BREAKFAST HABIT AND ACADEMIC PERFORMANCE AMONG SUBURBAN ELEMENTARY SCHOOL CHILDREN

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ABSTRACT

Academic performance is affected by a numbers of factors. Age, gender, nutritional status, and breakfast habits are some factors that have relation with academic performance. Nutritional statues among school children still to be concerned. Breakfast habit is important thing to do before school to maintain enough calories to study and work well. The aim of this study was to determine the association of breakfast habits and academic performance especially in suburban elementary school children. An analytic cross sectional study conducted in children aged 6-12 years who studied at SD 1 Taro, Gianyar regency, Bali. There were 178 students participated in this study. We found 3 factors associated with academic performance i.e. breakfast, gender, and age with OR=2.56 (95% CI 1.16 to 5.66), P=0.02; OR=0.32 (95% CI 0.15 to 0.70), P=0.04; OR=6.52 (95% CI 2.73 to 15.53), P<0.0001, respectively. We conclude there was an association between breakfast habits and academic performance. **[MEDICINA 2013;44:3-7]**

Keywords*: academic performance, breakfast habits, school age children.*

KEBIASAAN SARAPAN PAGI DAN PERFORMA AKADEMIS PADA ANAK SEKOLAH DASAR DI DAERAH SUBURBAN

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ABSTRAK

Performa akademis dipengaruhi oleh beberapa faktor. Umur, jenis kelamin, status nutrisi dan sarapan pagi adalah beberapa faktor yang mempunyai hubungan dengan performa akademis. Status nutrisi di antara anak sekolah masih menjadi perhatian. Sarapan adalah suatu hal penting yang dilakukan sebelum berangkat sekolah untuk menjamin kecukupan kalori selama belajar dan bekerja dengan baik. Penelitian ini bertujuan untuk mengetahui hubungan antara kebiasaan sarapan pagi dengan performa akademis. Penelitian ini merupakan suatu penelitian potong lintang yang dilakukan pada anak sekolah berumur 6-12 tahun yang bersekolah di SD 1 Taro, Gianyar sebanyak 178 murid. Kami dapatkan 3 faktor yang berhubungan dengan performa akademis yaitu kebiasaan sarapan, jenis kelamin, dan umur dengan RO=2,56 (IK 95% 1,16 sampai 5,66), P=0,02; RO=0,32 (IK 95% 0,15 sampai 0,70), P=0,04; RO=6,52 (IK 95% 2,73 sampai 15,53), P<0,0001,berturut-turut. Disimpulkan terdapat hubungan antara kebiasaan sarapan pagi dengan nilai akademis. **[MEDICINA 2013;44:3-7]**

Kata kunci *: nilai akademis, kebiasaan sarapan pagi, anak usia sekolah.*

INTRODUCTION

There are numbers factors that associate with academic performance. Age, gender, nutritional status, and breakfast habits are some factors that have relation with academic performance. Nutritional status among school children still to be concerned. As we know, the need of balance nutrition is important to develop their potency maximally. Based on the basic health research 2010, less consume of the energy and protein especially happen in school age (6-12 years old).

One specific lifestyle habit that has been studied is breakfast consumption. Some studies showed there were relationship between breakfast and academic performance.[1-4] Breakfast before school will help students perform bet on the cognitive level. Research has been done on this topic because so many children could be helped if breakfast truly does have a positive effect on students' learning abilities and functioning in their classes or we called academic performance.[5,6] Based on survey on 1991 in US, the approximate children who skipped their breakfast on the day of the survey was 8% (1 to 7 years), 12% (8 to 10 years), 20% (11 to 14 years), and 30% (15 to 18 years). It was expected that the daily supply of nutrients with breakfast will produce a benefit in the long term on nutritional status and health, and thus have a positive impact on cognitive function and learning performance.[7,8]

This study aimed to obtain relationship between breakfast habits and academic performance, to analyze kind of breakfast, and relation between lesson subject value and breakfast habits.

METHODS

This analytic cross-sectional study was conducted in suburban elementary school SD 1 Taro, November 2010, and approved by ethic committee medical fac of Udayana University and "Kesbangpolinmas" Gianyar regency.

We used rule of thumb sample size, with type I error (α = 0.05), power (1-β) 90 %, and minimum sample size was 30 subject. A non-randomized sampling was obtained; with include all the students in SD 1 Taro, grade 1 until 6. We got 178 students in this study. Inclusion criteria were children who study at SD 1 Taro grade 1-6. The exclusion criteria were children who never done final examination, so they didn't get final value.

Anthropometric data including body weight and length were obtained from all subjects using standard anthropometric procedures. Nutritional status was determined by calculating Z-score values (cut-off point -2 SD), weight for age (underweight), height for age (stunting) and weight for height (wasting), using WHO growth standard. We gave questions about their breakfast habits, yes or no. If the answer"yes", the question will be continued with recall of breakfast kind. We also recorded the value of their final examination on last semester. Academic performance was described as mean of final value examination of all fields on last semester, and we divided into 2 cathagories lower mean, and upper mean. Mean value of final value examination was 71.1 points. We divided age into 2 cathagories, there were 6- 9 years old, and over 9 years old.

