Research Article

The Affect of Obstretic and Maternal Nutrition History to Criminal Behaviour in Children : A Case- Control Study

Pengaruh Riwayat Nutrisi Ibu dan Anak terhadap Sifat Kriminal Anak - anak : Sebuah Studi Kasus Kontrol

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Abstract

Objective: To determine the relationship between obstetric history and maternal nutrition factors to the incidence of crime in children.

Methods: This study was an observational analytic study using a case-control method. The subject of this research is the mother of a child criminal offender in Tangerang Juvenile Detention Center who was recruited using a consecutive sampling method. Sampling was conducted in January 2016 to March 2019. Nutrition history data were obtained using an Indonesian version of the Food Frequency Questionnaire.

Results: There were 56 mothers of child offenders who met the study inclusion criteria and 38 subjects as controls. A significant obstetric history of violent crime in children is parity (p = 0.006), place of pregnancy control (p <0.001), birth attendants (p <0.001), and place of delivery (p <0.001). A history of nutritional adequacy that was significant for violent crime was fiber (p = 0.012), folic acid (p = 0.033), vitamin B1 (p = 0.046), vitamin B2 (p = 0.013), vitamin B6 (p <0.001), and vitamin C (p <0.001).

Conclusions: Obstetric history and maternal nutrition factors influence the incidence of crime in children. Further study about this topic should be done using retrospective cohort method spanning a larger period of time.

Keywords: child crime, maternal nutrition, obstetric history.

Abstrak

Tujuan: *Mengetahui hubungan faktor riwayat obstetri dan nutrisi maternal terhadap kejadian kriminalitas pada anak.*

Metode: *Penelitian ini merupakan penelitian analitik observasional dengan metode case control. Kelompok kasus penelitian ini merupakan ibu dari anak pelaku pidana di Lembaga Pembinaan Khusus Anak Tangerang, sementara kelompok kontrol merupakan ibu dari anak dengan usia remaja bukan pelaku pidana yang berkunjung ke Poliklinik Obstetri dan Ginekologi RSCM menggunakan metode consecutive sampling pada Januari 2016 hingga Maret 2019. Data yang dikumpulkan berupa riwayat obstetrik melalui wawancara dan riwayat nutrisi yang didapatkan menggunakan kuesioner Food Frequency Questionnaire versi Bahasa Indonesia. Data numerik dianalisis menggunakan uji tidak berpasangan atau Mann Whitney U, sementara data kategorik dianalisis menggunakan uji Chi square atau Fisher.*

Hasil: *Didapatkan sebanyak 56 subyek ibu dari anak pelaku pidana yang memenuhi kriteria inklusi penelitian dan 38 subyek sebagai kontrol. Riwayat obstetri yang berperan terhadap kejadian kriminalitas pada anak adalah paritas (p = 0,006), tempat kontrol kehamilan (p < 0,001), penolong persalinan (p < 0,001), dan tempat bersalin (p < 0,001). Riwayat kecukupan nutrisi yang bermakna terhadap kejadian kriminalitas adalah serat (p = 0,012), asam folat (p = 0,033), vitamin B1 (p = 0,046), vitamin B2 (p = 0,013), vitamin B6 (p < 0,001), dan vitamin C (p < 0,001).*

Kesimpulan: *Faktor riwayat obstetrik dan riwayat nutrisi maternal memiliki pengaruh terhadap perilaku kriminal pada anak. Sebaiknya penelitian selanjutnya dilakukan menggunakan metode kohort dengan jangka waktu yang lebih panjang.*

Kata kunci: *nutrisi maternal, kriminalitas anak, riwayat obstetrik.*

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INTRODUCTION

Changes in behaviour in children occur due to the process of adaptation of internal stimulus and external stimulus.[1,2] Behavior that exists in children can be divided into internalizing behaviour and externalizing behaviour. Internalizing behaviour is a disorder that occurs on its own and affecting one's self without involving the surrounding environment, such as depression, and anxiety. Meanwhile, externalizing behaviour is the opposite of internalizing behaviour, of which adolescents with externalizing behaviour have more aggressive, emotional, and brutal behaviours and may harm others.[1,2]

Based on 2008 data in the United States, it is estimated that there are 8.3 million children aged 4-17 years having behavioural and emotional problems with the highest proportion occurring in boys.[3,4] In 1997, a juvenile court in the United States recorded handling 180,000 criminal cases with the defendant being children less than 13 years old.[3] Data on criminal acts committed by children in Indonesia, based on data from the Directorate General of Corrections, in 2011 was about 54,712 children, with 3,312 children of which had already been charged.[5]

Many factors can shape behaviour. These factors include factors for parenting children by parents, maternal nutrition during pregnancy, and also the history of pregnancy and childbirth of mothers of criminal children.[2,6,7] Nutrition is an important element in determining human growth and development. Early trimester of pregnancy is important in the formation of fetal growth and development.[8] Both macronutrients and micronutrients are needed for the formation of placental and fetal components. If malnutrition occurs in early pregnancy, the fetus will have growth and development retardation in the future.

