

## Parental Involvement, Health Behaviors and Mental Health among School-going Adolescents in Six Asian Countries

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### ABSTRACT

**T**he aim of this investigation was to assess the association between parental involvement, health behaviors, and mental health among adolescents in six Asian countries (Iraq, Kuwait, Malaysia, Mongolia, Philippines, and Vietnam). Using data from the cross-sectional 'Global School-Based Student Health Survey (GSHS)', 44,231 adolescents (mean age 15.1 years, SD=1.5) were assessed with a self-administered structured questionnaire. In multivariable regression, higher levels of parental involvement were positively associated with fruit and vegetable consumption and physical activity in half of the study countries, and negatively associated with bullying victimization, having been in a physical fight, loneliness, anxiety, and suicidal ideation in most countries. Parental involvement and/or support may be effective in increasing the number of positive health behaviors, including fruit and vegetable consumption, physical activity, no violent behaviors, school attendance, and mental health in this adolescent population.

**Keywords:** Parental involvement, Health risk behavior, Mental health, Adolescents, Asia

## INTRODUCTION

“Previous research has provided considerable support for the idea that increased parental support and control are strong determinants of lower prevalence levels of adolescent risk behavior” (de Looze et al., 2012). According to Newman et al. (2008),

*There are many dimensions of the adolescent-parent relationship that might influence adolescent health and developmental outcomes, as well as the development of risky health behaviors. Specific parenting behaviors that have been found to influence adolescent health and risky health behaviors include type of discipline (consistent versus inconsistent), level of parental involvement, level of parental monitoring, type of communication, and parenting style.*

Most research on parental involvement has been conducted on individual risk behaviors in high-income countries, and there is a need to investigate a broad range of health risk behaviors, such as dietary behavior, physical activity, violence, truancy, and mental health, in developing countries, including Asia (Newman et al., 2008).

### Dietary behavior and physical activity

In a study among adolescents in the USA, “maternal, paternal, and peer support for healthy eating were positively associated with the vegetable and fruit pattern” (Cutler et al., 2011). Lack of parental involvement in a study among adolescents in California

associated with low fruit and vegetable consumption (Mistry et al., 2009), and adolescents who reported to have authoritative parents ate more fruit per day than those who described parents as neglectful (Pearson et al., 2010). Parental support was positively associated with physical activity among adolescents in California (Mistry et al., 2009), Estonia (Raudsepp, 2006), Pakistan (Ahmed et al., 2016), as well as in a systematic review (Yao and Rhodes, 2015). In a national representative survey among adolescents in the USA, “children’s perception of parental support and parent’s reports of direct support were strongly related to organized physical activity” (Heitzler et al., 2006).

### Violence and school truancy

In a study among adolescents in Turkey, poor paternal support monitoring was associated with both bullying victimization and perpetration (Erginoz et al., 2015). Among school-going adolescents, parental supervision protected children from physical fighting in the Philippines (Rudatsikira et al., 2008), from being bullied in China (Hazemba et al., 2008) and from school truancy in Swaziland and Zambia (Siziya et al., 2007; & Muula et al., 2012). In a meta review, parental monitoring was found to be protective against delinquency (Hoeve et al., 2009).

### Mental health

Parental regulation and monitoring has been associated with lower levels

of suicidal ideation and depression (Barber, 2002). Arat and Wong (2016) found that parental bonding protected adolescents from loneliness in four out of six African countries, and parental connectedness was negatively associated with anxiety, depression, and suicidal ideation in three countries. In several countries, parental supervision was positively associated with mental distress indicators (loneliness, anxiety, and suicidal ideation) (Arat & Wong, 2016). Among adolescents, parental involvement was associated with better mental health in India (Hasumi et al., 2012), with fewer symptoms of depression and suicidal thoughts in Thailand (Tammariello et al., 2012), and with fewer mental health issues in the Caribbean (Abdirahman et al., 2012). In a study in Malaysia, mother and father closeness was negatively associated with suicidal ideation among adolescents (Wu & Yaacob, 2017). In a meta review of intervention trials, enhanced parental involvement prevented internalizing problems, such as anxiety, in adolescents (Yap et al., 2016).

The aim of this investigation was to assess the association between parental involvement (support and monitoring) and health behaviors and mental health among adolescents in six Asian countries.

