Supplementary files

Table S1. Quality assessment of body composition.

Study	Question described	Appropriate study design	Appropriate subject selection	Characteristics described	Random allocation	Researchers blinded	Subjects blinded	Outcome measures well defined and robust to bias	Sample size appropriate	Analytic methods well described	Estimate of variance reported	Controlled for confounding	Results reported in detail	Conclusion supported by results?	Rating	Study quality
Maughan et al. [41]	2	1	2	2	n/a	n/a	n/a	2	2	2	2	1	2	2	90.9	strong
Meckel et al. [42]	2	0	1	1	n/a	n/a	n/a	1	1	1	2	0	2	2	59.1	moderate
Lotfi et al. [45]	2	0	1	1	n/a	n/a	n/a	1	2	1	2	0	2	2	63.6	moderate
Güvenç [48]	2	0	1	2	n/a	n/a	n/a	1	1	1	2	0	2	2	63.6	moderate
Aziz et al. [43]	2	1	1	2	n/a	n/a	n/a	1	1	1	2	0	2	2	68.2	moderate
Aziz et al. [44]	2	1	1	2	n/a	n/a	n/a	1	1	1	2	0	2	2	68.2	moderate
Aloui et al. [53]	2	0	1	1	n/a	n/a	n/a	1	1	1	2	0	2	2	59.1	moderate
Hammouda et al. [46]	2	0	1	2	n/a	n/a	n/a	1	1	1	2	0	2	2	63.6	moderate
Bouhlel et al. [49]	2	0	1	1	n/a	n/a	n/a	1	1	1	2	0	2	2	59.1	moderate
Hammouda et al. [47]	2	0	1	2	n/a	n/a	n/a	1	1	1	2	0	2	2	63.6	moderate
Bouhlel et al. [50]	2	0	1	2	n/a	n/a	n/a	1	1	1	2	0	2	2	63.6	moderate
Zarrouk et al. [51]	2	0	1	2	n/a	n/a	n/a	1	1	1	2	0	2	2	63.6	moderate
% of lost points	0	87.5	45.8	16.6	n/a	n/a	n/a	45.8	41.6	45.8	0	95.8	0	0		

n/a: not applicable.

Table S2. Quality assessment of dietary intake.

Study	Question described	Appropriate study design	Appropriate subject selection	Characteristics described	Random allocation	Researchers blinded	Subjects blinded	Outcome measures well defined and robust to bias	Sample size appropriate	Analytic methods well described	Estimate of variance reported	Controlled for confounding	Results reported in detail	Conclusion supported by results?	Rating	Study quality
Maughan et al. [41]	2	1	2	2	n/a	n/a	n/a	2	2	2	2	1	2	2	90.9	Strong
Meckel et al. [42]	2	0	1	1	n/a	n/a	n/a	2	1	1	2	1	1	1	59.09	Moderate
Güvenç. [48]	2	0	1	2	n/a	n/a	n/a	2	2	1	2	1	2	2	77.27	Strong
Aziz et al. [43]	2	1	1	2	n/a	n/a	n/a	1	1	2	2	1	2	2	77.27	Strong
Aloui et al. [53]	2	0	1	1	n/a	n/a	n/a	2	1	1	2	1	2	2	68.18	Moderate
Hammouda et al. [46]	2	0	1	2	n/a	n/a	n/a	0	1	1	1	1	2	2	59.09	Moderate
Bouhlel et al. [49]	2	0	1	1	n/a	n/a	n/a	0	1	1	2	1	2	2	59.09	Moderate
Hammouda et al. [47]	2	0	1	2	n/a	n/a	n/a	1	1	1	2	1	2	2	68.18	Moderate
Bouhlel et al. [50]	2	0	1	2	n/a	n/a	n/a	0	1	1	2	1	2	2	63.63	Moderate
Zarrouk et al. [52]	2	0	1	2	n/a	n/a	n/a	2	1	2	2	1	2	2	77.27	Strong
% of lost points	0	90	45	15	n/a	n/a	n/a	40	40	35	5	50	5	5	-	-

n/a: not applicable.

Table S3. Training characteristics of the included studies.

