

ORIGINAL ARTICLE

Demographic and Socio-economic Characteristics, Household Food Security Status and Academic Performance Among Primary School Children in North Kinta, Perak, Malaysia

Nor Syaza Sofiah Ahmad¹, Norhasmah Sulaiman^{1,2}

¹ Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 UPM, Serdang Selangor, Malaysia.

² Research Centre of Excellence, Nutrition and Non-Communicable Diseases (NNCD), Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400, Serdang, Selangor, Malaysia.

ABSTRACT

Introduction: Good academic performance is important for children to ensure their personal well-being. This cross-sectional study investigated the associations between demographic and socio-economic characteristics, household food security status and academic performance among primary school children at North Kinta, Perak, Malaysia. **Methods:** Two national primary schools were selected randomly and all Standard 5 and 6 students were invited to participate in this study. Self-administered questionnaire on demographic and socio-economic characteristics and food security status was completed by parents. The results from last year examination were acquired from the teacher to evaluate students' academic performance. **Results:** Overall, 140 respondents were involved, in which 51.4% were male. A majority of the household (80.7%) displayed food insecurity. Multiple logistic regression revealed that students from well-off households were more likely to have higher marks in English Language Comprehension (OR=8.28, 95%CI: 1.49, 45.91), Writing (OR=25.02, 95%CI: 2.36, 265.69) and Mathematics (OR=7.79, 95% CI: 1.44, 42.11). Female students showed high odds to pass English Language Comprehension (OR=3.47, 95% CI: 1.49, 8.16) and Writing (OR=4.16, 95%CI: 1.51, 11.45) compared to male students. **Conclusion:** This study unveiled that gender and low household income results in the low achievement in students' academic. Therefore, for the upcoming intervention programmes should focusing more on helping students from poor households in order to enhance students' academic performance.

Keywords: Academic performance, Primary school, Household income, Gender, Food security status

Corresponding Author:

Norhasmah Sulaiman, PhD
Email: norhasmah@upm.edu.my
Tel: +603-97692461

INTRODUCTION

Quality education is vital in building a strong foundation in one's life (1). Good academic performance leads to positive outcomes in education. At present, it is not enough to just sent children to school, it needs to be ensured that they have obtained all the basic knowledge and skills which are needed for their personal well-being (2). High academic achievement indicates that the student is on the honour roll. Thus, achieving better academic performance is very important for children in their development of the consciousness and personality as well as their well-being for the future of the nation (3). Moreover, it is extremely important for children to develop awareness on the important of good academic performance in order to ensure the well-being of nation's future (3).

Poor academic performance has significant effects on the society, both socially and economically (4) The consequences include difficulties in obtaining and understanding information, the likelihood of receiving a lower income due to being engaged in lower-quality jobs, possessing a lower self-esteem, suffering from poor health, and many more (5). It is also an important social determinant of health. The knowledge, personal as well as skills learning in the school can help in accessing and understanding information for better health (5).

There are many factors contribute to the academic performance of school children in school. For instance, demographic factors such as gender that influence the students' academic performance. On top of that, the gender of the students may be a factor in determining a student's performance. Ahmad, Jelas and Ali (6) had investigated students' achievement that was based on gender and type of schools. Findings of their study showed that females had a more adaptive approach to learning tasks compared to males. It indicated that there were differences in the cognitive-motivational

functioning of males and females in the academic environment (6). Hannover and Kessels (7) reported that males were less likely to enter higher educational tracks because they achieved worse grades than females (controlling for competence) (7). Moreover, a previous study had found that females enjoyed studying more as compared to males (8).

Having financial difficulty and a low household income have an effect on academic performance as well. There is a significant association between socio-economic and academic performance (9). Generally, these children have access to additional opportunities as such private tuitions from instructors who are highly qualified and who have advanced technical knowledge as well (9). Living in poor and slum areas were found to have contributed to the low academic achievement among students. Most low achievers were also from poor families (10).