## METHODOLOGY

### Participants and procedures

This study was a secondary analysis of already existing data from the 'Global School-based Health Survey'

(GSHS) from six Asian countries (all those that had utilized the modules related to this study). Details about the GSHS and its data can be accessed. The GSHS used a 'two-stage (schools and classrooms) cluster sampling design to generate nationally representative samples of students in years 1 to 4 in secondary schools' (CDC, 2017). "Students completed a self-administered questionnaire under the supervision of trained survey administrators" (CDC, 2017). National Ethics Committees approved the study protocol, and 'informed consent was obtained from the students, parents and/or school officials (CDC, 2017).

### Measures

This study utilized the GSHS questionnaire's modules on diet, physical activity, violence, injury, mental health, and other health related behaviors, along with demographics (CDC, 2017). Adequate fruit consumption was defined as two or more servings a day and adequate vegetable consumption as three or more servings a day (CDC, 2013). Adequate physical activity was defined as 'at least 60 minutes of moderate to vigorous-intensity physical activity daily' (WHO, 2010). The study variables are described in Table 1.

Table 1. Variable description.

Variables	Question	Response options
Hunger	"During the past 30 days, how often did you go hungry because there was not enough food in your home?"	1 = never to 5 = always (coded 1-3=0 and 4-5=1)
Peer support	"During the past 30 days, how often were most of the students in your school kind and helpful?"	1 = never to 5 = always (coded 1-3=0 and 4-5=1)
<b>Parental involvement</b>		
Parental supervision	"During the past 30 days, how often did your parents or guardians check to see if your homework was done?"	1 = never to 5 = always (coded 1-3=0 and 4-5=1)
Parental monitoring	"During the past 30 days, how often did your parents or guardians go through your things without your approval?"	1 = never to 5 = always (coded 1-2=1 and 3-5=0)
Parental connectedness	"During the past 30 days, how often did your parents or guardians understand your problems and worries?"	1 = never to 5 = always (coded 1-3=0 and 4-5=1)
Parental bonding	"During the past 30 days, how often did your parents or guardians really know what you were doing with your free time?"	1 = never to 5 = always (coded 1-3=0 and 4-5=1)
<b>Dietary behavior and physical activity</b>		
Fruit consumption	"During the past 30 days, how many times per day did you usually eat fruit, such as a banana, apple, orange, guava, rambutan, or mango?"	1 = I did not eat fruit during the past 30 days to 7 = 5 times or more per day (coded 1-3=0 and 4-7=1)

Variables	Question	Response options
Vegetable consumption	"During the past 30 days, how many times per day did you usually eat vegetables, such as morning glory, cabbage, or spinach?"	1 = I did not eat vegetables during the past 30 days to 7 = 5 times or more per day (coded 1-4=0 and 5-7=1)
Physical activity	"During the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day?"	1 = 0 days to 8 = 7 days (coded 8=1 and 1-7=0)
<b>Violence and truancy</b>		
Bullied	"During the past 30 days, on how many days were you bullied?"	1 = 0 days to 7 = all 30 days (coded 1=0 and 2-7=1)
In a physical fight	"During the past 12 months, how many times were you in a physical fight?"	1 = 0 times to 8 = 12 or more times (coded 1=0 and 2-8=1)
School truancy	"During the past 30 days, on how many days did you miss classes or school without permission?"	1 = 0 days to 5 = 10 or more days (coded 1=0 and 2-5=1)
<b>Mental health indicators</b>		
Loneliness	"During the past 12 months, how often have you felt lonely?"	1 = never to 5 = always (coded 1-3=0 and 4-5=1)
Anxiety	"During the past 12 months, how often have you been so worried about something that you could not sleep at night?"	1 = never to 5 = always (coded 1-3=0 and 4-5=1)
Suicidal ideation	"During the past 12 months, did you ever seriously consider attempting suicide?"	1 = yes, 2 = no

### Data analysis

Descriptive statistics were used to describe the data, Chi-square statistics were used to test for differences in proportion, and one-way ANOVA was used to test for differences in means. The dichotomized responses of the four parental involvement items were added up to create a scale from 0 to 4, with 4 reflecting the highest level of parental involvement. Logistic regression was used for assessing the impact of parental involvement variables and nine different health behaviors for each country separately. The regression model was adjusted with variables that could influence parental involvement, i.e., age, gender, socioeconomic status or hunger, and peer support. Both the 95% confidence intervals and P-values were adjusted for the multi-stage, stratified, cluster sampling strategy of the study. All analyses were done with STATA software version 12.0 (Stata Corporation, College Station, TX, USA).