Studies	Activity	Level of practice	Time of day of training during Ramadan	Number of training sessions	Duration of training sessions (h)	Timing of measurement	Training program
						In the morning	Training program
Maughan et al. [41]	Soccer	First and third division	In the afternoon before breaking the fast	7	1	In the afternoon	maintained during compared to before Ramadan
Meckel et al. [42]	Soccer	Amateur	-	-	-	-	High intensities activities decreased during compared to before Ramadan
Lotfi et al. [45]	Soccer	Professional		3			
Lotti et al. [45]	Running	Professional	<u>-</u>	3	<u>-</u>	_	<u>-</u>
Güvenç [48]	Soccer	Amateur	After breaking the fast	3	2	In the afternoon	0
Aziz et al. [43]	Soccer or basketball	Amateur	Before breaking the fast	3	1	-	ed t
						08h00	ıpar
Aziz et al. [44]	Martial arts sport of pencaksilat	Amateur	In the late afternoon or evening	3-4	1-1.5	18h00	con
						21h00	ing
Hammouda et	Soccer	Professional	After breaking the fast	4	2	In the morning	dur
al. [46]	Soccer	1 Totessionai	After breaking the last			In the monthing	ed
Zarrouk et al. [51]	Karate	Amateur	After breaking the fast	5	2	In the afternoon	n maintained du before Ramadan
Bouhlel et al.							nain
[49]	Karate	Amateur	-	5	2	-	m n bef
Hammouda et	Karate	Amateur	_	5	2	_	gra
al. [47]	Karate	Amateur				<u>-</u>	brc
Bouhlel et al. [50]	Boxing	Amateur	-	5	1.5	In the afternoon	Training program maintained during compared to before Ramadan
Zarrouk et al. [52]	Karate	Amateur	After breaking the fast	5	2		Tra

4 **Table S4.**Effect of Ramadan fasting on body mass.

Studies	Sample size		Country	Year of experimental protocol	Fasting hours	Study design	Measured parameter	Effect
Maughan et al.	34 (a.m)	- 18.5	Tunisia	2006	14.5	Pre/post-control	Body mass (kg)	↔
[41]	25 (p.m)	10.5	Turnsia	2000	14.5	Tie/post-control	body mass (kg)	↔
Meckel et al. [42]	19	15.1	Israel	-	-	Pre/post	Body mass (kg)	↔
	10 (soccer)	15.8						\leftrightarrow
Lotfi et al. [45]	17 (runners)	16.8	Morocco	-	-	Pre/post	Body mass (kg)	† 2.85% at R1 and † 2.74% at R4 vs. Bef-R
Güvenç [48]	16	17.4	Turkey	-	-	Pre/post	Body mass (kg)	↔
Aziz et al. [43]	10	17.5	Singapore	-	13.5	Pre/post-control	Body mass (kg)	\leftrightarrow
Aziz et al. [44]	9	18.9	Singapore	_	13.7	Counterbalanced cross-over design	Body mass (kg)	↓ 2.08% at Ramadan vs. Bef-R
			8.1			8	,	↔
Hammouda et al. [46]	15	17.3	Tunisia	2010	15.5	Pre/post	Body mass (kg)	\downarrow 1.96% at R2 and \downarrow 3.60% at R4 vs. Bef-R
Zarrouk et al. [51]	8	17.2	Tunisia	2009	14	Pre/post	Body mass (kg)	\leftrightarrow
Bouhlel et al. [49]	10	18.5	Tunisia	<u> </u>	-	Pre/post	Body mass (kg)	\leftrightarrow
Hammouda et al. [34]	10	18.5	Tunisia	-	-	Pre/post	Body mass (kg)	\downarrow 2.81 at R2. and \downarrow 4.14% at R4 vs. Bef-R
Bouhlel et al. [50]	10	18.8	Tunisia	2011	15	Pre/post	Body mass (kg)	↓ 1% at R4 vs. Bef-R
Zarrouk et al. [52]	8	17.2	Tunisia	2009	14	*Pre/post	Body mass (kg)	\leftrightarrow

NM = not mentioned; \downarrow = decrease; \rightleftharpoons = no-change; \uparrow = increase; vs= versus; Bef-R = Before Ramadan; R1 = First week of Ramadan; R2 = Second week of Ramadan; R4 = Fourth week of Ramadan.

9 **Table S5.** Effect of Ramadan fasting on body composition.