Food insecurity is one of the aspects that lead to a student's low academic performance. Based on a longitudinal study that has been conducted in Columbia, poor food security is one of the factors that have been associated with the delay in reading performance and impaired social skills in later grades (11-12). Other studies have also found that food insecurity affects social and academic skills, and predicts poor performance during a child's first year in school, which negatively implicates the opportunity for future academic success (13). Food insecurity can have undesirable consequences on the academic performance in children (12). The prevalence of food insecurity has been rising rapidly around the globe, including in Malaysia. Several studies (14-15) that have been conducted in this country have proven that a high prevalence of food insecurity is still reported. A recent study (14) on household food security and nutritional status among schoolchildren in Kuantan, Pahang (located in Eastern part of Peninsular Malaysia) has reported that 77% of households suffer from food insecurity. Meanwhile, a study from Ihab et al. (15) on household food insecurity and nutritional outcomes in Bachok, Kelantan, has reported that 83.9% of households have fallen into food insecurity; 29.1% households and 19.3% of individuals have experienced food insecurity, along with 35.0% of child hunger.

In light of the limited studies that have been conducted in Malaysia, there is a need to investigate some factors that are affecting students to perform well academically. Therefore, this study aims to determine factors, which include demographic and socio-economic factors as well as household food security, that are related with academic performance among schoolchildren in North Kinta, Perak, Malaysia.

MATERIALS AND METHODS

Study population and design

This cross-sectional study was done at two primary school in the District of North Kinta in Perak state, Malaysia. Two out of 61 national primary schools in the North Kinta district were selected randomly. All students in Standard 5 and Standard 6 from the selected schools took part in this study. In order to be included in this study the respondents must be a Malaysian citizen who is in Standard 5 or Standard 6. Mothers or students who refused to participate in this study and students with special needs (e.g. mentally retarded) were excluded. An information sheet and a consent form were distributed to the mothers. The consent forms were collected from the mothers prior to the administration of the questionnaire.

Data collection was conducted between January until February 2017. The ethical approval was sought from the Ethics Committee for Research Involving Human Subjects of Universiti Putra Malaysia (Reference number: UPM/TNCPI/RMC/1.4.18.2 (JKEUPM)), prior to running the data collection. Permission to conduct the survey at the school was obtained from the Ministry of Education, the Department of Education in Kinta Utara, Perak, and from the headmaster of the school.

Instruments

A set of questionnaire consists of questions about demographic and socio-economic characteristics, household food security status and academic performance was used in this research. Demographic and socio-economic data were acquired from mother/guardian. The background data of the respondents including date of birth, gender, ethnicity and religion; data from parents, which were educational level, monthly household income and household size.

Meanwhile, the household food security status was determined by using Radimer/Cornell Hunger and Food Insecurity Instrument (16). This instrument consists of ten-items used to identify the severity level of food insecurity, which are household food security, household food insecurity, individual food insecurity, and child hunger. Negative answer to all items indicate that the respondent is food secure. Any positive answer to items number one until four indicates household food insecurity. Meanwhile for individual food insecurity: any positive answer to items number five until eight. Lastly, the severe level of food insecurity, at least one positive answer to any items from number nine to ten indicates child hunger. Negative answer is 'not true' while positive answer whether 'sometimes true' or 'often true'.

Academic performance of the respondents were requested and obtained from school administration. The last year final examination mark for the all six core subjects namely Malay Language (Comprehension & Writing), English Language (Comprehension & Writing), Mathematics and Science were acquired.

Statistical Analysis

IBM SPSS Statistics 22.0 (IBM Corp., Armonk, NY, USA) was used for data analysis. Univariate analysis results were presented as frequencies and percentages for categorical data and means and standard deviations for continuous data. Chi-square test and Fisher's exact test (for >25% cell counted less than 5) was used to test the associations between demographic and socio-economic characteristic with academic performance while Independent Sample t-test was used to compare food security status with academic performance. Multiple logistic regression (enter method) was used to determine the factors contributing towards academic performance. The variables with $p < 0.25$ in the chi-square test were all included in the analysis. The results were presented in odds ratio (OR) with 95% confidence interval (CI). The statistical significance level was set at $p < 0.05$.

RESULTS

Demographic and socio-economic background and food security status

A total of 140 of respondents consist of 51.4% boys and 48.6% girls participated in this study. Table I shows the demographic and socio-economic backgrounds of respondents. Majority of the respondents were Malay (91.4%). High percentage of fathers (84.8%) and mothers (84.6%) were found to have tertiary education level and the mean number for household size was 4.8 ± 2.1 , approximately five people per household. The mean total household income for the respondents was $RM2822.45 \pm 2945.80$.