## RESULTS

### Sample characteristics

The sample included 44,231 school-going adolescents (mean age 15.1 years,  $SD=1.5$ ) from Iraq (response rate 88%), Kuwait (85%), Malaysia (89%), Mongolia (88%), Philippines (82%), and Vietnam (96%). The number

of students participating in the study in each country ranged from 2,072 in Kuwait to 25,507 in Malaysia.

While roughly a quarter to a third of students reported mostly or always receiving parental or guardian supervision, connectedness, or bonding, two thirds reported to be never or rarely monitored by their parents or guardians. Approximately four in ten students ate less than two servings of fruit per day. Only one in eight met the physical activity guidelines of at least 60 minutes per day, 7 days a week. Approximately a quarter to a third of all students conceded that they had been bullied in the past month, had been in a physical fight in the past 12 months, or had engaged in school truancy in the past month. In the past 12 months, one in eight students felt mostly or always lonely, one in ten had mostly or always experienced anxiety or worry, and one in six had seriously considered committing suicide (Table 2).

**Table 2.** Sample characteristics.

Characteristic		Iraq (2012)	Kuwait (2011)	Malaysia (2012)	Mongolia (2013)	Philippines (2011)	Vietnam (2013)	All
Sample	N	2,083	2,072	25,507	5,393	5,290	3,331	44,231
Age	M (SD)	14.4 (1.3)	14.3 (1.0)	14.9 (1.4)	14.7 (1.7)	14.5 (1.3)	15.8 (1.4)	15.1 (1.5)
Gender (Male)	%	57.3	52.3	50.2	48.3	49.5	46.9	49.2
Hunger	%	8.8	8.3	3.9	1.9	6.8	1.1	4.3
Peer support	%	48.3	59.1	44.3	24.8	30.1	50.1	42.0
<b>Parental involvement</b>								
Parental supervision	%	47.6	54.1	14.2	46.7	21.4	27.8	25.9
Parental connectedness	%	40.8	39.3	31.5	30.7	27.1	30.5	30.3
Parental bonding	%	44.9	37.8	43.1	48.8	30.8	37.3	36.6
Parental monitoring	%	86.9	70.3	74.0	77.6	62.5	63.2	66.6
<b>Health behavior</b>								
Fruits (2+)/day	%	41.7	35.6	44.0	17.2	38.3	42.4	40.7
Vegetables (3+)/day	%	23.7	19.3	29.8	23.9	25.9	18.3	22.9
Physical activity	%	14.7	15.4	14.1	25.2	9.3	13.9	12.6
Bullied	%	29.1	28.3	17.9	27.4	47.7	22.7	31.4
In physical fight	%	37.0	44.9	27.4	41.4	36.6	16.6	27.1
School truancy	%	29.2	57.9	30.9	24.6	33.8	19.4	26.9
Loneliness	%	16.6	18.7	8.1	11.9	14.9	11.5	12.7
Anxiety	%	13.1	20.2	5.4	5.7	11.4	NA	10.3
Suicidal ideation	%	17.6	19.9	7.9	23.0	17.0	16.9	16.0

Note: NA=not assessed.

### Bivariate analysis of parental involvement

More than one half of the students reported none to only one level of parental involvement; only 6% reported four levels of parental involvement. High parental involvement was associated with younger age, less experience of hunger and peer support, but did not differ in terms of gender.

Fruit consumption increased in all countries, except for Kuwait, as parental involvement increased. In contrast, vegetable consumption increased in three countries and did not increase in three countries as parental involvement increased. Physical activity increased in five countries, except for the Philippines, as parental involvement increased (Tables 3 and 4).

