAH patients who were critically ill or receiving intensive care at the pediatric intensive care unit, patients with a nuclear family history (father/mother/siblings) of mental disorders, and patients who regularly used psychotropic drugs. The independent variables were father's age, mother's age, father's education level, mother's education level, father's occupation, mother's occupation, and family income. The dependent variables were psychosocial problems, emotional problems, conduct problems, hyperactivity, peer problems, and prosocial.

Data were collected through online interview using phone, filling out the SDQ, and some from medical records. Descriptive analysis was conducted to describe the frequency distribution of each variable. Bivariate analysis was performed to determine the relationship between variables, using the Chi-square test with  $p < 0.05$  to consider as a statistically significant. All statistical analyzes were conducted using software Statistical Package for the Social Science version 17.0.

## Results

The characteristics of CAH patients are shown in Table 1, while the results of the SDQ are presented in Figure 1. Based on the results of bivariate analysis, family income was found to be significantly correlated to conduct problems ( $p = 0.032$  and  $CI = 95\%$ ), as well as hyperactivity ( $p = 0.019$  and  $CI = 95\%$ ). No significant relationship was noted between parental age, parental education, and parental occupation with behavioral disorders and hyperactivity/attention. Parental age, education, occupation, and income had no significant correlations with psychosocial disorders, emotional disorders, and relationship disorders with friends.

The descriptive analysis in this study is shown in Table 1.

The distribution of SDQ results is shown in Figure 1.

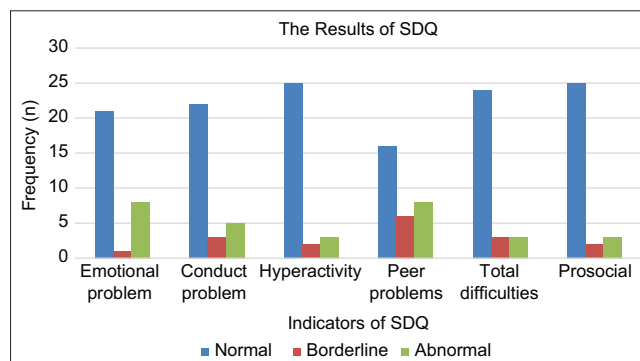
**Table 1: Patient characteristics**

Characteristics	Value n = 30 (%)
Age	
3–10 years old	23 (76.7)
11–17 years old	7 (23.3)
Father's age	
<40 years old	17 (56.7)
≥40 years old	13 (43.3)
Sex (n)	
Male	11 (36.7)
Female	19 (63.3)
Father's education level	
Elementary to high school	14 (46.7)
Higher than high school	16 (53.3)
Father's occupation	
Employees	19 (63.3)
Professional	11 (36.7)
Mother's age	
<38 years old	13 (43.3)
≥38 years old	17 (56.7)
Mother's occupation	
Employed	8 (26.7)
Unemployed	22 (73.3)
Mother's education level	
Elementary to high school	13 (43.3)
Higher than high school	17 (56.7)
Family income	
<IDR 2 million	9 (30)
≥IDR 2 million	21 (70)

Data are presented as n (%). IDR: Indonesian Rupiahs.

## Discussion

A significant relationship was observed between family income and behavioral disorders in children with CAH. Similarly, an Australian study found a relationship between poor family conditions and worsening mental health in children. Furthermore, Miller (2013) found a significant relationship between family income levels and mental emotional and behavioral disorders ( $p = 0.010$  and  $r = 0.40$ ). Respondents with low socioeconomic levels were significantly associated with poor mental health in children ( $OR = 2.7$  and  $CI = 1.6–4.4$ ) [9], [10].



**Figure 1: The distribution of SDQ results. SDQ: Strength and difficulties questionnaire**

Family income was related with hyperactivity in children with CAH ( $p = 0.019$ ). In total, 4 children (44.4%) from families with below-average income experienced hyperactivity disorders, whereas only 1 (4.8%) out of 21 children from families with above-average incomes had hyperactivity. Thus, children from families with incomes below minimum wage are more likely to experience hyperactivity, whereas those from families with incomes above the minimum wage are not. Mental disorders that are most strongly associated

with low-income families are hyperactivity and defiant behavior in children, whereas disorders such as anxiety and depressive states have no significant relationship [11].