Meanwhile, only 19.3% households were categorized as food secure, 26.4% households were experiencing household's food insecurity. Another 27.9% households were categorized as individual food insecure while 26.4% experienced child hunger. Child hunger is the severe level of food insecurity. For household food insecurity, individual food insecurity and child hunger, all these were categorized as food insecure (80.7%). In addition, the mean total marks for academic performance of respondents were highest in Malay Language (Comprehension) which was 58.7 marks meanwhile the lowest in mean total marks was in Mathematics that was 33.5 marks.

Socio-demographic characteristics and academic performance among respondents

Demographic and socio-economic characteristics were found to be associated with academic performance (Table II). Monthly household income was significantly

Table I: Distribution of demographic and socio-economic characteristics and food security status

	n(%)	Mean±SD
Age (years)		10.7±0.7
Gender		
Male	75(51.4)	
Female	68(48.6)	
Ethnicity		
Malay	128(91.4)	
Chinese	1(1.0)	
Indian	4(4.0)	
Others	7(5.7)	
Religion		
Muslim	132(91.3)	
Christian	6(4.3)	
Hindu	1(0.7)	
Others*	1(0.7)	
Father formal education		
No formal education	3(2.5)	
Primary education	1(2.5)	
Secondary education	14(11.9)	
Tertiary education	100(84.8)	
Mother formal education		
No formal education	0(0.0)	
Primary education	4(3.3)	
Secondary education	15(12.2)	
Tertiary education	104(84.5)	
Household monthly income (RM)**		
<RM3860	106(75.7)	2822.45 ±
RM3860-RM8318.99	22(15.7)	2945.80
≥RM8319	12(8.6)	
Household size		4.8±2.1
Food security status		
Food secure	27(19.3)	
Household food secure	37(26.4)	
Individual food secure	39(27.9)	
Child hunger	37(26.4)	
Subjects academic performance		
Malay Language (Comprehension)		58.7±18.2
Malay Language (Writing)		53.4±18.9
English Language (Comprehension)		37.5±20.9
English Language (Writing)		34.6±16.7
Mathematics		33.5±18.5
Science		49.9±14.7

*Indigenous people

** Based on thresholds of monthly household gross income by state (Perak), Malaysia, 2016 (17)

associated with English Language (Comprehension and Writing), as well as Mathematics ($p < 0.05$). Similar pattern were found in both subjects where the prevalence of failures was higher among respondents with income below RM3860 (84.1%), compared to failures among respondents with income of RM3860 and above. Meanwhile gender was found to be significantly associated with English Language (Writing) ($p < 0.05$). Male respondents showed more failures (59.3%) than those of female respondents (40.7%). Furthermore, female respondents had passed the subject (65.9%) more than male respondents (34.1%).

Food security status and academic performance among respondents

In this study, all food secure group shown better marks in all subjects compared to food insecurity group. In Table III, there was significant differences in English Language (Comprehension) and Mathematics score ($p < 0.05$) between food security (45.4 ± 23.9 and

Table II: Demographic and socio-economic characteristics and academic performance among respondents