Studies	Sample size	Age	Country	Year of experimental protocol	Fasting hours	Study design	Measured parameters	Effect
Maughan et al. [41]	34 (a.m)	18.5	Tunisia	2006	14.5	Pro/post control	Rody fot (9/)	\leftrightarrow
Maugnan et al. [41]	25 (p.m)	16.3	Turnsia	2006	14.3	Pre/post-control	Body fat (%)	\leftrightarrow
Güvenç [48]	16	17.4	Turkey			Pro/most	Body fat (%)	\leftrightarrow
Guvenç [46]	10	17.4	Turkey			Pre/post	Fat-free mass (Kg)	\leftrightarrow
Hammouda et al. [46]	15	17.3	Tunisia	2010	15.5	Dwo/most	Fat mass (%)	↓ 3.7% at R4 vs. Bef-R
nammouda et al. [46]	13	17.3	Turnsia	2010	13.3	Pre/post	Lean mass (kg)	\leftrightarrow
Zarrouk et al. [51]	8	17.2	Tunisia	2009	14	Dwalmaak	Fat mass (kg)	\leftrightarrow
Zarrouk et al. [51]	0	17.2	Turnsia	2009	14	Pre/post	Lean mass (kg)	\leftrightarrow
Bouhlel et al. [49]	10	18.5	Tunisia			Pre/post	Fat mass (kg)	\leftrightarrow
Hammouda et al. [47]	10	18.5	Tunisia			Pre/post	Fat mass (kg)	↓ 6.71% at R4 vs. Bef-R
							Body fat (%)	\leftrightarrow
Bouhlel et al. [50]	10	18.8	Tunisia	2011	15	Pre/post	Fat mass (kg)	\leftrightarrow
							Fat- free mass (kg)	↓ 2.71% at R4 vs. Bef-R

NM = not mentioned; ↓ = decrease; ↔ = no-change; ↑ = increase; vs.= versus; Bef-R = Before Ramadan; R4 = Fourth week of Ramadan.

Table S6. Effect of Ramadan fasting on dietary intake.

Studies	Sample size	Age	Country	Year of experimental protocol	Fasting hours	Study design	Supervision by their coaches	dietary intake	Method of measurement	Effect
								Caloric intake		\leftrightarrow
						D ()		Proteins	0.1	† 7.93% at Dur-R vs.Bef-R
Maughan et al. [41]	59	18.5	Tunisia	2006	14.5	Pre/post- control	Yes	Fat	3-day record+interview	\leftrightarrow
[41]						control		Carbohydrate	recordinatiview	\leftrightarrow
								Water intake		\leftrightarrow
Meckel et al. [42]	10	15.1	Israel	-	-	Pre/post	Yes	Caloric intake	2-day record	↔
Güvenç [48]	16	16	Turkey	-	-	Pre/post	Nm	Caloric intake	2-day record	↔
								Caloric intake		\leftrightarrow
								Proteins		$\qquad \qquad \longleftrightarrow$
Aziz et al. [43]	10	17.5	Singapore	-	13.5	Pre/post- control	Nm	Fat	3-day record	\leftrightarrow
						COLLIGI		Carbohydrate		\leftrightarrow
								Water intake		↔
Aloui et al. [53]	12	13.3	Tunisia	-	15	Pre/post	Nm	Caloric intake	3-day record	↔
								Caloric intake		↓ 15.29% Dur-R vs.Bef-R
Hammouda et	15	17.3	Tunisia	2010	15.5	Pre/post	Yes	Proteins	7-day record	↔
al. [46]	13	17.5	Turnsia	2010	10.0	1 Te/post	165	Fat	7-day record	↓ 6.46% Dur-R vs.Bef-R
								Carbohydrate		\leftrightarrow
Bouhlel et al.	10	18.5	Tunisia	_	_	Pre/post	Nm	Caloric intake	7-day record	↓ 21.30% Dur-R vs.Bef-R
[49]	10	10.5	Turnsia	_		1 Ic/post	TVIII	Water intake	7-day record	↓ 18.18% Dur-R vs.Bef-R
								Caloric intake		↓ 14.30% Dur-R vs.Bef-R
Hammouda et	12	17.52	Tunisia	2010	15.5	Pre/post	Nm	Proteins	7-day record	↔
al. [47]	12	17.52	Turnsia	2010	10.0	1 Te/post	1 1111	Fat	7-day record	↓ 6.21% Dur-R vs.Bef-R
								Carbohydrate		↔
Bouhlel et al.	10	18.8	Tunisia	2011	15	Pre/post	Nm	Caloric intake	7-day record	↓ 3.75% Dur-R <i>vs</i> .Bef-R

