Corrigendum





## Corrigendum to: Prevalence and incidence of type 1 diabetes in the world: a systematic review and meta-analysis Mobasseri M, Shirmohammadi M, Amiri T, Vahed N, Hosseini Fard H, Ghojazadeh M. Health Promot Perspect. 2020 Mar 30;10(2):98-115. doi: 10.34172/hpp.2020.18

Majid Mobasseri<sup>1</sup>, Masoud Shirmohammadi<sup>2</sup>, Tarlan Amiri<sup>3</sup>, Nafiseh Vahed<sup>4,5</sup>, Hossein Hosseini Fard<sup>5</sup>, Morteza Ghojazadeh<sup>5</sup>

<sup>1</sup>Endocrine Research Center, Tabriz University of Medical Sciences, Tabriz, Iran
<sup>2</sup>Liver and Gastrointestinal Diseases Research Center, Tabriz University of Medical Sciences, Tabriz, Iran
<sup>3</sup>Student Research Committee, Tabriz University of Medical Sciences, Tabriz, Iran
<sup>4</sup>Emergency Medicine Research Team, Tabriz University of Medical Sciences, Tabriz, Iran
<sup>5</sup>Research Center for Evidence-Based Medicine, Iranian EBM Centre: A Joanna Briggs Institute Affiliated Group, Tabriz University of Medical Sciences, Tabriz, Iran

\*Corresponding Author: Morteza Ghojazadeh, Email: ghojazadehm@hotmail.com

Received: April 27, 2024, Accepted: April 27, 2024, ePublished: July 29, 2024

**B** ased on the comments we received from the readers of our article entitled "Prevalence and incidence of type 1 diabetes in the world: a systematic review and meta-analysis", published in *Health Promotion Perspectives*, we rechecked the whole of the article and its associated data set, and identified a set of errors and missing attributions that should be corrected as follows:

In the results section, heterogeneity between studies for the prevalence of type 1 diabetes in Asia, Africa, and Europe was incorrectly written as non-significant, while it should have been reported as significant. Also, heterogeneity between the studies in Africa was written as non-significant in the main text, which should have been reported as statistically significant.

In terms of the incidence of type 1 diabetes in America, there is a non-significant heterogeneity, which was incorrectly written as significant in the text. Additionally, in the published paper, there are some incorrect values in Table 3; however, the values used for the meta-analysis are correct. In this table, the correct prevalence values per 100 000 reported from the studies of Mayer-Davis et al,<sup>1</sup> Ehehalt et al,<sup>2</sup> Erikson et al,<sup>3</sup> Evans et al,<sup>4</sup> and Lopez Siguero et al<sup>5</sup> are 57, 110, 270, 220, and 78, respectively.

Furthermore, Moussa et al<sup>6.7</sup> conducted two studies to investigate the prevalence of type 1 and type 2 diabetes among Kuwaiti children, and in our article, instead of the reference of the study on type 1 diabetes,<sup>6</sup> the reference

of the study considering type 2 diabetes was cited.<sup>7</sup> In addition, Peter had two studies, within which the trend of type 1 diabetes,<sup>8</sup> and the prevalence and incidence of type 1 diabetes in the Bahamas<sup>9</sup> were determined. In our meta-analysis, the first study was mistakenly cited instead of the second study.

In the studies conducted by Dabelea et al,<sup>10</sup> Kemper et al,<sup>11</sup> Ashner et al,<sup>12</sup> and Garancini et al,<sup>13</sup> the prevalence estimates reported were for overall diabetes, type 1 diabetes, or type 2 diabetes. In our study, however, those estimates were incorrectly extracted as the estimates for overall diabetes or type 2 diabetes. So, the corrections were as follow: for the study of Kemper et al,<sup>11</sup> the errors were corrected and the type 1 diabetes data were extracted; the study of Dabelea et al<sup>10</sup> was replaced with another publication with more complete information<sup>14</sup>; for the study of Garancini et al,<sup>13</sup> the data on type 1 diabetes were unclear and insufficient to be included in our analysis, and was therefore excluded from the meta-analysis; in the study of Ashner et al,<sup>12</sup> the prevalence estimate of type 1 diabetes was not reported, and was thus excluded from our analysis.