Variables	Malay Language (Comprehension)				Malay Language (Writing)				English Language (Comprehension)			
	Fail n (%)	Pass n (%)	χ^2	p-value	Fail n (%)	Pass n (%)	χ^2	p-value	Fail n (%)	Pass n (%)	χ^2	p-value
Ethnicity				^a 0.253				^a 0.437			1.152	0.283
Malay	16 (84.2)	103 (92.8)			21 (95.5)	98 (90.7)			74 (93.7)	45 (88.2)		
Non-malay	3 (15.8)	8 (7.2)			1 (4.5)	10 (9.3)			5 (6.3)	6 (11.8)		
Religion				^a 0.219				^a 0.972				^a 0.551
Muslim	16 (88.9)	106 (96.4)			21 (95.5)	101 (95.3)			86 (96.2)	46 (93.9)		
Non-muslim	2 (11.1)	4 (3.6)			1 (4.5)	5 (4.7)			3 (3.8)	3 (6.1)		
Gender			2.009	0.159			2.429	0.119			3.754	0.053
Male	13 (68.4)	53 (47.7)			15 (68.2)	51 (47.2)			46 (58.2)	20 (39.2)		
Female	6 (31.6)	58 (52.3)			7 (31.8)	57 (52.8)			33 (41.8)	31 (60.8)		
Mother's education years				^a 0.795			1.698	0.193			0.583	0.445
< 12 years	2 (14.3)	7 (17.0)			5 (27.8)	14 (14.6)			9 (13.6)	10 (20.8)		
≥ 12 years	12 (85.7)	83 (83.0)			13 (72.2)	82 (85.4)			53 (86.4)	38 (79.2)		
Father's education years				^a 0.505				^a 0.200			2.450	0.115
< 12 years	1 (7.7)	13 (14.0)			4 (23.5)	10 (11.2)			5 (8.1)	9 (20.5)		
≥ 12 years	12 (92.3)	80 (86.0)			13 (76.5)	79 (88.8)			57 (91.9)	35 (79.5)		
Monthly household income			3.540	0.155			0.143	0.873			6.295	0.042*
<RM3860	12 (63.2)	90 (81.1)			18 (81.8)	84 (77.8)			66 (83.5)	36 (70.6)		
RM3860-RM8318.99	5 (26.3)	14 (12.6)			3 (13.6)	16 (14.8)			11 (13.9)	8 (15.8)		
≥RM8319	2 (10.5)	7 (6.3)			1 (4.5)	8 (7.4)			2 (2.5)	7 (13.7)		
Household size			2.432	0.119			0.234	0.629			0.071	0.789
≤5	10 (52.6)	75 (70.8)			14 (63.6)	71 (68.9)			51 (67.1)	34 (69.4)		
>5	9 (47.4)	31 (29.2)			8 (36.4)	32 (31.1)			25 (32.9)	15 (30.6)		
Food security status			0.103	0.748			0.270	0.603			0.435	0.501
Food secure	5 (26.3)	25 (22.9)			4 (19.0)	26 (24.3)			16 (20.8)	14 (27.5)		
Food insecure	14 (73.7)	84 (77.1)			17 (81.0)	81 (75.7)			61 (79.2)	37 (72.5)		

*Significant at p<0.05

Note: Chi-square test used unless otherwise noted. ^aFisher's exact test used

Table II (continue): Demographic and socio-economic characteristics and academic performance among respondents

Variables	English Language (Writing)				Mathematics				Sciences			
	Fail n (%)	Pass n (%)	χ^2	p-value	Fail n (%)	Pass n (%)	χ^2	p-value	Fail n (%)	Pass n (%)	χ^2	p-value
Ethnicity			2.170	0.141				^a 0.944			0.330	0.566
Malay	81 (94.2)	38 (86.4)			77 (91.7)	42 (91.3)			26 (89.9)	93 (93.0)		
Non-malay	5 (5.8)	6 (13.6)			7 (8.3)	4 (8.7)			3 (10.3)	7 (7.0)		
Religion				^a 0.090				^a 0.923				^a 0.133
Muslim	83 (97.6)	39 (90.7)			79 (95.2)	43 (95.6)			26 (89.7)	96 (97.0)		
Non-muslim	2 (2.4)	4 (9.3)			4 (4.8)	2 (4.4)			3 (10.3)	3 (3.0)		
Gender			6.428	0.011*			0.098	0.754			1.262	0.261
Male	51 (59.3)	15 (34.1)			44 (52.4)	22 (47.8)			18 (62.1)	48 (48.0)		
Female	35 (40.7)	29 (65.9)			40 (47.6)	24 (52.2)			11 (37.9)	52 (52.0)		
Mother's education years			1.122	0.289			0.185	0.667			0.309	0.527
< 12 years	10 (13.3)	9 (23.3)			13 (18.6)	6 (13.6)			3 (13.0)	16 (17.8)		
≥ 12 years	65 (86.7)	30 (76.9)			57 (81.4)	38 (86.4)			20 (87.0)	74 (82.2)		
Father's education years			3.656	0.056			0.312	0.576				^a 0.136
< 12 years	6 (8.6)	8 (22.2)			7 (10.9)	7 (16.7)			1 (4.5)	13 (15.5)		
≥ 12 years	64 (91.4)	28 (77.8)			57 (69.1)	35 (83.3)			21 (95.5)	71 (84.5)		
Monthly household income			9.220	0.010*			7.662	0.022*				^a 0.860
<RM3860	73 (84.9)	29 (65.9)			68 (81.0)	34 (73.9)			24 (82.8)	77 (77.0)		
RM3860-RM8318.99	11 (12.8)	8 (18.2)			14 (16.7)	5 (10.9)			3 (10.3)	16 (16.0)		
≥RM8319	2 (2.3)	7 (15.9)			2 (2.3)	7 (15.2)			2 (6.9)	7 (7.0)		
Household size			0.052	0.820			0.408	0.523			0.161	0.688
≤5	57 (68.7)	28 (66.7)			56 (70.0)	29 (64.4)			19 (65.5)	66 (69.5)		
>5	26 (31.3)	14 (33.3)			24 (30.0)	16 (35.6)			10 (34.5)	29 (30.5)		
Food security status			1.961	0.161			1.666	0.197			0.003	0.954
Food secure	16 (19.0)	14 (31.8)			16 (19.3)	14 (31.1)			6 (21.4)	24 (24.2)		
Food insecure	68 (81.0)	30 (68.2)			67 (80.7)	31 (68.9)			22 (78.6)	75 (75.8)		