Obstetric history also plays a role in the formation of personality changes.[9,10] Several studies mentioned that mothers who experience obstetric complications in the form of placental abruption and preeclampsia would have their offspring experiencing damage to the structure of the central nervous system, resulting in changes in behaviour and decreased intelligence.[9] Based on several studies mention that aggressive criminals have different brain structures compared to people who do not commit crimes.

Although it has been known that events in early life even since the womb is very influential on the incidence of crime in adolescents, not much research has been done considering the technical difficulties of conducting such research, especially in Indonesia. Therefore, this study seeks to assess whether there is a relationship between maternal nutritional status and obstetric status to the incidence of crime in adolescents.

METHODS

Analytic observational research with retrospective cohort method was done in Tangerang Juvenile Detention Center, Tangerang, Indonesia on January 2016 to March 2019. The event population of this study were the mother of a child criminal offender in Tangerang Juvenile Detention Center. Controls were the mother of similar age child visiting Obstetrics and Gynecology Clinic in Dr. Cipto Mangunkusumo National General Hospital, Jakarta, Indonesia. Subjects with communication difficulty were excluded from this study.

Consecutive sampling method was done in this study. Patients were divided into criminal and control group. Nutrition history data were obtained using an Indonesian version of the Food Frequency Questionnaire. Nutritional adequacy was determined using Indonesian's nutritional adequacy number *(Angka Kecukupan Gizi)* 2013.

Baseline characteristics were then analyzed and compared. Bivariate analysis between maternal nutrition history, obstetric history, and study group was done. Ethical clearance was issued from health research and ethical committee in the Faculty of Medicine, Universitas Indonesia with ethical clearance letter-number KET-225/UN2.F1/ETIK/PPM.00.02/2019.

RESULTS

During the time of the study, a total of 153 event subjects were recruited. However, 97 patients met the exclusion criteria and were excluded from the study. A total of 56 mothers of child offenders were included in this study. For the control group, a total of 38 subjects were recruited and included in the study. Baseline characteristics of subjects can be found in Table 1.

Table 1. Baseline Characteristics of Subjects

Variables	Offender group (N = 56)	Control group (N= 38)	P-value
Age	44.5 (42 – 49)	46 (41 – 52)	0.002
Education			< 0.001
Uneducated	15 (26.8)	0	
Primary school	41 (73.2)	0	
Junior high	0 (0)	15 (39.5)	
Senior high	0 (0)	19 (50)	
Undergraduate	0 (0)	4 (10.5)	
Occupation			
Housewive	36 (64.3)	20 (52.6)	< 0.001
Farmer	11 (19.6)	0	
Worker	9 (16.1)	18 (47.4)	
Income (rp, month)			0.015
< 2.000.000	20 (35.7)	5 (13.2)	
> 2.000.000	36 (64.3)	33 (86.8)	
Number of marriage	1 (1 - 3)	1 (1 - 2)	0.01

In order to determine the differences of obstetric characteristics between study groups, bivariate analysis between groups was done. Result of bivariate analysis in this study can be found in Table 2.

Table 2. Obstetrics Characteristics of Subjects

Charateristic	Offender group (N = 56)	Control group (N= 38)	P-value
Parity	3 (2 – 7)	2 (1 – 4)	0.006*
Pregnancy control place			< 0.001*
None	20 (35.7)	0	
Integrated health centre	23 (41.1)	0	
Public health centre	13 (23.2)	3 (7.9)	
Hospital	0 (0)	35 (92.1)	
Birth attendants			< 0.001
Shaman	24 (42.9)	0	
Midwife	23 (41.1)	22 (57.9)	
Doctor	9 (16.1)	16 (42.1)	
Birthplace			< 0.001
House	30 (53.6)	0	
Public health centre	17 (30.4)	22 (57.9)	
Hospital	9 (16.1)	16 (42.1)	
Birth weight	3000 (2000 – 4000)	3000 (2200 – 3700)	0.762
Delivery Method			0.591
Normal	48 (85.7)	31 (81.6)	
Operative	8 (14.3)	7 (18.4)	

In order to determine the differences in maternal nutrition characteristics between study groups, bivariate analysis between groups was done. Result of bivariate analysis in this study can be found in Table 3.