[50]								Proteins		↓ 23.47% Dur-R <i>vs</i> .Bef-R
								Fat	•	↓ 19.72% Dur-R vs.Bef-R
								Carbohydrate		↑ 12.68% Dur-R vs.Bef-R
								Water intake		↓ 16.66% Dur-R vs.Bef-R
								Caloric intake		† 18.90% Dur-R vs.Bef-R
7 1 . 1								Proteins	2.1	\leftrightarrow
Zarrouk et al. [52]	8	17.2	Tunisia	2009	14	Pre/post	Yes	Fat	3-day record+interview	↑ 28.84% Dur-R <i>vs</i> .Bef-R
[32]								Carbohydrate	recordinatiview	\leftrightarrow
								Water intake		† 18.18% Dur-R <i>vs</i> .Bef-R

NM = not mentioned; \downarrow = decrease; $\stackrel{\longleftarrow}{\longrightarrow}$ = no-change; \uparrow = increase; vs.= versus; Bef-R = Before Ramadan; Dur-R = During Ramadan.

Study name		_5	Statistics for	each stud	dy				Std diff i	n means and	95% CI	
	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value					
Lotfi, 2010 (soccer)	0.205	0.248	0.061	-0.280	0.691	0.830	0.407		-			
Lotfi, 2010 (runners)	-0.013	0.188	0.035	-0.381	0.356	-0.067	0.947			-	_	
Güvenç, 2011	-0.085	0.194	0.038	-0.465	0.295	-0.439	0.660		-		- :	
Aziz, 2012	0.055	0.245	0.060	-0.426	0.535	0.223	0.823					
Bouhlel, 2014	-0.082	0.245	0.060	-0.563	0.399	-0.335	0.738		+	-		
Bouhlel, 2016	-0.072	0.245	0.060	-0.553	0.409	-0.293	0.769		+	-		
Zarrouk, 2016	-0.041	0.274	0.075	-0.578	0.496	-0.150	0.881		+	-		
	-0.011	0.086	0.007	-0.180	0.158	-0.126	0.899					
								-1.00	-0.50	0.00	0.50	1.00

Figure S1. Forest plot for the effect of one week of Ramadan observance on body mass in adolescent athletes.

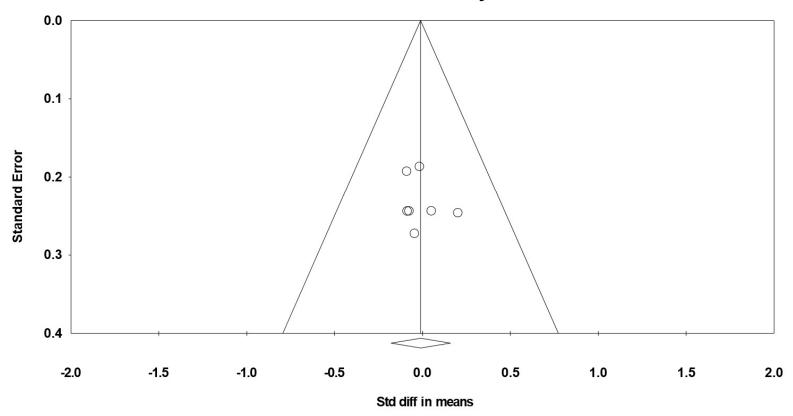


Figure S2. Funnel plot of body mass for adolescent athletes during the first week of Ramadan observance showing no evidence of publication bias.

Study name		9	tatistics for	each stud	<u>dy</u>				Std diff i	n means and	95% CI	
	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value					
Maughan, 2008	-0.072	0.133	0.018	-0.333	0.189	-0.540	0.589		-			
Lotfi, 2010 (soccer)	0.054	0.245	0.060	-0.426	0.534	0.221	0.825					
Lotfi, 2010 (runners)	0.195	0.190	0.036	-0.176	0.567	1.031	0.303			-		
Aziz, 2012b	-0.124	0.246	0.060	-0.606	0.358	-0.503	0.615		-	-		
Hammouda, 2013	-0.120	0.201	0.040	-0.513	0.274	-0.597	0.550			-	-	
Hammouda, 2014	-0.027	0.224	0.050	-0.465	0.411	-0.121	0.904			-		
	-0.020	0.078	0.006	-0.174	0.134	-0.258	0.796					
								-1.00	-0.50	0.00	0.50	1.00

Figure S3. Forest plot for the effect of two weeks of Ramadan observance on body mass in adolescent athletes.