*Significant at p<0.05

Note: Chi-square test used unless otherwise noted. ^aFisher's exact test used

Table III: Food security status and academic performance among respondents

	Mean±SD		t-value	p-value
	Food secure	Food insecure		
Academic performance				
Malay Language Comprehension	60.2±21.3	58.3±17.5	0.500	0.647
Malay Language Writing	56.5±21.2	52.6±18.4	0.925	0.356
English Language Comprehension	45.4±23.9	35.6±19.8	2.137	0.034*
English Language Writing	39.0±19.1	33.6±15.9	1.459	0.147
Mathematics	40.5±20.8	31.8±17.6	2.158	0.033*
Science	52.2±14.9	49.3±14.7	0.863	0.390

*Significant at p<0.05

Note: Normality test had been done prior to perform Independent Sample t-test analysis

40.5±20.8 respectively) group and food insecurity group (35.6±19.8 and 31.8±17.6 respectively).

Factors associated with academic performance among respondents

In Table IV, multiple logistic regression revealed that female students were more likely to pass English Language Comprehension (OR = 3.47, 95% CI: 1.49, 8.16) and Writing (OR = 4.16, 95% CI: 1.51, 11.45) compared to male students. Meanwhile, respondents from high income households were more likely to pass the English Language tests (Comprehension and Writing) compared to those in the poor family group (OR = 8.28, 95% CI: 1.49, 45.91; OR = 25.02, 95% CI: 2.36, 265.69). Additionally, monthly household income also showed significant association with Mathematics (p<0.05). Students from households with income more than RM8319 were 7.79 times more likely to pass Mathematics compared to students from households with income below RM3860 (OR = 7.79, 95% CI: 1.44, 42.11).

DISCUSSION

This current study has provided a degree of understanding on food insecurity among Malaysian households. In this study, the prevalence of food insecurity was 80.7% and this result is consistent with the previous study that has been conducted in Kuantan, Pahang, which has been reported by Roselawati et al. (14) which was 77.0%. The high standard of living and pricey food in the urban market area might contribute to the risk of a higher prevalence of food insecurity among households of low income (14). They can have access to the food but cannot afford to buy due to a low or irregular income (18). Consequently, they just eat the food that they can afford, or might decrease their food intake, and worst of all they might be starving (18).