In addition, the estimated prevalence of type 1 diabetes reported by Elamin et al<sup>15</sup> in Sudan, was extracted incorrectly. We thus corrected the errors and repeated the meta-analyses, and found that the estimated prevalence of type 1 diabetes was 0.038 (95% CI: 0.017 to 0.084, *P* 

<sup>© 2024</sup> The Author(s). This is an open access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.



Figure 1. Prevalence of type 1 diabetes in Asia (the corrected form of Figure 2-B in the original article)



Figure 2. Prevalence of type 1 diabetes in Africa (the corrected form of Figure 3-B in the original article)

Model	Study name		Statistics for each study					ļ	Event r	ate and 9	5% CI	
		Event rate	Lower limit	Upper limit	Z-Value	p-Value						
	Akesen E et al (2010)	0.06706	0.058	0.078	-32.267	0.000						
	Bessaoud K et al (1990)	0.02676	0.018	0.039	-18.422	0.000						
	Dabelea D et al (2014)	0.14802	0.138	0.158	-43.258	0.000						
	Eriksson J et al (1992)	0.26994	0.260	0.280	-38.433	0.000						
	Evans JM et al (2000)	0.21996	0.210	0.230	-42.573	0.000						
	Frongia O et al (1997)	0.45896	0.449	0.469	-8.008	0.000						
	Gujral JS et al (1993)	0.07505	0.066	0.086	-34.161	0.000						
	Jorge Z et al (2003)	0.12803	0.118	0.138	-41.975	0.000						
	Ostrauskas R (2007)a	0.08076	0.071	0.091	-35.364	0.000						
	Ostrauskas R (2007)b	0.07018	0.061	0.081	-33.056	0.000						
	Rangasami J et al (1997	7)0.15006	0.140	0.160	-43.343	0.000						
	Scott R et al (1992)	0.11509	0.105	0.125	-40.704	0.000						
	Siguero JP et al (1997)	0.07818	0.069	0.089	-34.817	0.000						
	Songini M et al (1993)	0.11895	0.109	0.129	-41.137	0.000						
	Wu D et al (2005)	0.22697	0.217	0.237	-42.146	0.000						
Random		0.12487	0.086	0.177	-9.300	0.000				-   ◀		
							-0.50	.0-0	25	0.00	0.25	0.50

Figure 3. Prevalence of type 1 diabetes in Europe (the corrected form of Figure 5 in the original article)

Model	Study name		Statistics for each study						Ē	Event rate a	Event rate and 95%	Event rate and 95% CI	Event rate and 95% CI	Event rate and 95% Cl	Event rate and 95% CI
		Event rate	Lower limit	Upper limit	Z-Value	p-Value									
	Ehehalt S et al (2009)	0.11008	0.100	0.120	-40.116	0.000									
	Mayer-Davis E et al (200	9)0.05714	0.048	0.068	-29.569	0.000									
	Peter S et al (2007)	0.03120	0.023	0.043	-20.291	0.000									
	Pettitt D et al (2014)	0.19305	0.183	0.203	-43.667	0.000									
	Kemper AR et al (2006)	0.16700	0.158	0.177	-45.427	0.000									
	Dabelea D et al (2014)a	0.01400	0.014	0.014	-914.345	0.000						🗰			
	Dabelea D et al (2014)b	0.01900	0.019	0.019	-1001.467	0.000							🗰		
	Dabelea D et al (2009)	0.01800	0.017	0.019	-166.461	0.000									
Random		0.05010	0.036	0.070	-16.253	0.000					♦		♦	♦	
								-0.50	-0.50 -0.2	-0.50 -0.25 0.00	-0.50 -0.25 0.00	-0.50 -0.25 0.00 0.25	-0.50 -0.25 0.00 0.25	-0.50 -0.25 0.00 0.25 0.	-0.50 -0.25 0.00 0.25 0.50

Figure 4. Prevalence of type 1 diabetes in America (the corrected form of Figure 6-B in the original article)