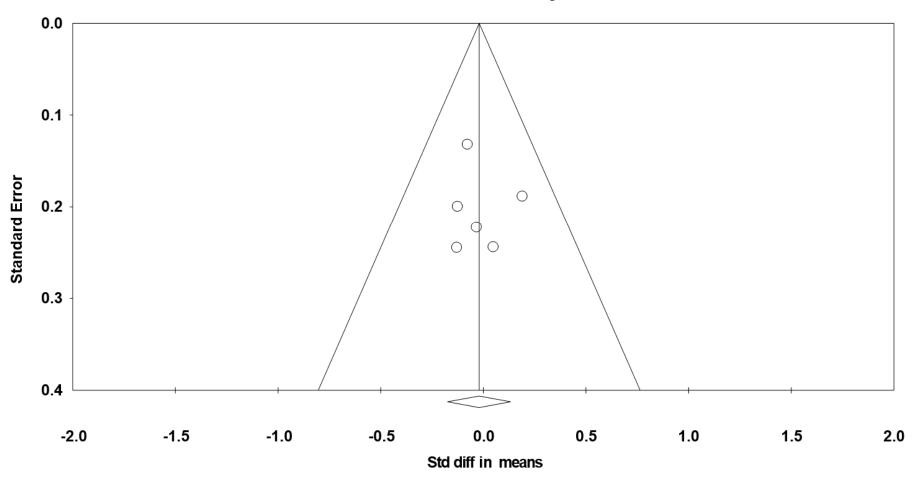


Figure S4. Funnel plot for body mass in adolescent athletes during the second week of Ramadan observance, showing no evidence of publication bias.

Study name		<u>S1</u>	atistics for	each s	<u>tud</u> y				Std diff in	means an	d 95% CI	
	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value					
Zarrouk, 2013	0.123	0.275	0.076	-0.416	0.662	0.447	0.655					
Bouhlel, 2014	-0.031	0.245	0.060	-0.511	0.450	-0.125	0.900		-			
Bouhlel, 2016	0.227	0.248	0.062	-0.259	0.713	0.915	0.360				<u> </u>	
	0.104	0.147	0.022	-0.184	0.393	0.707	0.480					
								-1.00	-0.50	0.00	0.50	1.00

Figure S5. Forest plot for the effect of one week of Ramadan observance on body fat mass in adolescent athletes.

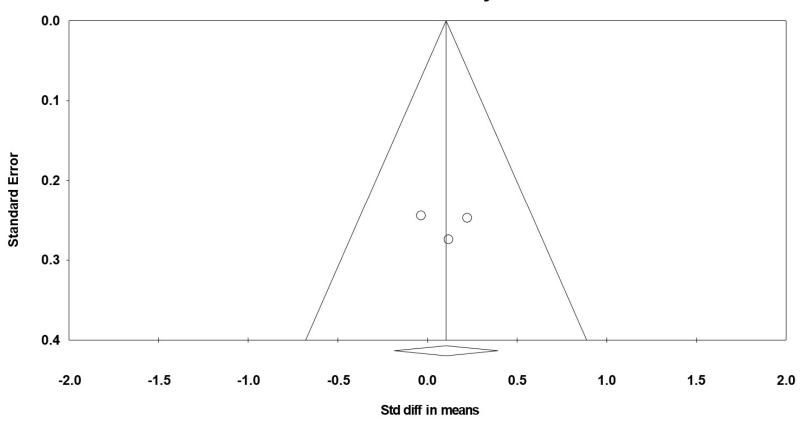


Figure S6. Funnel plot for body fat mass in adolescent athletes during the first week of Ramadan observance, showing no evidence of publication bias.

Study name		<u>s</u>	Statistics for	each stu	dy				Std diff i	n means and	195% CI	
	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value					
Zarrouk, 2013	0.056	0.274	0.075	-0.481	0.593	0.205	0.837	į.	-			
Hammouda, 2014	-0.181	0.225	0.051	-0.622	0.261	-0.801	0.423		-			
Bouhlel, 2014	-0.084	0.245	0.060	-0.565	0.396	-0.344	0.731		+			
Bouhlel, 2016	0.344	0.252	0.064	-0.150	0.838	1.363	0.173					_
	0.018	0.124	0.015	-0.224	0.261	0.149	0.882					
								-1.00	-0.50	0.00	0.50	1.0

Figure S7. Forest plot for the effect of four weeks of Ramadan observance on body fat mass in adolescent athletes.