Correspondingly, the present study shows that the highest mean total marks in students' academic performance is in the Malay Language and the lowest is in Mathematics. A constant result was found in a previous research by Anuar Zaini et al. (19), which reported that students attained the topmost mean total

Table IV: Factors associated with academic performance among respondents

Factors	B	OR [95%CI]	Sig
Malay Language (Comprehension)			
Religion			
Muslim		1.00(ref)	
Non-muslim	-1.70	0.18 [0.03-1.34]	0.095
Gender			
Male		1.00(ref)	
Female	1.13	3.21 [0.95-10.81]	0.060
Monthly household income			
<RM3860		1.00(ref)	
RM3860-RM8318.99	-1.09	0.33 [0.09-1.18]	0.090
≥RM8319	-1.17	0.31 [0.05-1.90]	0.206
Malay Language (Writing)			
Gender			
Male		1.00(ref)	
Female	1.10	2.00 [0.61-6.53]	0.247
Mother's education years			
< 12 years		1.00(ref)	
≥ 12 years	0.46	1.60 [0.20-12.36]	0.658
Father's education years			
< 12 years		1.00(ref)	
≥ 12 years	0.46	1.60 [0.20-12.36]	0.658
English Language (Comprehension)			
Gender			
Male		1.00(ref)	
Female	1.25	3.47 [1.47-8.16]	0.004*
Father's education years			
< 12 years		1.00(ref)	
≥ 12 years	-1.18	0.31 [0.09-1.06]	0.061
Monthly household income			
<RM3860		1.00(ref)	
RM3860-RM8318.99	0.25	1.28 [0.43-3.80]	0.652
≥RM8319	2.11	8.28 [1.49-45.91]	0.016*
English Language (Writing)			
Ethnicity			
Malay		1.00(ref)	
Non-malay	-0.20	0.82 [0.07-9.33]	0.874
Religion			
Muslim		1.00(ref)	
Non-muslim	0.69	2.00 [0.11-35.81]	0.638
Gender			
Male		1.00(ref)	
Female	1.34	4.16 [1.51-11.45]	0.006*
Father's education years			
< 12 years		1.00(ref)	
≥ 12 years	-1.27	0.28 [0.04-1.96]	0.201
Monthly household income			
<RM3860		1.00(ref)	
RM3860-RM8318.99	0.77	2.17 [0.622-7.56]	0.224
≥RM8319	3.22	25.02 [2.36-265.69]	0.008*
Food security status			
Food secure		1.00(ref)	
Food insecure	-1.18	0.31 [0.09-1.01]	0.052
Mathematics			
Monthly household income			
<RM3860		1.00(ref)	
RM3860-RM8318.99	-0.35	0.71 [0.23-2.19]	0.549
≥RM8319	2.05	7.79 [1.44-42.11]	0.017*
Food security status			
Food secure		1.00(ref)	
Food insecure	-0.44	0.65 [0.26-1.58]	0.328
Sciences			
Religion			
Muslim		1.00(ref)	
Non-muslim	-0.64	0.53 [0.04-6.30]	0.615
Father's education years			
< 12 years		1.00(ref)	
≥ 12 years	-0.41	0.66 [0.25-1.78]	0.430

*Significant at p<0.05

marks for the Malay Language and the lowermost mean total marks for the English Language. Since the majority of the respondents are Malay, they are more comfortable (and proficient) in using the Malay Language for daily conversations. A previous study found that students improved their classroom involvement and interactions when the teacher conducted the learning session using mother tongue language, therefore, improve the students' achievement (20-21).

The present study also shows that the group with food insecurity has lower mean scores for every subject, significantly for English Language Comprehension and Mathematics compared to a food secure group. The finding of the current study is consistent with past studies (12, 23-24). Food insecurity is often associated with low performance in Mathematics and poor reading skills (12, 23-24). The children's early life is a critical period when proper nutrition is essential for the growth of a healthy brain (25). Moreover, research has proposed that lacks in specific nutrients (e.g. folic acid) during children's early years can indeed impair cognitive functions. Nutrition makes a major contribution to maximise the brain functions (25). Therefore, children who are experiencing food insecurity have greater possibility of cognitive disability and are weaker in academic performance, since their brains have been deprived of adequate energy and nutrients to function properly (25-26). Apart from that, food insecurity adversely affects academic performance (27). Previous studies (28) have found that respondents who are food insecure have poor eating patterns, which results in low dietary quality. Consequently, the body experiences inadequate energy that is needed during lessons (27-28). This will cause the body to experience fatigue, a decreased concentration in class which may lead to the failure of performing well in academics (27-28). On the other hand, another important factor of food insecurity that needs to be considered is financial hardship. Even though the current study had not explored the relationship between household income and food insecurity, many prior studies had revealed a conclusive correlation between financial hardship and food insecurity (27-28).