**Table 3.** Bivariate analysis with sociodemographic variables according to the level of parental involvement.

Demographic	Level of parental involvement					Statistic P-value
	0 %	1 %	2 %	3 %	4 %	
n (%)	3,824 (13.3)	17,497 (41.7)	11,665 (23.2)	7,431 (15.6)	2,864 (6.2)	
Age in years; M (SD)	15.2 (1.5)	15.1 (1.5)	15.0 (1.5)	14.8 (1.5)	14.7 (1.5)	<0.000
Gender (male)	48.4	49.2	48.5	49.4	48.7	0.089
Hunger	4.1	5.1	4.1	3.2	1.9	<0.001
Peer support	33.2	30.9	47.0	61.3	70.7	<0.001

**Table 4.** Bivariate analysis with diet and physical activity according to the level of parental involvement.

Health behavior	Level of parental involvement					Statistic P-value
	0 %	1 %	2 %	3 %	4 %	
<b>Fruits 2 or more/day</b>						
Iraq	44.3	37.1	38.9	44.6	50.5	0.002
Kuwait	28.4	35.2	35.7	33.3	42.7	0.256
Malaysia	43.4	41.1	43.8	48.7	60.3	<0.001
Mongolia	11.5	14.7	16.2	18.5	23.6	<0.001
Philippines	37.0	36.5	38.0	44.8	46.0	0.023
Vietnam	41.3	38.4	41.3	49.8	53.8	<0.001



Health behavior	Level of parental involvement					Statistic P-value
	0 %	1 %	2 %	3 %	4 %	
Vegetables 3 or more/day						
Iraq	27.5	23.7	22.2	22.0	24.7	0.693
Kuwait	19.2	17.2	19.1	17.9	25.0	0.339
Malaysia	28.9	26.7	30.0	35.1	43.2	<0.001
Mongolia	19.1	19.1	22.8	28.5	31.8	<0.001
Philippines	25.1	26.0	24.5	28.8	26.9	0.450
Vietnam	17.0	16.1	19.0	20.2	28.1	0.004
Physical activity						
Iraq	10.1	9.7	15.4	18.7	19.8	<0.001
Kuwait	14.3	10.0	17.9	16.1	20.3	0.038
Malaysia	14.1	11.4	14.6	18.8	24.5	<0.001
Mongolia	19.0	19.8	24.1	29.9	36.0	<0.001
Philippines	6.9	8.6	11.3	12.1	13.6	0.060
Vietnam	15.1	11.1	14.9	14.0	22.7	0.004

Violent or aggressive behavior (being bullied and having been in a physical fight) decreased in all six countries as parental involvement increased. Likewise, school truancy decreased in all countries, except for Kuwait, as parental involvement

increased. In all but one country, loneliness and anxiety decreased as parental involvement increased, and in all countries suicidal ideation decreased as parental involvement increased (Table 5).

**Table 5.** Bivariate analysis with violence, truancy, and mental health variables according to the level of parental involvement.

Health behavior	Level of parental involvement					Statistic P-value
	0 %	1 %	2 %	3 %	4 %	
<b>Bullied</b>						
Iraq	52.2	33.9	30.2	24.4	21.0	<0.001
Kuwait	45.7	30.3	30.7	25.0	15.1	<0.001
Malaysia	24.1	19.6	16.8	12.7	11.8	<0.001
Mongolia	39.2	29.7	27.0	26.4	18.6	<0.001
Philippines	54.2	49.3	45.0	40.4	47.5	<0.001
Vietnam	29.7	24.4	21.1	16.1	16.5	<0.001