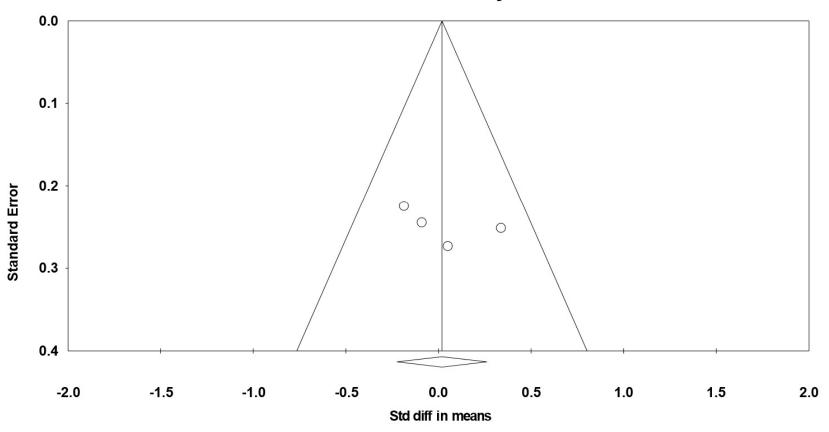


Figure S8. Funnel plot for body fat mass in adolescent athletes during the fourth week of Ramadan observance, showing no evidence of publication bias.

Study name		<u>s</u>	Statistics for	each stud	<u>dy</u>				Std diff i	n means and	<u> 95% CI</u>	
	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value					
Maughan, 2008	-0.068	0.133	0.018	-0.328	0.193	-0.509	0.611		-			
Guvenc, 2011	-0.150	0.195	0.038	-0.532	0.232	-0.771	0.441		-	-		
Hammouda, 2013	-0.091	0.200	0.040	-0.484	0.302	-0.455	0.649			-	-	
	-0.093	0.096	0.009	-0.282	0.095	-0.969	0.333		-			
								-1.00	-0.50	0.00	0.50	1.00

Figure S9. Forest plot for the effect of two weeks of Ramadan observance on body fat percentage in adolescent athletes.

Study name		9	Statistics for	r each stud	dy		Std diff in means and 95% CI							
	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z- Value	p-Value							
Maughan, 2008	0.031	0.133	0.018	-0.229	0.292	0.235	0.814				-			
Hammouda, 2013	-0.027	0.200	0.040	-0.419	0.365	-0.136	0.892		—	-	_			
	0.013	0.111	0.012	-0.204	0.230	0.121	0.904							
								-1.00	-0.50	0.00	0.50	1.00		

Figure S10. Forest plot for the effect of four weeks of Ramadan observance on body fat percentage in adolescent athletes.

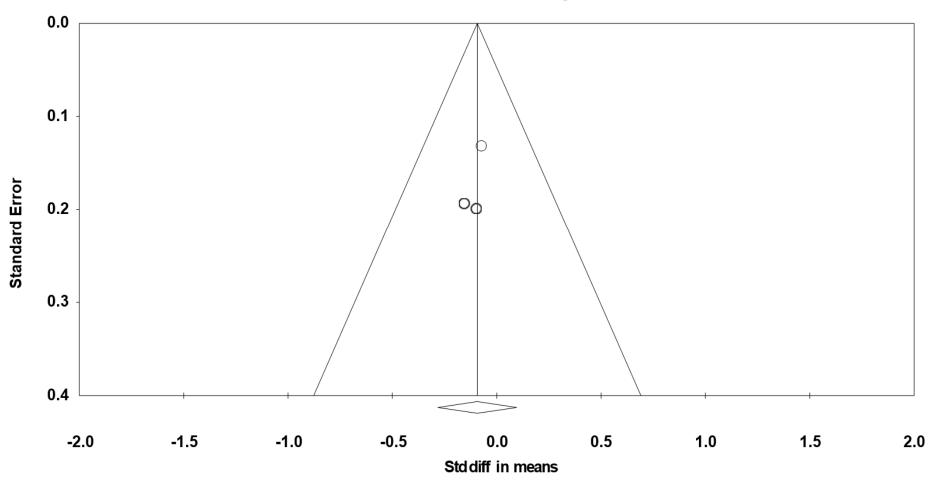


Figure S11. Funnel plot for the effect of four weeks of Ramadan observance on body fat percentage in adolescent athletes, showing no evidence of publication bias.

Study name		3	Statistics for	r each stud	dy							
	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value					
Hammouda, 2013	0.056	0.200	0.040	-0.336	0.449	0.281	0.778					
Zarrouk, 2013	-0.181	0.276	0.076	-0.722	0.361	-0.654	0.513		_	-		
	-0.025	0.162	0.026	-0.343	0.292	-0.156	0.876					
								-2.00	-1.00	0.00	1.00	2.00

Figure S12. Forest plot for the effect of four weeks of Ramadan observance on lean mass in adolescent athletes.