On another note, the current study has found that gender was significantly associated with the English Language (Comprehension and Writing). This finding is comparable to a study by Hassan et al. (29), where female students scored more than male students. The study explained that female students have regular attendance in class sessions, pay more attention in class through asking questions, and are tactfully knowledgeable in dealing with examination questions when compared to male students (29). Besides that, a research that has been conducted by Khaleel (8) has found that female students enjoy their academic pursuits more than the male students- who consider grades as an element of lesser importance for a future career as compared to female students (8). Female students are also more studious

compared to male students (8, 29). Previous studies also found that prevalence of male students further their study were low compared to female students because of poor performance in academic (6-8).

Nonetheless, the present study is consistent with previous studies (9, 10), which have revealed that a high monthly household income correlates with better marks in academic performance. Families with better monthly income can usually afford better educational supports for their children. Parents with more income have extra financial allocation for their children's education and are willing to pay for extra classes after school to enhance their children's understanding and knowledge, which can increase the likelihood of better academic performance (9, 10).

On another aspect, high-income parents will provide nutritious, healthy, and well-balanced food for their children, as these are important for learning. Good nutrition is highly essential for the brain's development, as well as for the general physical well-being of children; socioeconomic status is a significant determinant of health and nutrition (30). In contrast, living in poverty, in slums or under-developed areas will likely contribute to low academic performance among students (10). Low-income is associated with low expenditure for food. In other words, low-income groups consume more energy-dense food (i.e. carbohydrates) to stay full and consume less nutritious food, especially fruits and vegetables (i.e. vitamins and minerals) (30). Most low achievers are also from poor families (10).

In the present study, a few limitations need to be considered. Firstly, this study's causal relationship between gender, household income and academic performance could not be determined due to the cross-sectional study design that has been used in this study. On top of that, this study used a self-administered questionnaire where the respondents might have differences in understanding and interpretation of the questions, as well as representing a possible source for recall bias. Lastly, the sample size was not large enough to represent the national primary school children in North Kinta, Perak, since only two schools out of the 61 national primary schools had been selected. Therefore, the findings obtained in this study might not be generalized or representative to the whole population.

CONCLUSION

This study provides solid evidence to date, that gender and low household income are the main contributors for poor academic performance in students, as have been observed from the scores that are attained in language and mathematic subjects. The inability to provide better education for further understanding as well as inadequate nutritious food, which supplies basic energy for the brain to function optimally, has been the compromising

reasons for decreasing academic performance. For the purpose of increasing the academic performance among children, an intervention programme is recommended to focus on poor household children by providing free workshop or seminar at school on technique to score in academic performance. Furthermore, financial interventions from the government also can help students from poor household, since these students are the future leaders of the country.

ACKNOWLEDGEMENT

We thank the headmasters, the teachers, the parents and all the respondents.