odel	Study name	Statistics for each study							Event	Event rate and §	Event rate and 95% Cl	Event rate and 95% Cl	Event rate and 95% CI	Event rate and 95% Cl	Event rate and 95% CI	Event rate and 95% Cl	Event rate and 95% Cl	Event rate and 95% Cl	Event rate and 95% CI	
		Event rate	Lower limit	Upper limit	Z-Value	p-Value														
	Akazawa Y (1994)	0.01217	0.005	0.027	-10.703	0.000					🗰					🗰	📮			
	Akesen E et al (2010)	0.06706	0.058	0.078	-32.267	0.000														
	Al-Herbish A et al (2008)	0.10945	0.100	0.120	-40.058	0.000														
	Bessaoud K et al (1990)	0.02676	0.018	0.039	-18.422	0.000														
	Dabelea D et al (2014)	0.14802	0.138	0.158	-43.258	0.000														
	Ehehalt S et al (2009)	0.11008	0.100	0.120	-40.116	0.000														
	EI-Ziny MA et al (2014)	0.02695	0.019	0.039	-18.384	0.000														
	Eriksson J et al (1992)	0.26994	0.260	0.280	-38.433	0.000		1												
	Evans JM et al (2000)	0.21996	0.210	0.230	-42.573	0.000														
	Frongia O et al (1997)	0.45896	0.449	0.469	-8.008	0.000														
	Gujral JS et al (1993)	0.07505	0.066	0.086	-34.161	0.000														
	Jorge Z et al (2003)	0.12803	0.118	0.138	-41.975	0.000														
	Mayer-Davis E et al (2009)	0.05714	0.048	0.068	-29.569	0.000		1												
	Moussa M et al (2004)	0.26988	0.260	0.280	-38.437	0.000														
	Ostrauskas R (2007)a	0.08076	0.071	0.091	-35.364	0.000														
	Ostrauskas R (2007)b	0.07018	0.061	0.081	-33.056	0.000														
	Peter S et al (2007)	0.03120	0.023	0.043	-20.291	0.000														
	Pettitt D et al (2014)	0.19305	0.183	0.203	-43.667	0.000														
	Ramachandran A et al (199	20.02569	0.017	0.038	-17.942	0.000														
	Rangasami J et al (1997)	0.15006	0.140	0.160	-43.343	0.000														
	Scott R et al (1992)	0.11509	0.105	0.125	-40.704	0.000														
	Siguero JP et al (1997)	0.07818	0.069	0.089	-34.817	0.000														
	Soliman A et al (1996)	0.01394	0.007	0.029	-11.188	0.000														
	Songini M et al (1993)	0.11895	0.109	0.129	-41.137	0.000									▏			▏	▏	
	Wong G (1994)	0.00949	0.003	0.029	-8.012	0.000														
	Wu D et al (2005)	0.22697	0.217	0.237	-42.146	0.000					I I T									
	Elamin A et al (1989)	0.09500	0.092	0.098	-137.022	0.000														
	Kemper AR et al (2006)	0.16700	0.158	0.177	-45.427	0.000														
	Dabelea D et al (2014)a	0.01400	0.014	0.014	-914.345	0.000														
	Dabelea D et al (2014)b	0.01900	0.019	0.019	-1001.467	0.000														
	Dabelea D et al (2009)	0.01800	0.017	0.019	-166.461	0.000														
Random		0.07506	0.051	0.110	-11.838	0.000					♦									
							-0.	50	.50 -0.	-0.25	50 -0.25 0.00	50 -0.25 0.00 0.25	50 -0.25 0.00 0.25	50 -0.25 0.00 0.25 0	50 -0.25 0.00 0.25 0.	50 -0.25 0.00 0.25 0.5	50 -0.25 0.00 0.25 0.5	50 -0.25 0.00 0.25 0.50	50 -0.25 0.00 0.25 0.50	50 -0.25 0.00 0.25 0.50

Figure 5. Prevalence of type 1 diabetes in the world (the corrected form of Figure 7 in the original article)

Study name		Statist	ics for e	ach study			Event	rate and s	95% CI	
	Event rate	Lower limit	Upper limit	Z-Value	p-Value					
Ferreira S et al (1993)	0.008	0.000	0.142	-3.109	0.002			∎		$\rightarrow$
Frazer De Llado T et al (1998)	0.018	0.016	0.021	-53.704	0.000					
Gardner S et al (1997)	0.019	0.012	0.030	-16.305	0.000				-	
Lawrence J et al (2014)	0.024	0.022	0.027	-60.207	0.000					
Libman I et al (1998)	0.017	0.006	0.042	-8.372	0.000				_	
Lipman TH et al (1993)	0.013	0.004	0.042	-7.127	0.000				-	
Lipman TH et al (2002)	0.013	0.004	0.040	-7.400	0.000				_	
Lipman TH et al (2006)	0.015	0.005	0.041	-7.788	0.000				_	
Lipton R et al (1995)	0.012	0.004	0.034	-8.136	0.000				-	
Lipton R et al (2002)	0.015	0.006	0.038	-8.706	0.000				-	
Mayer-Davis E et al (2009)	0.016	0.006	0.042	-7.953	0.000				_	
Rueda O et al (1998)	0.001	0.000	0.995	-1.100	0.271			- +		$\rightarrow$
Smith TL et al (2007)	0.018	0.011	0.029	-15.766	0.000			- +	-	
Vehik KS (1996)	0.015	0.010	0.023	-18.481	0.000					
Washington R et al (2013)	0.015	0.002	0.138	-3.504	0.000					$\rightarrow$
Dabelea (2009)	0.026	0.026	0.027	-356.288	0.000					
	0.020	0.017	0.023	-46.457	0.000			•		
						-0.10	-0.05	0.00	0.05	0.10