Study name		<u>s</u>	Statistics for	each stud	<u>yk</u>			Std diff in means and 95% CI					
	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value						
Maughan, 2008	0.399	0.105	0.011	0.194	0.605	3.811	0.000		Î	-	- [Î	
Hammouda, 2013	0.022	0.200	0.040	-0.370	0.414	0.108	0.914			-			
Hammouda, 2014	0.029	0.224	0.050	-0.409	0.468	0.132	0.895			-			
Bouhlel, 2016	-0.740	0.276	0.076	-1.282	-0.199	-2.678	0.007		-				
Zarrouk, 2016	0.521	0.292	0.085	-0.051	1.093	1.785	0.074			-			
	0.069	0.192	0.037	-0.308	0.446	0.359	0.720						
								-2.00	-1.00	0.00	1.00	2.00	

Figure S13. Forest plot for the effect of Ramadan observance on protein intake in adolescent athletes.

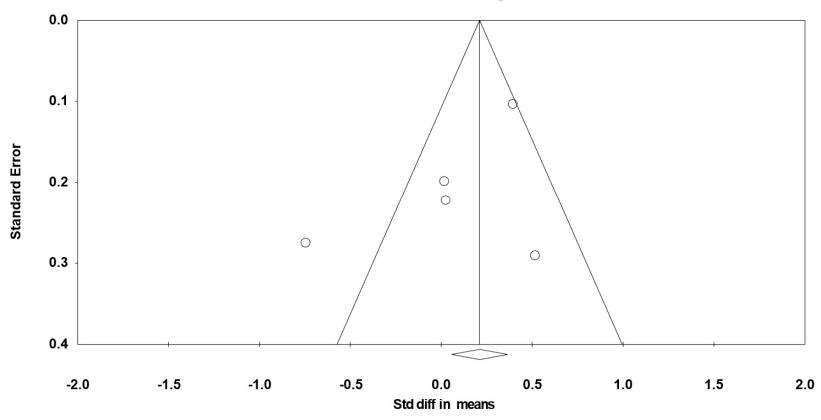


Figure S14. Funnel plot for protein intake in adolescent athletes during Ramadan observance showing no evidence of publication bias.

Study name		<u>s</u>	tatistics for	each stud	<u>yk</u>			Std diff in means and 95% CI					
	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value						
Maughan, 2008	0.043	0.101	0.010	-0.154	0.241	0.429	0.668					1	
Hammouda, 2013	-0.121	0.201	0.040	-0.515	0.272	-0.605	0.545			-			
Hammouda, 2014	-0.111	0.224	0.050	-0.550	0.329	-0.493	0.622			-			
Bouhlel, 2016	-0.705	0.274	0.075	-1.241	-0.168	-2.575	0.010		<u>-</u>				
Zarrouk, 2016	1.529	0.403	0.163	0.739	2.320	3.791	0.000			_	-		
	0.044	0.221	0.049	-0.390	0.478	0.199	0.842						
								-4.00	-2.00	0.00	2.00	4.00	

Figure S15. Forest plot for the effect of Ramadan observance on fat intakes in adolescent athletes.

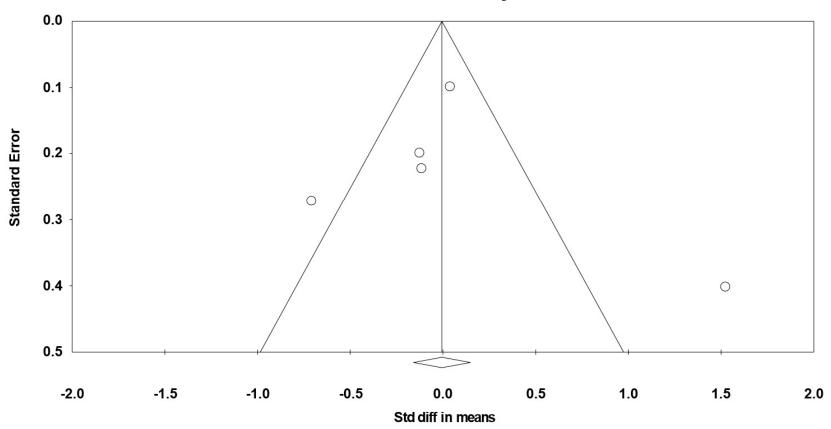


Figure S16. Funnel plot for fat intakes in adolescent athletes during Ramadan observance showing no evidence of publication bias.