Health behavior	Level of parental involvement					Statistic P-value
	0 %	1 %	2 %	3 %	4 %	
In physical fight						
Iraq	43.4	39.1	39.3	34.2	29.8	0.003
Kuwait	54.9	43.7	43.3	47.7	36.9	0.016
Malaysia	39.4	29.4	24.5	21.2	21.2	<0.001
Mongolia	45.9	41.8	43.7	40.2	35.6	0.011
Philippines	42.5	39.7	33.3	27.5	22.5	<0.001
Vietnam	22.0	17.3	14.5	14.6	8.4	<0.001
School truancy						
Iraq	35.6	37.7	28.7	24.3	17.2	<0.001
Kuwait	63.2	59.9	59.8	56.7	51.1	0.161
Malaysia	40.9	34.3	27.8	23.5	20.6	<0.001
Mongolia	37.3	28.2	25.1	20.1	15.2	<0.001
Philippines	38.4	34.4	32.7	29.8	19.5	0.003
Vietnam	25.7	21.0	19.5	14.5	6.7	<0.001
Loneliness						
Iraq	26.7	21.5	17.4	13.2	9.4	<0.001
Kuwait	31.7	26.0	16.6	13.5	7.0	<0.001
Malaysia	10.2	9.2	7.2	5.5	5.2	<0.001
Mongolia	23.5	13.7	11.1	9.8	6.8	<0.001
Philippines	15.7	16.2	13.6	12.2	10.9	0.137
Vietnam	18.6	12.3	10.4	6.5	4.4	<0.001
Anxiety						
Iraq	22.4	16.9	13.2	11.7	6.4	<0.001
Kuwait	29.7	24.3	20.0	17.5	10.6	<0.001
Malaysia	6.5	5.8	5.2	4.2	3.3	0.003
Mongolia	12.8	7.2	4.6	3.8	3.5	<0.001
Philippines	11.7	11.3	11.4	12.8	10.6	0.894
Vietnam	NA					
Suicidal ideation						
Iraq	37.4	21.6	17.4	15.3	8.5	<0.001
Kuwait	47.6	24.9	16.5	14.2	5.5	<0.001
Malaysia	13.4	9.5	6.0	5.0	3.1	<0.001
Mongolia	43.6	28.9	21.5	16.7	10.3	<0.001
Philippines	22.9	18.6	15.8	10.4	6.7	<0.001
Vietnam	30.8	19.4	12.2	7.6	7.2	<0.001

### Association between level of parental involvement and health behaviors

In multivariable regression analyses, adjusted for age, gender, socioeconomic status, and peer support, higher levels

of parental involvement were positively associated with fruit and vegetable consumption in Malaysia, Mongolia, and Vietnam, and with physical activity in Malaysia and Mongolia (Table 6).

**Table 6.** Multivariable logistic regression analyses of the level of parental involvement (presented as odds ratio with 95% confidence interval; reference category: no parental involvement) on dietary behavior and physical activity.

Country	Level of parental involvement <sup>1</sup>	Dietary behavior and physical activity		
		Fruit	Vegetables	Physical activity
Iraq	Level 1	0.76 (0.40, 1.43)	0.82 (0.48, 1.38)	0.96 (0.36, 2.61)
	Level 2	0.78 (0.44, 1.40)	0.79 (0.45, 1.37)	1.52 (0.57, 4.06)
	Level 3	0.97 (0.52, 1.80)	0.73 (0.44, 1.21)	1.76 (0.68, 4.57)
	Level 4	1.20 (0.69, 2.09)	0.85 (0.44, 1.65)	1.66 (0.61, 4.53)
Kuwait	Level 1	1.31 (0.64, 2.67)	0.82 (0.34, 1.98)	0.58 (0.25, 1.36)
	Level 2	1.34 (0.63, 2.85)	0.93 (0.37, 2.35)	1.17 (0.44, 3.09)
	Level 3	1.13 (0.52, 2.50)	0.80 (0.27, 2.35)	0.81 (0.35, 1.87)
	Level 4	1.60 (0.70, 3.64)	1.18 (0.39, 3.64)	1.10 (0.40, 3.00)
Malaysia	Level 1	0.92 (0.82, 1.03)	0.90 (0.78, 1.02)	0.80 (0.65, 0.99)*
	Level 2	1.00 (0.90, 1.11)	1.03 (0.90, 1.19)	1.00 (0.82, 1.23)
	Level 3	1.18 (1.03, 1.35)*	1.27 (1.10, 1.47)**	1.32 (1.09, 1.59)**
	Level 4	1.77 (1.41, 2.21)***	1.74 (1.47, 2.08)***	1.85 (1.45, 2.37)***
Mongolia	Level 1	1.29 (0.93, 1.78)	0.97 (0.73, 1.30)	1.03 (0.77, 1.37)
	Level 2	1.38 (0.91, 2.09)	1.14 (0.86, 1.53)	1.27 (0.94, 1.72)
	Level 3	1.56 (1.09, 2.25)*	1.42 (1.10, 1.85)**	1.66 (1.23, 2.24)***
	Level 4	2.01 (1.40, 2.91)***	1.56 (1.16, 2.08)**	2.15 (1.57, 2.95)***
Philippines	Level 1	0.99 (0.83, 1.19)	1.03 (0.79, 1.32)	1.28 (0.80, 2.05)
	Level 2	1.06 (0.85, 1.34)	0.93 (0.67, 1.27)	1.58 (1.12, 2.23)*
	Level 3	1.43 (1.12, 1.81)**	1.16 (0.85, 1.57)	1.46 (0.97, 2.21)
	Level 4	1.48 (0.96, 2.27)	1.04 (0.66, 1.65)	1.64 (0.63, 4.26)
Vietnam	Level 1	0.90 (0.71, 1.15)	0.93 (0.65, 1.33)	0.69 (0.47, 1.01)
	Level 2	0.99 (0.74, 1.33)	1.10 (0.75, 1.62)	0.93 (0.57, 1.54)
	Level 3	1.33 (0.99, 1.78)	1.10 (0.77, 1.57)	0.84 (0.58, 1.21)
	Level 4	1.58 (1.08, 2.33)*	1.69 (1.06, 2.70)*	1.55 (0.88, 2.75)