Figure 6. Incidence of type 1 diabetes in America (the corrected form of Figure 6-A in the original article)

< 0.001) in Asia (Figure 1 [the corrected form of Figure 2-B in the original article]), 0.052 (95% CI: 0.015 to 0.168, P < 0.001) in Africa (Figure 2 [the corrected form of Figure 5-B in the original article]), 0.125 (95% CI: 0.086 to 0.177, P < 0.001) in Europe (Figure 3 [the corrected form

of Figure 3-B in the original article]), 0.050 (95% CI: 0.036 to 0.070, P < 0.001) in America (Figure 4 [the corrected form of Figure 6-B in the original article]), and 0.075 (95% CI: 0.051 to 0.110, P < 0.001) in the world (Figure 5 [the corrected form of Figure 7 in the original article]).

Table 3. Characteristics of studies prevalence of type 1 diabetes

Study	Country	Sample Size	Prevalence Per 100 000		
Akazawa <sup>193</sup>	Japan	40	10		
Akesen et al <sup>194</sup>	Turkey	26	67		
Al-Herbish et al <sup>195</sup>	Saudi Arabia	42	109.5		
Aschner et al13	America	2827	8000		
Bessaoud et al18	Algeria	10	27		
		40	11		
Dabelea et al45	Navajo nation	31	81		
		106	278		
Dabelea et al <sup>196</sup>	USA	57	148		
Ehehalt et al⁵¹	Italy	3761	110		
Elamin et al <sup>197</sup>	Sudan	17	42.98		
El-Ziny et al <sup>53</sup>	Egypt	10	26.8		
Eriksson et al <sup>198</sup>	Finland	1009	270		
Evans et al <sup>199</sup>	Scotland	6592	220		
Frongia et al <sup>59</sup>	Italy	176	459		
Garancini et al <sup>200</sup>	Italy	31	80		
Gujral et al <sup>201</sup>	UK	29	75		
Jorge et al <sup>202</sup>	Portugal	49	128		
Kemper et al <sup>203</sup>	USA	70	183		
Mayer-Davis et al <sup>100</sup>	USA	218	57		
Moussa et al <sup>204</sup>	Kuwait	103	269.9		
Ostrauskas <sup>205</sup>	Lithuania	31	80.64		
Ostrauskas and Žalinkevičius <sup>206</sup>	Lithuania	27	70.23		
Peter et al <sup>116</sup>	Bahamas	12	31		
Pettitt et al <sup>207</sup>	USA	74	193		
Ramachandran et al <sup>208</sup>	India	10	26		
Rangasami et al <sup>127</sup>	Scotland	58	150		
Scott et al <sup>140</sup>	New Zealand	44	115		
López Siguero et al <sup>146</sup>	Malaga	297	78		
Soliman et al <sup>209</sup>	Oman	50	13.25		
Songini et al <sup>210</sup>	Sardinia	46	119		
Wong <sup>185</sup>	China	30	8.3		
Wu et al <sup>211</sup>	New Zealand	87	227		

Also, the corrected estimated incidence of type 1 diabetes was 0.020 (95% CI: 0.017 to 0.023, P < 0.001) in America (Figure 6 [the corrected form of Figure 6-A in the original article]). Moreover, in the abstract section of our paper, the estimate for the prevalence of type 1 diabetes should be 0.075% (95% CI: 0.051 to 0.110), instead of 9.5% (95% CI: 0.07 to 0.12). In summary, the overall results for the prevalence of type 1 diabetes in the world had a marginal change, and thus the conclusions drawn in our article are not changed.

