

Supplementary Table (1). Factors associated with vitamin D deficiency among adolescents in univariate analysis.

Characteristics	Total n=1150	Prevalence of vitamin D deficiency (%)	Prevalence Ratio [95%CI]	p
Gender				
Male	694	488 (70.32)	1 [Ref.]	<0.001
Female	722	662 (91.69)	1.30 [1.26- 1.33]	
Age (year)				
<12	527	409 (77.61)	1 [Ref.]	0.024
12-	439	369 (84.05)	1.07 [1.01- 1.12]	
≥13	450	372 (82.67)	1.06 [1.00- 1.10]	
Nationality				
Kuwaiti	1081	900 (83.26)	1 [Ref.]	<0.001
Non-Kuwait	335	250 (74.63)	0.90 [0.82-0.96]	
Governorate				
Capital	156	127 (81.41)	1 [Ref.]	0.003
Hawally	246	188 (76.42)	0.94 [0.82-1.03]	
Farawanya	236	183 (77.54)	0.95 [0.83-1.04]	
Jahra	239	214 (89.54)	1.10 [1.02-1.15]	
Mubarak al-Kabeer	148	124 (83.78)	1.03 [0.91-1.10]	
Ahmadi	371	296 (79.78)	0.98 [0.88-1.06]	
Father's Education				
Primary/Intermediate/no formal education	236	205 (86.86)	1 [Ref.]	<0.001
Secondary (high school)	344	297 (86.34)	0.99 [0.87-1.08]	
Diploma	261	220 (84.29)	0.95 [0.82-1.06]	
University & above	542	399 (73.62)	0.78 [0.65-0.90]	
Mother's Education				
Primary/Intermediate/no formal education	183	153 (83.61)	1 [Ref.]	<0.001
Secondary (high school)	304	263 (86.51)	1.04 [0.94-1.12]	
Diploma	304	259 (85.20)	1.02 [0.91-1.10]	
University & above	605	457 (75.54)	0.88 [0.76-0.99]	
Total number of brother/sisters				
Zero-two	298	223 (74.83)	1 [Ref.]	0.002
Three-four	538	434 (80.67)	1.05 [1.00-1.10]	
Five or more	553	469 (84.81)	1.10 [1.04-1.13]	
Passive smoking at household				
No	901	704 (78.14)	1 [Ref.]	<0.001
Yes	489	426 (87.12)	1.11 [1.06-1.15]	

Times per week consumed breakfast not prepared at home					
Zero	624	484 (77.56)	1	[Ref.]	0.019
One-two times	569	478 (84.01)	1.08	[1.02-1.12]	
Three-four	117	98 (83.76)	1.07	[0.97-1.14]	
Five or more	78	67 (85.90)	1.10	[1.00-1.17]	
Times per week consumed dinner not prepared at home					
Zero	157	114 (72.61)	1	[Ref.]	0.018
One-two times	878	719 (81.89)	1.09	[1.03-1.14]	
Three-four	257	211 (82.10)	1.09	[1.01-1.15]	
Five or more	86	75 (87.21)	1.14	[1.04-1.19]	
Consumption of sugary drinks per week					
None	171	123 (71.93)	1	[Ref.]	0.002
Once-Three times	772	633 (81.99)	1.09	[1.04-1.14]	
Four-Six	171	135 (78.95)	1.07	[0.98-1.13]	
Seven/more	299	256 (85.62)	1.12	[1.07-1.17]	
Currently taking supplements					
No	1,256	1,045 (83.20)	1	[Ref.]	<0.001
Yes	158	103 (65.19)	0.78	[0.68-0.88]	
Number of times walking to school per week					
None	1,158	982 (84.80)	1	[Ref.]	<0.001
1-8 times	155	99 (63.87)	0.74	[0.63-0.83]	
Every day	103	69 (66.99)	0.77	[0.65-0.89]	
Time walking to school					
None	1,158	982 (84.80)	1	[Ref.]	<0.001
≤5 minutes	80	50 (62.50)	0.71	[0.56-0.84]	
6- 10 minutes	76	53 (69.74)	0.80	[0.65-0.93]	
11-15	56	38 (67.86)	0.77	[0.60-0.92]	
16 minutes or more	45	26 (57.78)	0.65	[0.46-0.82]	
Time spent on physical activity per week					
Low (lower tertile)	469	396 (84.43)	1	[Ref.]	0.005
Medium (middle tertile)	473	391 (82.66)	0.97	[0.89-1.04]	
High (higher tertile)	474	363 (76.58)	0.89	[0.80-0.96]	
Body Mass Index Categories¹					
Normal weight	601	465 (77.37)	1	[Ref.]	0.001
Overweight	320	270 (84.38)	1.07	[1.02-1.11]	

Obese	471	400 (84.93)	1.08	[1.03-1.11]	
Under weight	24	15 (62.50)	0.84	[0.59-1.02]	
Time outside per day 10:00 am- 4:00 pm week days					
Less than 30 minutes	657	563 (85.69)	1	[Ref.]	<0.001
31 minutes to 1 hour	450	342 (76.00)	0.87	[0.80-0.94]	
More than 1 hour to 2 hours	222	178 (80.18)	0.93	[0.84-1.00]	
More than 2 hours	87	67 (77.01)	0.88	[0.74-0.99]	
Time outside per day 10:00 am- 4:00 pm week ends					
Less than 30 minutes	494	425 (86.03)	1	[Ref.]	0.003
31 minutes to 1 hour	312	257 (82.37)	0.94	[0.85-1.02]	
More than 1 hour to 2 hours	255	198 (77.65)	0.87	[0.76-0.96]	
More than 2 hours to 3 hours	185	142 (76.76)	0.85	[0.74-0.96]	
More than 3 hours	169	127 (75.15)	0.83	[0.71-0.94]	
Wearing sunscreen					
Never	1,100	874 (79.45)	1	[Ref.]	0.013
Rarely	77	65 (84.42)	1.06	[0.94-1.13]	
Sometimes	160	140 (87.50)	1.09	[1.02-1.14]	
Often/always	79	71 (89.87)	1.12	[1.02-1.18]	
Staying in shade or under an umbrella					
Never	493	396 (80.32)	1	[Ref.]	0.04
Rarely	97	70 (72.16)	0.90	[0.78-1.01]	
Sometimes	363	301 (82.92)	1.03	[0.96-1.08]	
Often	205	162 (79.02)	0.98	[0.90-1.05]	
Always	257	220 (85.60)	1.06	[0.99-1.11]	

%s are row percentages. ¹according to WHO growth charts.