The relationship between breakfast habits as independent variables with academic performance as a dependent variable was analyzed by *chi square test*. The effect size was measured by OR and 95% confident interval. *Fisher exact test* was used for variables with expected count less than 5. Multivariate logistic regression was done to obtain the relation between variables. We also did sub-analysis of the kind of breakfast which we divided into 2, there were complete and incomplete, with *chi square test*. Complete breakfast contain rice, meat or egg, vegetables, and milk. Incomplete breakfast contain out of mentioned above, for example cookies, tea, bread, etc. We also did sub-analysis for the value of each lesson, then we related with breakfast habits with *independent t test*. All data analyzed by SPSS version 16 (SPSS Inc., IL, Chicago, USA).

RESULTS

During the study period, 178 subjects met the inclusion and exclusion criteria. We found 51.7% had breakfast habits, 45.7% boys and 54.3% girls. Age divided into 2 groups, 6- 9

years (53.3%), and 10-12 years (46.6%). Most of the subjects had a normal nutritional status. Prevalence of wasting, underweight, and stunting were 6.7%, 3.9%, and 1.7%, respectively, as seen at **Table 1**. Mean value of academic performance was 71.1 (SD 5.7), with normal distribution of data.

Table 2 showed bivariate analyses of breakfast habits and academic performance. We found the student who had breakfast habits 2.22 times would have "upper" academic performance than the student who did not (P=0.022; 95% CI 1.11 to 4.45).

Table 3 showed there were 3 factors associated with academic performance after done multivariate analysis. The subjects who had breakfast habits, had OR 2.56 (*a*P=0.02; *a*95%CI1.16to5.66). Boys would have academic performance "upper" 0.32 times than girls (*a*P=0.04; *a*95% CI 0.15 to 0.70). Subjects with age 6-9 years old had academic performance "upper" 6.52 times than older age group (*a*P<0.0001; *a*95%CI 2.73 to 15.53).

In this study we also did sub-analysis of relation of kind of breakfast with academic performance, as seen at **Table 4.** Academic performance "upper" was 45.3% in subject who had complete contain of breakfast, and 15.4% in subject with incomplete breakfast. The interpretation was subject with complete kind of breakfast 4.5 times would have academic performance "upper" than

Table 1. Characteristics study subjects

Variables	Breakfast habits	
	Yes (N= 92)	No (N=86)
Age, n (%)		
6-9 years old	47 (51.1)	48 (55.8)
10-12 years old	45 (48.9)	38 (44.2)
Gender, n (%)		
Boys	42 (45.7)	53 (61.6)
Girls	50 (54.3)	33 (38.4)
Wasting, n (%)		
Yes	6 (6.5)	6 (7.0)
No	86 (93.3)	80 (93.0)
Underweight, n (%)		
Yes	5 (5.4)	2 (2.3)
No	87 (94.6)	84 (97.7)
Stunting, n (%)		
Yes	1 (1.1)	2 (2.3)
No	91 (98.9)	84 (97.7)

Table 2. Bivariate analyses of breakfast habits and academic performance

Variables	Academic performance				P	OR	95% CI
	Upper		Lower				
	n	%	n	%			
Breakfast habits							
Yes	61	46.6	31	66.0	0.022	2.22	1.11 to 4.45
No	70	53.4	16	34.0			

Table 3. Multivariate analyses of variables

Variables	Academic performance		P	OR (95% CI)	Adjusted P	Adjusted OR (95%CI)
	Upper	Lower				
	n (%)	n (%)				
Breakfast habits						
Yes						
No	61(46.6)	31(66.0)	0.02	2.44 (1.12 to 5.32)	0.02	2.56 (1.16 to 5.66)
	70(53.4)	16(34.0)				
Gender*						
Boys	79(60.3)	16(34.0)	0.03	0.31 (0.14 to 0.68)	0.04	0.32 (0.15 to 0.70)
Girls	52(39.7)	31(66.0)				
Age						
6-9 y.o	57(43.5)	38(80.9)	<0.0001	5.01 (2.24 to 11.24)	< 0.0001	6.52 (2.73 to 15.53)
10-12 y.o	74(56.5)	9(19.1)				
Wasting*						
Yes	11 (8.4)	1 (2.1)	0.30	4.05 (0.37 to 30.56)	0.19	4.21 (0.53 to 33.59)
No	120(91.6)	46(97.9)				
Underweight*						
Yes	6 (4.6)	1 (2.1)	0.46	1.56 (0.05 to 4.10)	0.33	2.21 (0.26 to 18.84)
No	125(95.4)	46(97.9)				
Stunting						
Yes	3 (2.3)	0 (0)	0.57	1.34 (1.23 to1.46)	0.47	1.37 (1.25 to 1.50)
No	128(97.7)	47(100)				

** Fisher exact test*

them who had incomplete breakfast (P= 0.003; 95% CI 1.63 to 12.67)

In **Table 5**, we did comparison of the mean value of each lesson with breakfast habits using *independent t test* analysis. It showed that the mean value of each lesson were higher in group of having breakfast, except in Balinese language lesson.

