Risk Factors Affecting Attention Deficit Hyperactivity Disorder Among Early Childhood in the Agricultural Area in Indonesia

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ABSTRACT

Background: ADHD (Attention Deficit Hyperactivity Disorder) is a behavioral disorder the most common among children. This disorder is often found in early childhood and school age. The purpose of this study was to determine the incidence and risk factors for ADHD in early childhood in agricultural areas.

Method: This study used a cross-sectional design. The subjects of this study were 1,113, kindergarten students aged 5-7 years in the agricultural area of Brebes Regency, Central Java, Indonesia. The independent variables in this study were age, sex, history of preterm birth, education level and parental work, and the dependent variable is the incidence of ADHD. The multivariate logistic regression test is used to determine variables which are risk factors.

Results: The study showed that from 1.113 total subjects. there were 480 (43.1%) subjects in ADHD diagnosis. History of preterm birth (OR = 1.577; 95% CI = 1.128-2.205), low father's education level (OR = 1.422; 95% CI = 1.106-1.827), low mother's education level (OR = 1.312; 95% CI = 1.008-1.708), parental involvement in agriculture (OR = 1.580; 95% CI = 1.231-2.028) and gender (OR = 3.126; 95% CI = 2.442-4.001) proved to be an independent risk factor for ADHD.

Conclusion: The incidence of ADHD in early childhood in agricultural areas reached 43.1%. History of preterm birth, the low father education level, the parental involvement in agriculture and the male gender are independent risk factors for early childhood ADHD incidence in agricultural areas.

Keywords: ADHD, Risk Factors, Early Childhood, Agriculture Area

INTRODUCTION

One of the developmental disorders of children is a disorder of concentration, where the number is increasing over time. ADHD is characterized by a continuous and persistent pattern of attention deficit and hyperactivity-impulsivity. ADHD is the most common and disturbing psychiatric condition in childhood, estimated to affect 5-10% of school-age children [1].

ADHD is a disorder characterized by an inability to maintain attention, regulate activity levels, and control impulsive behavior. The essence of this disorder is a lack of focus, motor hyperactivity, and chronic impulsivity often persist from childhood to adolescence [2]. Another literature says ADHD is a biological disorder in continuous brain function that causes cognitive dysfunction (executive function) that is not following the child's age development [3]. These disorders can be found in everyday life, both in preschoolers, adolescents, and even adults can experience this disorder [4].

ADHD disorders can cause psychosocial problems that are worse, for example learning difficulties will adversely affect achievement academic, drug abuse, alcohol, and other addictive substances, behavioral

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disorders such as delinquency, violence, and criminal acts, difficulty adjusting, both at home, at school and in the community, and can cause problems in the family if they do not get intervention since early [5].

The prevalence of ADHD varies depending on the screening instrument and the diagnostic criteria used, as well as the characteristics of the population studied. In general, worldwide prevalence rates are estimated at around 5.29% [6].

The exact cause of ADHD is still unknown. Several theories state that the incidence of ADHD is related to several factors such as genetics, prenatal and perinatal, environmental toxins, family adversity and early caregiving, gene-environment interplay [7]. It is now being discovered that the potential role of toxic chemicals in the environment is a risk factor in brain development disorders in fetuses and children and is a risk factor for ADHD [8]. One of the potentially toxic chemicals in the environment is the use of pesticides in agricultural areas. As happened in Indonesia, which is one of the countries with a large agricultural sector, it also uses pesticide chemicals of farming processes. The results of Suhartono's research, the exposure to pesticides is a risk factor for thyroid dysfunction in women of childbearing age in agricultural areas where women and children are involved in agricultural activities [9].

The prevalence of ADHD in children in agricultural areas in Indonesia is not known with certainty, due to the absence of research and exact figures have not been reported, so this study is needed to make the handling of the incidence of ADHD in early childhood can be done earlier so that the case does not last until adult.

METHODOLOGY

This research is a case study in the agricultural area of Brebes Regency, Central Java. The design of this study uses a cross-sectional with the subject of kindergarten students in the farming area. The subjects of this study were 1,113 kindergarten students living in agricultural areas. The research subjects were taken from 31 kindergarten schools in agrarian areas consisting of boys and girls aged 5-7 years.

The assessment uses appropriate local standard instruments, namely SPPAHI (Scale of Indonesian Hyperactive Behavior Assessment). Dr. Dwidjo

Saputro, Sp developed this scale. KJ (K) adjusted to the psychopathology of ADHD children and parents' perception of ADHD symptoms in Indonesia. This rating scale is simple, but sensitive to the symptoms of attention-deficit / hyperactivity in children in the community either in the clinic or outside the clinic is valid and reliable. The items of these instruments were prepared based on objective signs that showed the psychopathology of attention deficit hyperactivity problems most frequently expressed by teachers and parents. Further, it is coupled with items from the Conners Parent Rating Scale, Conners Teacher Rating Scale, Child Behavior Checklist (CCL), Edelbrock Children's Attention Problem (CAP), the ADD Comprehensive Teacher Rating Scale (ACTeRS) that is most often found in children in Indonesia and in accordance with Indonesian norms and culture [10].

Observation and interviews assess schools by kindergarten teachers who have been trained by pediatric psychiatry doctors. The results of the evaluation carried out by the teacher were randomly selected to be tested by the child psychiatric interrater doctor, and the results were by those assessed by the teachers. Observations and interviews were carried out for approximately 30 minutes by filling in 35 points from the SPPAHI instrument assessment. The multivariate logistic regression test is used to determine variables which are risk factors.