Study name		<u>s</u>	statistics for	each stud	<u>yt</u>			Std diff in means and 95% CI					
	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value						
Maughan, 2008	-0.155	0.101	0.010	-0.354	0.043	-1.531	0.126			-			
Hammouda, 2013	0.587	0.217	0.047	0.163	1.012	2.712	0.007						
Hammouda, 2014	-0.014	0.224	0.050	-0.453	0.424	-0.064	0.949			-			
Bouhlel, 2016	0.189	0.247	0.061	-0.295	0.673	0.764	0.445			-			
Zarrouk, 2016	-0.151	0.275	0.076	-0.691	0.388	-0.549	0.583		_	-			
	0.075	0.146	0.021	-0.211	0.362	0.516	0.606						
								-2.00	-1.00	0.00	1.00	2.00	

Figure S17. Forest plot for the effect of Ramadan observance on carbohydrates intakes in adolescent athletes.

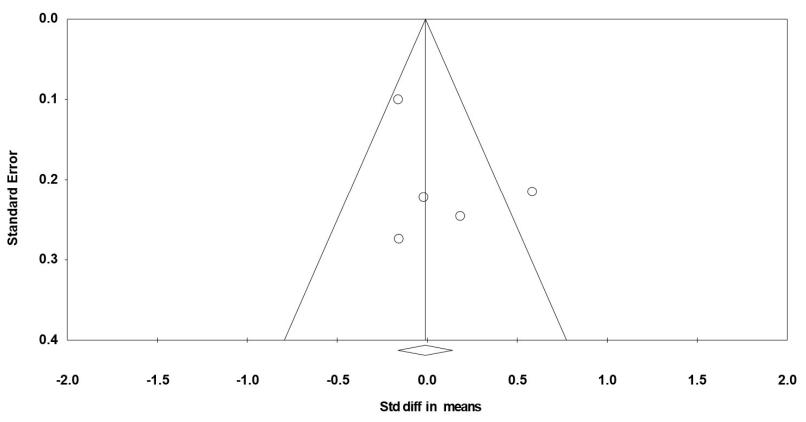


Figure S18. Funnel plot for carbohydrates intakes in adolescent athletes during Ramadan observance showing no evidence of publication bias.

Study name		St	atistics for	each st	<u>tudy</u>							
	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value					
Maughan, 2008	-0.224	0.102	0.010	-0.424	-0.024	-2.196	0.028		1	-		
Aziz, 2012	0.458	0.257	0.066	-0.047	0.963	1.779	0.075			-	I	
Bouhlel, 2014	-0.667	0.271	0.073	-1.197	-0.136	-2.462	0.014		-			
Bouhlel, 2016	-0.757	0.278	0.077	-1.301	-0.212	-2.724	0.006		-	_		
Zarrouk, 2016	0.667	0.303	0.092	0.073	1.260	2.202	0.028			-		
	-0.115	0.235	0.055	-0.576	0.346	-0.490	0.624		-			
								-2.00	-1.00	0.00	1.00	2.00

Figure S19. Forest plot for the effect of Ramadan observance on total water intakes in adolescent athletes.

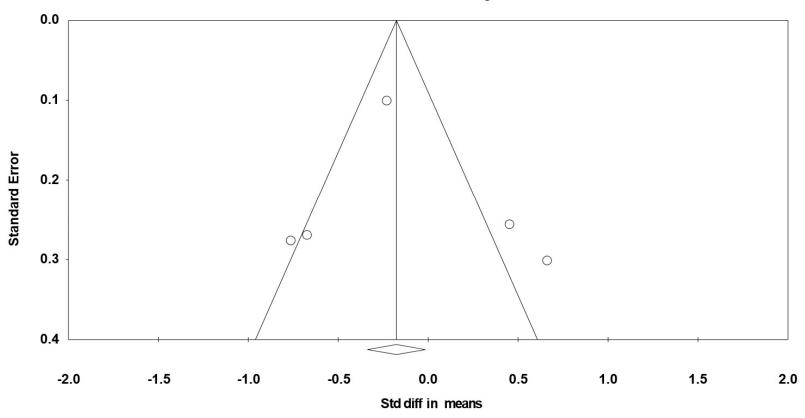


Figure S20. Funnel plot for total water intakes in adolescent athletes during Ramadan observance showing no evidence of publication bias.