DISCUSSION

Breakfast habit has been labeled the most important meal of the day. Evidence suggests that breakfast consumption may improve cognitive function, in this case academic performance.[8-10] This study found a significantly relationship between students who having breakfast before go to school and them who did not have breakfast. Breakfast served enough calories for children to be more alert and consent in learning and accept lesson. Breakfast consumption could impact cognitive performance by alleviating hunger. Breakfast may modulate the short term metabolic response to fasting conditions to maintain a supply of nutrient to the central nervous system, or through long-term-effects on nutrient intake and status that may positively affect cognition. The effects might be attributal to enhanced blood glucose concentrations, suggesting that other mechanisms, possibly changes in neurotransmit concentrations may play a role. Our finding of younger children had better academ performance than older children. It different with another study that said older children had better academ performance than younger one.[6-8] It might be higher the class, the lesson would be more difficult. There was not clearly explanation why girl had better academic performance than boys. It may be boys usually more active so sometime they don't have good concentration to accept the lessons.[8-10]

Nutritional status has relation with academic performance, where children with malnutrition will not be able to learn and to keep in memory of the lesson. They don't have enough calories to be consent. Usually it happened chronically.[3,5] In our study, we found no relationship between stunting, underweight, and wasting with academic performance. It may be caused by the data of the academic performance only take once, so it would not describe the effect of long-term malnutrition.

Limitation of this study was food recall only in one day, we did not measured of amounts and when the food eaten. Other indicators such as family income or familial socioeconomic, and parental education often predict academic achievement in children.[5] In this study we did not collect information about it, because the school did not have

Table 4. Association of breakfast contain with academic performance

Kind of breakfast	Academic performance		P	OR	95%CI
	Upper N (%)	Lower N (%)			
Complete	24 (45.3)	29 (54.7)	0.003	4.5	1.63 to 12.67
Incomplete	6 (15.4)	33 (84.6)			

Table 5. Compare mean between lesson subject value with breakfast habits

Subject lesson	Breakfast	Mean	SD mean	Mean diff	P	95% CI diff
Mathematics	Yes	70.85	8.50	4.92	< 0.0001	2.22 to 7.64
	No	65.93	9.79			
Indonesian language	Yes	73.22	6.87	5.43	< 0.0001	3.05 to 7.81
	No	67.79	9.12			
Natural science	Yes	74.13	6.97	3.7	0.002	1.45 to 5.99
	No	70.40	8.36			
Social science	Yes	72.46	7.32	4.17	< 0.0001	1.91 to 6.43
	No	68.29	7.93			
Civic education	Yes	72.30	7.44	4.67	< 0.0001	2.52 to 6.82
	No	67.62	7.07			
Balinese language	Yes	71.53	7.25	1.68	0.147	- 0.59 to 3.96
	No	69.84	8.16			
Physical education	Yes	71.92	3.17	1.22	0.02	0.19 to 2.25
	No	70.69	3.72			

any data about it. The design of the study was cross sectional so the relationship between dependent and independent variable were weak.

We suggest further studies with better design and evaluate the composition of the breakfast meal in general, longer recall, reason for breakfast skipping, and blood glucose level. Regarding academic performance, controlled trial using age appropriate cognitive test should be conducted, so that studies can be compared more readily. Intervention trials are needed to examine the long term benefits of breakfast consumption on academic performance, while accounting for socioeconomic variables.

CONCLUSION

There was association between breakfast habits and academic performance. Subject who had breakfast habits would have academic performance better than them who had not

REFERENCES

1. Gail CR, Pereira MA, Beverly LG, Adams J, Metzi JD. Breakfast habits, nutritional status, body weight, and academic performance in children and adolescent. JADA. 2005;02:743-55.
2. Cueto S. Breakfast and dietary balance: the enkid study. Public health nutrition. 2001;4:1429-31.
3. Abudayya A, Abed SY, Otessen H. Diet, nutritional status and school performance among adolescent in Gaza strip. EMHJ. 2011;3:219-25.
4. Taras H. Nutrition and student performance at school. Journal of school health. 2005;75:199-213.
5. Schmunk H. Lowerstanding the Relationship Between Nutritional Status, Obesity, and Academic Achievement [Thesis]. Sociology and Anthropology Honors Thesis; 2010.
6. Yousefi F, Mansor M, Juhari R, Redzuan M, Abu T. Relationship between gender, age, depression and academic achievement. Current research of psychology. 2010;6:61-6.
7. Brown JL, Beardslee WH, Prothrow D. Impact of school breakfast on children's health and learning. Massachusets: Sodexo foundation; 2008. h. 1-4.
8. Siega R, Popkin BM, Carson T. Trends in breakfast consumption for children in the united states from 1965-1991. Am J Clin Nutr.1998;67:748-56.
9. Bakhetia P, Jain R. Anthropometric profile and physical performance of rural school girls. Anthropologist. 2007;9:139-41.
10. Busch T. Gender difference in self efficacy and academic performance among students of business administration. Scandinavian journal of educational research. 1995;39:311-8.