RESULTS

The characteristics of respondents were based on LBW (Low Birth Weight), birth history, birth history with action, parental involvement in agricultural activities, father's education level, mother's education level, child age, child gender, and detection early on ADHD. The gender of the respondents between men and women was not much different, namely 47.3% for male and 52.7% for female. The prevalence of ADHD was 43.1% and children whose ages 5-6 years was 75.3%.

Table 1: Characteristic of respondents

Characteristics	N	(%)
Low Birth Weight Babies		
Yes	70	6.3
No	1043	93.7
Premature Birth		
Yes	161	14.5
No	952	85.5

Conted…

Birth history with action		
Yes	161	14.5
No	952	85.5
Parental involvement in agriculture		
Yes	382	34.3
No	731	65.7
Father's education level		
Basic education	717	64.4
Higher education	396	35.6
Mother's education level		
Basic education	788	70.8
Higher education	325	29.2
Children's age		
60-72 months / 5-6 years	838	75.3>
73 months /> 7 years	275	24,7

Conted…

Gender		
male	527	47.3
female	586	52.7
Early detection on ADHD	480	43.1

Table 2 presents the bivariate analysis results for each variable, and obtained several risk factors that significantly increased the incidence of ADHD in early childhood, namely a history of preterm birth (OR = 1.577; 95% CI = 1.128-2.205), father's low level of education (OR = 1.422; 95% CI = 1.106- 1.827), the mother's low education level (OR = 1.312; 95% CI = 1.008-1.708), parental involvement in agriculture (OR = 1.580; 95% CI = 1.231-2 . 028) and male gender (OR = 3.126; 95% CI = 2.442-4.001). Non-significant risk factors include LBW, birth by action, and age of the children.

Table 2: Respondents' Risk Factors

No.	Variables	Early Detection of ADHD	No ADHD	p-value	OR	95% CI
1.	**Low Infant Body Weight**					
	<37 weeks	35	35	0.230	1.344	0.828-2.181
	≥37 weeks	445	598			
2.	**History of preterm birth**					
	<2500 gr	85	76	0.007	1.577	1.128-2.205
	≥2500 gr	395	557			
3.	**History of birth with actions**					
	(Cesar. Vacuum. Forcep)	60	101	0.105	0.752	0.533-1.062
	Normal	420	532			
4.	**Involvement in agriculture**					
	Involved	193	189	0.001	1.58	1.231 to 2.028
	Not engaged	287	444			
5.	**Father's educational level**					
	Elementary to Secondary	331	366	0.006	1.422	1.106 to 1.827
	Junior High to colleges	149	247			
6.	**Mother's educational level**					
	Elementary to Secondary	355	433	0.044	1.312	1.008 to 1.708
	Junior High to colleges)	125	200			
7.	**Children's Age**					
	5-6 years	372	466	0.137	1.234	0.935 to 1.630
	≥7 years	108	167			
8.	**Children 's gender**					
	Male	303	224	0.001	3.126	2.442 to 4.001
	Female	177	409			

Results of the logistic regression indicated eight significant variables namely low birth weight, history of preterm birth, birth history with action, parental involvement in agriculture, father's education level, mother's education level, child age, gender. The results of the multivariate test showed that three variables could increase the risk of early detection of ADHD, namely a history of preterm birth, the low level of education of the father, parental involvement in agriculture and male gender. The distribution of the characteristics of respondents based on table 3 is 76%. This means that there are 76% risk factors for early detection of ADHD, supported by a history of preterm birth, the latest level of education of the father and the sex of the child so that other supporting factors are 24%.

DISCUSSIONS

The results showed that the history of preterm birth, the low level of education of the father parental involvement in agriculture and male gender could increase the risk of ADHD in early childhood in agricultural areas. The results of this study are in line with previous studies which suggested that preterm birth was one of the factors causing ADHD [11,12]. Another study found that 16 out of 72 children born prematurely will display ADHD symptoms at the age of 7-8 years. Results from a meta-analysis study found that preterm birth was associated with an increased risk of the incidence of ADHD in children. Children who are born prematurely are at risk of decreasing cognitive test scores and their immaturity at birth is directly proportional to the average cognitive value at school age. Children born prematurely also show an increased incidence of ADHD and other behaviors [13].

Fathers with a low level of education increase the risk of the incidence of ADHD in early childhood. The low level of parental education will affect knowledge where individuals know what to do and how to do it, which is one aspect of behavior that shows a person's ability to understand and use the skills of everything he has learned. Knowledge is a domain that is very important for the formation of one's actions, including increasing creativity in parenting and behavior patterns in children. [14]. Parents are not easy to understand children with behaviors such as children with ADHD, especially followed by low education, poor socio-economic conditions, not understanding how to care for children, there are psychological problems in the family so that parents are powerless in caring for children [15].

The results of this study found that the prevalence of early detection of ADHD was 43.1%. This is a relatively high number, in which case the range of figures put forward by experts regarding the prevalence of ADHD ranges from 2–7% in school-aged children, and has been reported to reach a 17.1% prevalence in community surveys [16]. The prevalence results are quite high ever obtained in the study conducted in primary schools in Jakarta the capital of Republic Indonesia, namely 26.2% [17]. With the high rate in the capital city, it is not surprising that in rural areas people still keep on fighting to solve the problem.

CONCLUSION

The research on early childhood in agricultural areas concludes that the prevalence of early detection of ADHD is 43.1% with a comparison between boy and girl is 2: 1. The risk factors that most play a role in the occurrence of ADHD in early age children are the history of premature birth, low level of father's education, parental involvement in agriculture and the gender. It is suggested to parents to be more careful in storing pesticides, storing agricultural products and it is advisable to immediately wash their hands and change clothes after exposure to pesticides whereas for children it is recommended to stay away from the shallot farming area.

ACKNOWLEDGMENT

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