Note: <sup>1</sup>Adjusted for age, gender, socioeconomic status (experience of hunger), and peer support.  
\*\*\*P<0.001; \*\*P<0.01; \*P<0.05.

Further, higher levels of parental involvement were negatively associated with bullying victimization and having

been in a physical fight in all six countries, and with school truancy in five countries (Table 7).

**Table 7.** Multivariable logistic regression analyses of the level of parental involvement (presented as odds ratio with 95% confidence interval; reference category: no parental involvement) on violence and truancy.

Country	Level of parental involvement <sup>1</sup>	Violence and truancy		
		Bullying victimization	In physical fight	School truancy
Iraq	Level 1	0.50 (0.31, 0.81)**	0.90 (0.54, 1.50)	1.03 (0.53, 2.01)
	Level 2	0.48 (0.27, 0.85)*	0.98 (0.59, 1.65)	0.75 (0.39, 1.42)
	Level 3	0.37 (0.20, 0.67)**	0.74 (0.43, 1.28)	0.63 (0.33, 1.21)
	Level 4	0.30 (0.18, 0.50)***	0.58 (0.35, 0.97)*	0.43 (0.20, 0.90)*
Kuwait	Level 1	0.48 (0.30, 0.76)**	0.54 (0.36, 0.81)**	0.94 (0.57, 1.56)
	Level 2	0.53 (0.29, 0.98)*	0.57 (0.38, 0.85)**	0.89 (0.49, 1.61)
	Level 3	0.34 (0.17, 0.69)**	0.58 (0.36, 0.95)*	0.81 (0.47, 1.39)
	Level 4	0.18 (0.09, 0.39)***	0.36 (0.21, 0.62)***	0.61 (0.35, 1.07)
Malaysia	Level 1	0.81 (0.67, 0.99)*	0.67 (0.57, 0.78)***	0.75 (0.65, 0.85)***
	Level 2	0.71 (0.60, 0.85)***	0.54 (0.45, 0.64)***	0.58 (0.50, 0.66)***
	Level 3	0.54 (0.43, 0.67)***	0.46 (0.39, 0.55)***	0.49 (0.43, 0.56)***
	Level 4	0.47 (0.34, 0.65)***	0.46 (0.36, 0.60)***	0.46 (0.36, 0.57)***
Mongolia	Level 1	0.64 (0.48, 0.85)**	0.76 (0.63, 0.92)**	0.63 (0.50, 0.80)***
	Level 2	0.53 (0.39, 0.73)***	0.78 (0.61, 1.00)	0.54 (0.43, 0.69)***
	Level 3	0.50 (0.38, 0.67)***	0.70 (0.55, 0.89)**	0.45 (0.36, 0.57)***
	Level 4	0.33 (0.23, 0.47)***	0.57 (0.44, 0.76)***	0.35 (0.25, 0.48)***
Philippines	Level 1	0.83 (0.66, 1.04)	0.90 (0.73, 1.12)	0.78 (0.65, 0.94)**
	Level 2	0.73 (0.56, 0.96)*	0.72 (0.58, 0.90)**	0.79 (0.63, 0.98)*
	Level 3	0.61 (0.43, 0.86)**	0.57 (0.41, 0.79)***	0.77 (0.57, 1.04)
	Level 4	0.83 (0.54, 1.27)	0.44 (0.30, 0.66)***	0.44 (0.26, 0.77)**
Vietnam	Level 1	0.76 (0.59, 0.97)*	0.73 (0.56, 0.97)*	0.75 (0.58, 0.98)*
	Level 2	0.65 (0.48, 0.88)**	0.58 (0.43, 0.77)***	0.71 (0.53, 0.94)*
	Level 3	0.47 (0.34, 0.66)***	0.50 (0.36, 0.71)***	0.52 (0.39, 0.75)***
	Level 4	0.53 (0.32, 0.88)*	0.29 (0.17, 0.49)***	0.23 (0.12, 0.46)***