As per our findings, it was also determined that most of the children (83.3%) did not experience hyperactivity. The forms of hyperactivity displayed by CAH children in this study were restlessness, overreacting, inability to stay still for a long time, and constantly moving restlessly and squirming. Nevertheless, most children had good attention spans and were able to complete tasks or homework. If this hyperactive behavior is not handled properly, it could eventually cause obstacles to adjusting social behavior and academic abilities in the home and school environment. As a result, the development of children is not optimal with the emergence of behavioral disorders in the future. This disorder can also hinder the development of language skills. Furthermore, children with hyperactivity may also have difficulty in controlling emotions; they can get frustrated and angry more easily compared with normal children [12].

Out of the 30 children with CAH, 8 (26.7%) were found to have experienced emotional disorders. Similarly, studies by Kung and Wiguna, 2010 stated that as many as 42.2% of children who came for the treatment at the pediatric and adolescent outpatient clinic of Cipto Mangunkusumo Hospital experienced emotional disorders [13]. The forms of emotion reported were nervous feelings or difficulty in parting with parents or caregivers in new situations as well as losing self-confidence easily. The emotional characteristics and patterns described by children included fear, worry, shame, and anxiety. There were also fearful characteristics, such as retreating and withdrawing, as well as imagined pain (i.e., false complaints), such as headaches and stomach pains [14].

There were five children (16.7%) found to have conduct problems, whereas three children (10%) had borderline conduct problems. Often, this manifested as difficulty in controlling anger. The symptoms of children experiencing behavioral disorders included a tendency to intimidate others, fight, use weapons, commit sexual violence, damage the property of oneself and others, start fights, lie, go out at night, run away from home, skip from school, steal, and physically abuse other people or animals. These conduct problems can have a variety of adverse effects on children that can negatively impact them in the future. Conduct problems occurring at a young age are suspected to increase the risk of mental and behavioral disorders in middle age, so it is very important to detect and treat problems as early as possible [15].

Moreover, 8 children (26.7%) had peer problems, while 6 (20%) were declared borderline in this aspect. These problems included a tendency to be alone, play alone, and having an easier time in

making friends with adults than with other children. This is in line with the theory put forward by Hosokawa, wherein low family income was directly related to conflicts in marriage and parenting practices. This also significantly affected the children's mental health functions, manifesting as impaired social abilities and behavioral problems. On the other hand, high levels of family income are associated with more constructive marital conflict; these are subsequently more widely used in positive parenting practices, resulting in better mental health functioning of children [16], [17].

A family's parenting style affects the emotional development of children. If a child grows up in a family with positive emotions, the child's emotional development will be positive. On the other hand, if the parents express negative emotions, such as venting anger with an aggressive attitude, irritability, disappointment, and pessimism in dealing with problems, then the child's emotional development will be negative [17]. The results of the bivariate analysis showed that no dependent variables were associated with the occurrence of emotional disorders in children with CAH.

Most children with CAH (83.3%) did not experience prosocial behavior problems. In this study, children with younger parents had a greater tendency to experience higher prosocial disorders. This is allegedly related to the ability and experience in educating children. Supposedly, more mature parents would be better at educating their children.

Finally, parents with a higher education level had a higher incidence of prosocial disorders among their children. This contradicts a study in Munich, Germany, mentioning that low parental education is the strongest risk factor for poor mental health in children [10]. The results of this study indicate that none of the dependent variables have a relationship with prosocial disorders in children with CAH.

The limitations of this study are single center and there was no previous data on psychosocial disorders in children with CAH before the pandemic. Another limitation, this study has not analyzed the correlation of psychosocial disorders and the quality of life. The researchers also declared that there was no conflict of interest in this study.

## Conclusion

Family income is related to behavioral disorders and hyperactivity in children with CAH during the COVID-19 pandemic. These findings can be taken into consideration for routine screening and early intervention. However, more follow-up research on other factors with a wider population is needed to affirm the results of this study.

## Ethical Clearance

We sought approval of this research from the Clinical Research Unit of Dr. Soetomo General Hospital Surabaya, Indonesia, as our Ethical Committee Review Board. The ethical clearance was issued by the Clinical Research Unit of Dr. Soetomo General Hospital Surabaya (number 1023/KEPK/III/2019).

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## Author Contribution

Muhammad Faizi and Irma I. Soelistiyo, designed the study; Nur Rochmah and Yuni Hisbiyah, supervisor on data assessment; Irwanto and Rayi K Perwitasari, responsible for the statistical analysis and publication process. All authors contributed to the literature search and final approval of the version to be submitted.

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