

## **Multimedia Appendix 1**

### **Association Between Frequency of Muscle-Strengthening Exercise and Depression Symptoms Among Middle and High School Students: A Cross-Sectional Study in China**

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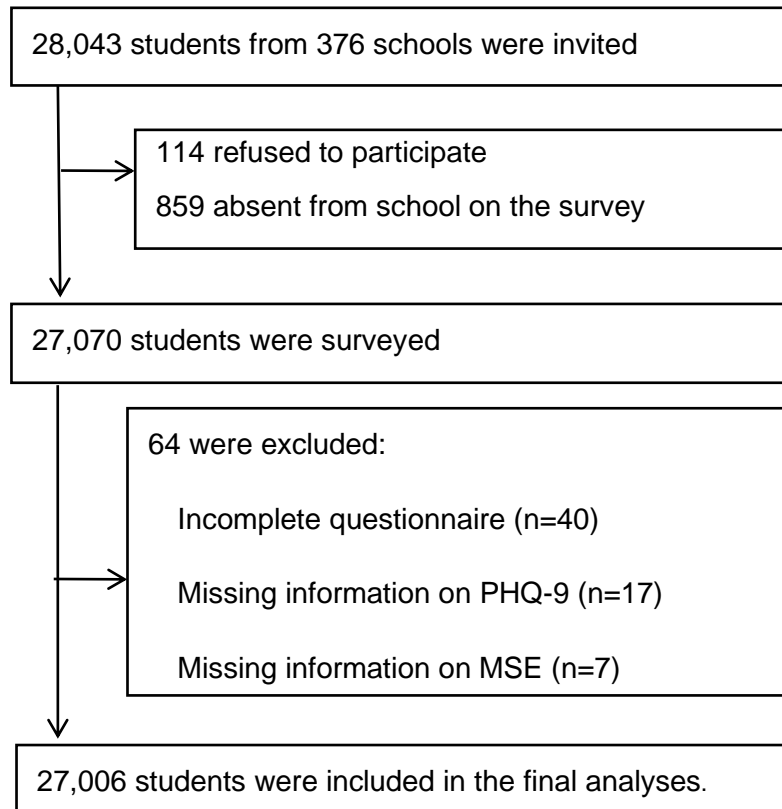
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**Figure S1. Study flow diagram**

**Table S1 Weighted prevalence of mild, moderate, moderately severe, and severe depression symptoms by different characteristics**

	Partici pants, n	Mild			Moderate			Moderately severe			Severe		
		Case, n	Prevalence (95%CI)	<i>P</i> value	Case , n	Prevalence (95%CI)	<i>P</i> value	Case , n	Prevalence (95%CI)	<i>P</i> value	Case, n	Prevalence (95%CI)	<i>P</i> value
Age range (years)				<.001			.01			.56			<.001
≤13	5594	1825	32.4 (30.4-34.4)		675	12.7 (11.4-14.0)		265	5.1 (4.5-5.7)		137	2.4 (1.9-2.8)	
14-15	8575	3264	37.5 (36.0-39.1)		1219	14.9 (13.9-15.9)		464	5.2 (4.6-5.9)		269	3.4 (2.9-4.0)	
≥16	12,837	5813	45.5 (44.2-46.7)		1852	14.8 (13.8-15.8)		678	5.5 (5.0-6.0)		323	2.4 (2.0-2.8)	
Gender				<.001			<.001			<.001			<.001
Boys	13,933	5312	37.8 (36.5-39.1)		1608	12.0 (11.3-12.7)		543	3.9 (3.5-4.3)		255	1.9 (1.5-2.2)	
Girls	13,073	5590	42.2 (40.9-43.5)		2138	17.0 (16.1-18.0)		864	6.9 (6.3-7.4)		474	3.7 (3.3-4.1)	
Area				0.61			.003			<.001			.006
Urban	10,788	4324	39.4 (37.6-41.3)		1421	13.2 (12.4-14.0)		482	4.4 (3.9-4.8)		249	2.3 (2.0-2.6)	
Rural	16,218	6578	40.1 (38.5-41.7)		2325	15.0 (14.1-15.9)		925	5.9 (5.4-6.3)		480	3.0 (2.6-3.4)	
Type of school				<.001			.02			.10			.09
Middle school	12,762	4474	34.9 (33.4-36.4)		1692	13.9 (13.0-14.8)		642	5.1 (4.6-5.6)		362	3.0 (2.6-3.4)	
Academic high school	7373	3555	48.0 (46.2-49.7)		1146	15.9 (14.5-17.4)		444	6.0 (5.3-6.7)		211	2.6 (2.1-3.1)	
Vocational high school	6871	2873	42.0 (40.4-43.6)		908	13.6 (12.2-14.9)		321	5.0 (4.1-5.8)		156	2.3 (1.7-2.8)	