Note: <sup>1</sup>Adjusted for age, gender, socioeconomic status (experience of hunger), and peer support.  
\*\*\*P<0.001; \*\*P<0.01; \*P<0.05.

Regarding mental health, higher levels of parental involvement were negatively associated with suicidal ideation in all six countries, loneliness in five countries, and anxiety in four countries (Table 8).

**Table 8.** Multivariable logistic regression analyses of the level of parental involvement (presented as odds ratio with 95% confidence interval; reference category: no parental involvement) on mental health indicators.

Country	Level of parental involvement <sup>1</sup>	Mental health		
		Loneliness	Anxiety	Suicidal ideation
Iraq	Level 1	0.66 (0.33, 1.31)	0.53 (0.25, 1.12)	0.39 (0.18, 0.82)*
	Level 2	0.52 (0.24, 1.11)	0.44 (0.20, 0.94)*	0.33 (0.15, 0.70)**
	Level 3	0.41 (0.20, 0.87)*	0.42 (0.19, 0.91)*	0.32 (0.15, 0.68)**
	Level 4	0.29 (0.12, 0.73)*	0.23 (0.11, 0.48)***	0.18 (0.08, 0.40)***
Kuwait	Level 1	0.83 (0.59, 1.14)	0.81 (0.55, 1.19)	0.37 (0.23, 0.59)***
	Level 2	0.47 (0.33, 0.68)***	0.64 (0.45, 0.92)*	0.23 (0.14, 0.38)***
	Level 3	0.42 (0.29, 0.60)***	0.59 (0.39, 0.91)*	0.20 (0.09, 0.41)***
	Level 4	0.21 (0.11, 0.42)***	0.35 (0.18, 0.66)**	0.06 (0.03, 0.14)***
Malaysia	Level 1	0.88 (0.68, 1.13)	0.88 (0.66, 1.16)	0.68 (0.56, 0.82)***
	Level 2	0.68 (0.54, 0.85)***	0.78 (0.55, 1.10)	0.43 (0.34, 0.55)***
	Level 3	0.50 (0.39, 0.65)***	0.64 (0.46, 0.86)**	0.37 (0.29, 0.47)***
	Level 4	0.51 (0.34, 0.75)***	0.53 (0.32, 0.88)*	0.23 (0.15, 0.36)***
Mongolia	Level 1	0.62 (0.40, 0.70)***	0.50 (0.34, 0.72)***	0.53 (0.41, 0.69)***
	Level 2	0.42 (0.31, 0.58)***	0.33 (0.20, 0.55)***	0.39 (0.30, 0.48)***
	Level 3	0.36 (0.27, 0.47)***	0.28 (0.18, 0.43)***	0.27 (0.21, 0.36)***
	Level 4	0.24 (0.16, 0.37)***	0.26 (0.16, 0.45)***	0.16 (0.12, 0.22)***
Philippines	Level 1	1.02 (0.77, 1.39)	0.95 (0.70, 1.29)	0.74 (0.59, 0.93)*
	Level 2	0.87 (0.64, 1.19)	0.95 (0.62, 1.47)	0.64 (0.49, 0.83)***
	Level 3	0.79 (0.51, 1.23)	0.99 (0.64, 1.52)	0.43 (0.29, 0.62)***
	Level 4	0.71 (0.46, 1.09)	0.79 (0.38, 1.65)	0.27 (0.13, 0.56)***
Vietnam	Level 1	0.60 (0.45, 0.81)***	NA	0.52 (0.40, 0.67)***
	Level 2	0.53 (0.38, 0.73)***		0.31 (0.20, 0.46)***
	Level 3	0.34 (0.23, 0.50)***		0.20 (0.13, 0.31)***
	Level 4	0.23 (0.12, 0.45)***		0.19 (0.10, 0.36)***