REFERENCES

1. Asmare B, Taddele M, Berihun S, Wagnew F. Nutritional status and correlation with academic performance among primary school children, northwest Ethiopia. *BMC Res Notes*. 2018; 11: 805.
2. Aregaw E. Multilevel analysis of factors affecting academic achievement of primary school students, Ethiopia, Gondar. *Imperial J Interdiscip Res*. 2016; 2(2): 1362–2454.
3. Bharwaj A. Importance of education in human life: A holistic approach. *Int J Sci Conscious*. 2016; 2(2): 23–28.
4. Al-Zhoubi S. Low academic achievement: Causes and results. *Theory Pract Lang Stud*. 2015; 5(11): 2262–268.
5. United Nations Children's Fund (UNICEF). Education. UNICEF for every children. 2019. Available from <https://www.unicef.org/education>.
6. Ahmad NR, Jelas Z, Mohd Ali M. Understanding students performance based on gender and types of schooling using SEM. *Procedia- Soc Behav Sci*. 2010; 7: 425–429.
7. Hannover B, Kessels U. Are boys left behind at school? Reviewing and explaining education-related gender disparities. *Zeitschrift Fur Padagogische Psychol*. 2010; 25(2): 89–103.
8. Khaleel M. Female students are more likely to get higher grades than male students. *Int J Sci Res Pub*. 2017; 7(3), 378–386.
9. Imran M and Afshari M, Ghavifekr S, Razak, AZA. Demography factors and students' academic performance in secondary schools. *Malays Online J Educ Manag*. 2013; 1(2): 1–9.
10. Farooq MS, Chaundhry AH, Berhanu G. Factors affecting students' quality of academic performance: A case of secondary school level. *J Qual Technol Manag*. 2011; VII(II): 1–14.
11. Howard LL. Does food insecurity at home affect non-cognitive performance at school? A longitudinal analysis of elementary student classroom behaviour. *Econ Educ Rev*. 2010; 30(1): 157–176.
12. Jyoti DF, Frongillo EA, Jones SJ. Food insecurity affects school children's academic performance, weight gain, and social skills. *J Nutr*. 2010; 135: 2831–2839.
13. Hickson M, Ettinger de Cuba S, Weiss I, Donofrio G, Cook J. Too Hungry to Learn: Food Insecurity and School Readiness. 2010; 1–4.
14. Roselawati MY, Wan Azdie MAB, Aflah A, Jamalludin AR, Shariff ZM. Food security status and childhood obesity in Kuantan, Pahang. *Int J Allied Health Sci*. 2017; 1(2): 56–71.
15. Ihab AN, Jalil R, Wan Muda WM, Wan Nik WS, Shariff ZM, Abdullah MR. Association between household food insecurity and nutritional outcomes among children in Northeastern of Peninsular Malaysia. *Nutr Res Pract*. 2014; 8(3): 304–311.
16. Radimer KL, Olson CM, Campbell CC. Development of indicators to assess hunger. *J Nutr*. 1990; 120: 1544–1548
17. Department of Statistic Malaysia. Household Income and Basic Amenities Survey 2016 by Department of Statistic Malaysia. 2016.
18. Mohamadpour M, Sharif ZM, Keysami MA. Food insecurity, health and nutritional status among sample of palm-plantation household in Malaysia. *J Health Popul Nutr*. 2012; 31(3): 291–302
19. Anuar Zaini MZ, Lim CT, Lim WY, Low F, Harun. Factors affecting nutritional status of Malaysian primary school children. *Asia Pac J Pub Health*. 2005; 17(2); 81–87.
20. Bachore MM. Learners' success in mother tongue based classroom instruction and the attitudes and perception of school communities. *Int J Sociol Educ*. 2014; 3(2): 118–135.
21. Smits J, Huisman J, Kruiff K. Home language and education in the developing countries. UNESCO. 2018.
22. Thomson S. Achievement at school and socioeconomic background-an educational perspective. *NPJ Sci Learn*. 2018; 3: 5.
23. Kim L. The Relationship between Food insecurity and academic achievement in the United States. DigitalGeorgetown. Georgetown University. 2017.
24. Faught EL, Williams PL, Willows ND, Asbridge M, Veugelers PJ. The association between food insecurity and academic achievement in Canadian school-aged children. *Pub Health Nutr*. 2017; 20(15): 2778–2785.
25. Nyaradi A, Li J, Hickling S, Foster J, Oddy WH. The role of nutrition in children's neurocognitive development, from pregnancy through childhood. *Front Hum Neurosci*. 2013; 7: 97.
26. Woodhouse A. The relationship of food and academic performance: A preliminary examination of the factors of nutritional neuroscience, malnutrition, and diet adequacy. *Christian Perspect Educ*. 2012; 5(1).
27. Silva MR, Kleinert WL, Sheppard AV, Cantrell KA, Freeman-Coppadge DJ, Tsoy E, et al. The

- relationship between food security, housing stability, and school performance among college students in an urban university. *J Coll Stud Ret.* 2015; 0(0): 1–16.
28. Bruening M, Brenhoffer S, van Woerden, I, Todd M, Laska, M. Factors related to the high rates of food insecurity among diverse, urban college freshmen. *J Acad Nutr Diet.* 2016; 16(9), 1450–1457.
29. Hassan N, Hassan T. Female students get more marks as compared to male students: A statistical study. *J Bus Financ Aff.* 2016; 5: 226.
30. Shariff ZM, Lin KG, Sariman S, Lee HS, Siew CY, Nisak B, Yusof M. The relationship between household income and dietary intakes of 1-10 year old urban Malaysian. *Nutr Res Pract.* 2015; 9(3), 278–287.