## Disclosure

As the team of authors, we take full responsibility for the errors and missing attributions, and appreciate the opportunity to prepare this corrigendum.

## References

- Mayer-Davis EJ, Beyer J, Bell RA, Dabelea D, D'Agostino R Jr, Imperatore G, et al. Diabetes in African American youth: prevalence, incidence, and clinical characteristics: the SEARCH for Diabetes in Youth Study. Diabetes Care. 2009;32(Suppl 2):S112-22. doi: 10.2337/dc09-S203.
- Ehehalt S, Popovic P, Muntoni S, Muntoni S, Willasch A, Hub R, et al. Incidence of diabetes mellitus among children of Italian migrants substantiates the role of genetic factors in the pathogenesis of type 1 diabetes. Eur J Pediatr. 2009;168(5):613-7. doi: 10.1007/s00431-008-0808-9.
- Eriksson J, Forsén B, Häggblom M, Teppo AM, Groop L. Clinical and metabolic characteristics of type 1 and type 2 diabetes: an epidemiological study from the Närpes community in western Finland. Diabet Med. 1992;9(7):654-60. doi: 10.1111/j.1464-5491.1992.tb01862.x.
- Evans JM, Newton RW, Ruta DA, MacDonald TM, Morris AD. Socio-economic status, obesity and prevalence of type 1 and type 2 diabetes mellitus. Diabet Med. 2000;17(6):478-80.
- López Siguero JP, Martínez-Aedo Ollero MJ, Moreno Molina JA, Lora Espinosa A, Martínez Valverde A. [The development of the incidence of diabetes mellitus I in children 0 to 14 years of age in Malaga (1982-1993)]. An Esp Pediatr. 1997;47(1):17-22. [Spanish].
- Moussa MA, Alsaeid M, Abdella N, Refai TM, Al-Sheikh N, Gomez JE. Prevalence of type 1 diabetes among 6- to 18-yearold Kuwaiti children. Med Princ Pract. 2005;14(2):87-91. doi: 10.1159/000083917.
- Moussa MA, Alsaeid M, Abdella N, Refai TM, Al-Sheikh N, Gomez JE. Prevalence of type 2 diabetes mellitus among Kuwaiti children and adolescents. Med Princ Pract. 2008;17(4):270-5. doi: 10.1159/000129604.
- Peter S. Trends in the incidence of type I diabetes mellitus worldwide. West Indian Med J. 2007;56(3):264-9. doi: 10.1590/s0043-31442007000300015.
- Peter SA, Johnson R, Taylor C, Hanna A, Roberts P, McNeil P, et al. The incidence and prevalence of type-1 diabetes mellitus. J Natl Med Assoc. 2005;97(2):250-2.
- Dabelea D, DeGroat J, Sorrelman C, Glass M, Percy CA, Avery C, et al. Diabetes in Navajo youth: prevalence, incidence, and clinical characteristics: the SEARCH for Diabetes in Youth Study. Diabetes Care. 2009;32(Suppl 2):S141-7. doi: 10.2337/ dc09-S206.
- Kemper AR, Dombkowski KJ, Menon RK, Davis MM. Trends in diabetes mellitus among privately insured children, 1998-2002. Ambul Pediatr. 2006;6(3):178-81. doi: 10.1016/j. ambp.2006.01.001.
- Aschner P, Aguilar-Salinas C, Aguirre L, Franco L, Gagliardino JJ, de Lapertosa SG, et al. Diabetes in South and Central America: an update. Diabetes Res Clin Pract. 2014;103(2):238-43. doi: 10.1016/j.diabres.2013.11.010.
- Garancini MP, Calori G, Ruotolo G, Manara E, Izzo A, Ebbli E, et al. Prevalence of NIDDM and impaired glucose tolerance in Italy: an OGTT-based population study. Diabetologia. 1995;38(3):306-13. doi: 10.1007/bf00400635.
- Dabelea D, Mayer-Davis EJ, Saydah S, Imperatore G, Linder B, Divers J, et al. Prevalence of type 1 and type 2 diabetes among children and adolescents from 2001 to 2009. JAMA. 2014;311(17):1778-86. doi: 10.1001/jama.2014.3201.
- Elamin A, Omer MI, Hofvander Y, Tuvemo T. Prevalence of IDDM in schoolchildren in Khartoum, Sudan. Diabetes Care. 1989;12(6):430-2. doi: 10.2337/diacare.12.6.430.