Note: NA=not assessed. <sup>1</sup>Adjusted for age, gender, socioeconomic status (experience of hunger), and peer support. \*\*\*P<0.001; \*\*P<0.01; \*P<0.05.

## DISCUSSION

This study of school-going adolescents in six Asian countries from different regions (Middle East, Central, and Southeast Asia) agreed with previous studies (Heitzler et al., 2006; Raudsepp, 2006; Mistry et al., 2009; Pearson et al., 2010; Cutler et al., 2011; Yao & Rhodes, 2015; and Ahmed et al., 2016) that higher levels of parental involvement were positively associated with fruit and vegetable consumption and physical activity in half of the study countries (Malaysia, Mongolia, and Vietnam). One possible reason for the mixed results of the relationship between parental involvement and dietary and physical activity behavior in Iraq, Kuwait, and Philippines may be that the extended family played a larger role in child care activities in these countries, and this was not measured in our study (Arat and Wong, 2016). In addition, parental involvement was the lowest among the six countries in the Philippines, which have may contributed to the non-significant results regarding dietary and physical activity behavior there. In a UNICEF report, among other countries, the Philippines also ranked poorly in child well-being in the Pacific region (Daly et al., 2015).

Consistent with previous studies (Siziya et al., 2007; Hazemba et al., 2008; Rudatsikira et al., 2008; Hoeve, 2009; Muula et al., 2012; and Erginoz, 2015), this study also found a negative association between parental involvement and violence (being bullied and in a physical fight) and truancy. An

intervention trial that utilized parental involvement reduced truant and other problem behaviors among adolescents (Stanton et al., 2004). Likewise, parental involvement and support can be utilized in interventions targeted to reduce aggressive and truancy behaviors in adolescents.

Regarding mental health, in almost all countries, increasing parental involvement prevented internalizing problems, including loneliness, anxiety, and suicidal ideation. These findings are consistent with a number of previous studies and reviews (Barber, 2002; Abdirahman et al., 2012; Hasumi et al., 2012; Tammariello et al., 2012; Yap et al., 2016; Arat & Wong, 2016; and Wu & Yaacob, 2017;).

Our study findings also showed that, generally, only one level of parental involvement had a protective effect in most countries on being bullied, in a physical fight, school truancy, and suicidal ideation, while three or four levels were needed for fruit and vegetable consumption and physical activity. The effect seems to become stronger with increasing levels of parental involvement, and could possibly be used by parents or guardians to improve on the prevalence of various health behaviors of their adolescent children. Parenting support, in the form of health-promoting interventions for parents and children and general support for parents, could be strengthened in the study countries (Daly et al., 2015), to eventually improve health promotion targets.

### Study limitations

Due to the cross-sectional study design, causal inferences cannot be made. The study included only adolescents who were attending school and those not attending or out of school were not included in the study, so generalizations cannot be made for the total adolescent population in each country. Further, the self-report of certain health behaviors, such as having been in a physical fight, should be interpreted with caution, because of poor memory recall and possibly underreporting. Moreover, several indicators were only measured with a single item, which has its limitations. Some of the variables assessed in the GSHS were not available for all the study countries. The study only assessed generic parental involvement, and did not assess parental involvement related to specific health behaviors, such as fruit and vegetable consumption or physical activity, which should be assessed in future studies.

### CONCLUSION

The study found that a considerable proportion of adolescents in six Asian countries engage in various health risk behaviors. Parental involvement and/or support may be effective in increasing the number of healthy behaviors, including fruit and vegetable consumption, physical activity, no violent behaviors, school attendance, and mental health in this adolescent population. The magnitude of the

possible influence of parental involvement on adolescent health behaviors, including mental health, necessitates more research, social policy, and implementation on parental or family-based interventions for adolescent health promotion in the Asian region.

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