Table 3. Maternal Nutrition Characteristics of Subjects

Nutrition (%)	Offender group (N = 56)	Control group (N = 38)	*P-value*	OR (CI95%)
Energy	7 (12.5)	5 (13.2)	1.000	1.06 (0.31-3.62)
Carbohydrate	9 (16.1)	11 (28.9)	0.225	2.13 (0.78-5.78)
Protein	32 (57.1)	20 (52.6)	0.795	0.83 (3.6-1.91)
Fat	11 (19.6)	1 (2.6)	0.024	0.11 (0.01-0.89)
Fiber	1 (1.8)	1 (2.6)	1.000	1.48 (0.09-23.5)
Folid acid	1 (1.8)	1 (2.6)	1.000	1.48 (0.09-24.5)
Calsium	3 (5.4)	3 (7.9)	0.683	1.51 (0.29-7.93)
Iodin	0 (0)	0 (0)	-	-
Copper substances	41 (73.2)	31 (81.6)	0.347	1.62 (0.58-4.45)
Fe	1 (1.8)	0 (0)	1.00	0.48 (0.02-12.1)
Magnesium	21 (37.5)	18 (47.4)	0.341	1.5 (0.65-3.46)
Zinc	2 (3.6)	0 (0)	0.513	0.28 (0.01-6.06)
Vitamin A	48 (85.7)	36 (94.7)	0.194	3.00 (0.6-14.98)
Vit B1	4 (7.1)	1 (2.6)	0.645	0.35 (0.04-3.27)
Vit B2	11 (19.6)	16 (42.1)	0.018	2.98 (1.18-7.48)
Vit B6	18 (32.1)	26 (68.4)	0.001	4.57 (1.89-11.1)
Vit B12	30 (53.6)	24 (63.2)	0.356	1.48 (0.64-3.45)
Vit K	1 (1.8)	0 (0)	1.000	0.48 (0.02-12.1)
Vit D	1 (1.8)	2 (5.3)	0.563	3.05 (0.27-34.9)
Vit E	0 (0)	0 (0)	-	-
Vit C	33 (58.9)	35 (92.1)	< 0.001	8.13 (2.23-29.6)

DISCUSSION

It should be noted that the obstetric history and maternal nutritional history do not necessarily have a direct effect on the tendency for criminality in children. The intended crime tendency is a spectrum that can consist of only prenatal factors, only environmental factors, and a combination of these two factors. In the event of combined conditions of the two factors, it is found that the risk is many times higher than the presence of just one factor.[10]

Based on the data obtained in this study, it is known that the significant obstetric characteristics of criminal behaviour are parity (p = 0.006), place of pregnancy control (p <0.001), birth attendants (p <0.001), and place of delivery (p <0.001). In general, the number of parities in the criminal offender group was higher than in the control group (median 3 vs. median 2, p = 0.006). Previous studies did not directly assess the place of pregnancy control, birth attendants, or delivery places for crime in children and adolescents. However, these factors are judged to be associated with poorly managed prenatal complications in mothers who do not carry out pregnancy control and perinatal complications that are not diagnosed in helper assistants who are less competent or delivery places with inadequate equipment.[11]

In this study, the mean daily energy sufficiency values were similar between the study groups. Malnutrition in pregnant women is associated with persistent criminal behaviour, especially antisocial tendencies in children. The occurrence of delinquency behaviour may ultimately evolve into violence. Previous studies have assessed that the population of pregnant women in the Netherlands who were starving due to the blockade by Germany in the second world war had children with antisocial personality as much as 2.5 times compared to the normal population.11 This was confirmed by research conducted by Gesch and Gomes who reported a link between nutrition and the formation of the central nervous system, especially in this case the limbic system that regulates emotional problems.[12,13]

Fibre adequacy was considered to be one of the risk factors for crime in children. Other studies assess that the adequacy of fibre is not directly related to the presence of neuropsychiatric deficits in children which causes a tendency for criminal behaviour, but is related to the value of a child's BMI in childhood. Subjects with low fibre consumption and higher sugar consumption tend to have higher BMI values up to the obese category.[14] Meta-analysis conducted in 2014 concluded that children with obesity have a tendency to become victims of abuse by their peers at school age, both speech and physical abuse.[15] Continuous harassment in obese children

can be a risk factor for the formation of antisocial personality.[14]

Based on the results of this study obtained vitamin B2 (p = 0.018, OR 2.98 CI95% 1.18-7.48), vitamin B6 (p = 0.001, OR 4.57 CI95% 1.89-11.1), and vitamin C (p <0.001, OR 8.12 CI95% 2.23-29.6) plays a role in making criminal behavior. This is consistent with previous research conducted in 2018 where several vitamins and micronutrients such as vitamins B1, B2, B6, and folic acid together play a role in the development of neurological organs since the womb. In addition, the four multivitamins are needed in the formation of neurotransmitters, especially serotonin, which are related to the regulation of emotions in children.[15] Previous studies assess that deficiency of one of the four micronutrients is associated with increased impulsivity, irritability, and aggressiveness.[15,16] Other studies in the Netherlands showed that micronutrient supplementation in the form of folic acid and vitamins for 1-3 months reduced the incidence of violence in adult prison inmates.[16]

CONCLUSIONS

Obstetric characteristics affecting criminal behaviour in children are parity, pregnancy control place, birth attendant, and birthplace. Maternal nutrition affecting criminal behaviour in children are fibre, folic acid, vitamin B, vitamin B2, vitamin B6, and vitamin C.

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