**Table S2 Adjusted  $\beta$  coefficients for scores of depression symptoms associated with muscle-strengthening exercise among students**

	Adjusted $\beta^a$ (95%CI)	<i>P</i> value
Total		
Model 1 <sup>b</sup>	-0.10 (-0.12, -0.07)	<.001
Model 2 <sup>c</sup>	-0.05 (-0.08, -0.02)	<.001
Boys		
Model 1 <sup>b</sup>	-0.10 (-0.13, -0.07)	<.001
Model 2 <sup>c</sup>	-0.05 (-0.08, -0.02)	.002
Girls		
Model 1 <sup>b</sup>	-0.10 (-0.15, -0.06)	<.001
Model 2 <sup>c</sup>	-0.05 (-0.10, -0.01)	0.02

<sup>a</sup> $\beta$  coefficients (95%CI) represent changes in the scores of depression symptoms per day difference in muscle-strengthening exercise.

<sup>b</sup>Model 1: adjusted for age, gender, region, and type of school.

<sup>c</sup>Model 2: adjusted for age, gender, region, type of school, parental education level, parental marital status, family income, cigarette smoking, alcohol drinking, physical activity, academic performance, and physical fight.

**Table S3 Association of depression symptoms with frequency of muscle-strengthening exercise  
after further adjustment for being bullied**

	Frequency of muscle-strengthening exercise								P for trend
	None	1 day/wk <sup>d</sup>	2 days/wk	3 days/wk	4 days/wk	5 days/wk	6 days/wk	7 days/wk	
Total									
Participants, n	10,703	3474	3684	2758	1300	1599	640	2848	
Depression, n	2724	743	717	506	227	298	123	544	
APR <sup>a</sup> (95%CI <sup>b</sup> )	1(ref <sup>c</sup> )	0.98 (0.97-0.99)	0.96 (0.94-0.97)	0.93 (0.91-0.96)	0.91 (0.88-0.95)	0.89 (0.85-0.93)	0.87 (0.83-0.92)	0.85 (0.80-0.91)	<.001
Boys									
Participants, n	4143	1672	2051	1627	860	1019	431	2130	
Depression, n	862	285	329	236	118	162	77	337	
APR <sup>a</sup> (95%CI)	1(ref)	0.97 (0.96-0.98)	0.94 (0.92-0.97)	0.92 (0.88-0.95)	0.89 (0.85-0.94)	0.87 (0.81-0.92)	0.84 (0.78-0.91)	0.82 (0.75-0.90)	<.001
Girls									
Participants, n	6560	1802	1633	1131	440	580	209	718	
Depression, n	1862	458	388	270	109	136	46	207	
APR <sup>a</sup> (95%CI)	1(ref)	0.98 (0.97-0.99)	0.96 (0.94-0.99)	0.95 (0.91-0.99)	0.93 (0.89-0.98)	0.91 (0.86-0.97)	0.90 (0.83-0.97)	0.88 (0.81-0.96)	<.001

<sup>a</sup>APR: Adjusted prevalence ratio. Prevalence ratios were adjusted for age, gender, region, type of school, parental education level, parental marital status, family income, cigarette smoking, alcohol drinking, physical activity, academic performance, physical fight, and being bullied.

<sup>b</sup>CI: confidence interval.

<sup>c</sup>ref: reference.

<sup>d</sup>wk: week.