Obesity and development – maybe a fit?

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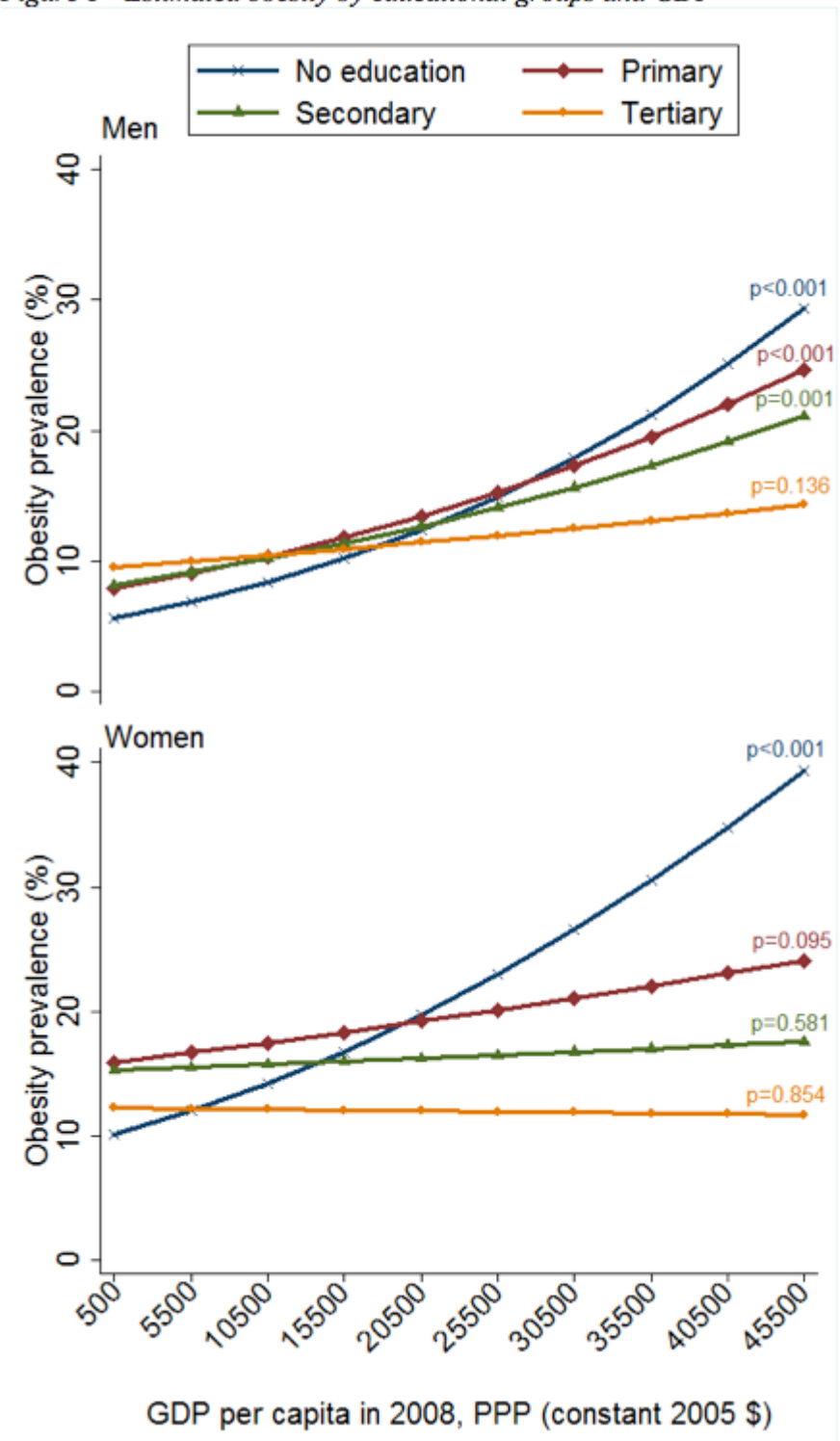
Wikipedia informs us that "obesity is a medical condition in which excess body fat has accumulated to the extent that it may have a negative effect on health, leading to reduced life expectancy and/or increased health problems." People in these conditions have a body mass index (BMI) that exceeds 30 kg/m^2, where the BMI is obtained by dividing a person's weight (in kilograms) by the square of the person's height (in metres).

Obesity is on the rise all over the world: previous studies, mostly focused on low- and medium-income countries, have shown that the number of people with obesity increases with the gross domestic product (GDP) of a country, and that education can be an important factor in this context.

Recent data now sheds new light on the phenomenon.

Relationship between education, obesity and GDP

Figure 1 - Estimated obesity by educational groups and GDP



Supplementary table 1: Sample details by country and gender

	GDP per capita in 2008 (PPP 2005)	Years with data	Men N	Men % obese	Women N	Women % obese
Australia	34 406	2012	693	25	649	27
Austria	36 177	2003-2007, 2011	3570	21	5018	22
Belgium	33 617	2003-2007, 2011, 2012	6834	19	8138	18
Bosnia and Herzegovina	7598	2003	342	12	480	11
Brazil	9584	2003	1508	11	1723	14
Bulgaria	11 992	2011	339	16	488	17
Chad	1262	2003	1105	13	1065	14
Chile	14 111	2011	462	21	703	23
China	5712	2003, 2007	8030	4	9135	7
Comoros	998	2003	522	2	688	4
Congo	3434	2003	622	4	685	13
Croatia	17 300	2003, 20011	753	20	960	16
Czech Republic	24 359	2003, 2006, 2007, 2011, 2012	4602	26	6111	21
Denmark	34 123	2003, 2006, 2007, 2011, 2013	3444	15	4036	15
Dominican Republic	7728	2003	1110	14	1059	16
Ecuador	7128	2003	1336	9	1609	17
Estonia	18 941	2003, 2010, 2011	2996	19	4488	25
Finland	33 443	2003, 2011	821	14	1038	17
France	30 272	2003-2007, 2011	6450	17	8510	16
Georgia	4516	2003	918	12	1300	16
Germany	33 829	2003, 2004, 2006, 2007, 2011, 2012	4296	19	5004	19
Ghana	1380	2003, 2007	3703	7	3726	16
Greece	26 113	2003-2007	3036	18	3863	23
Guatemala	4365	2003	982	9	1161	19
Hungary	17 901	2003, 2011	1763	26	2392	24
India	2635	2003, 2007	6769	1	7787	3
Ireland	39 294	2003	805	30	999	19
Israel	25 646	2003, 2007, 2011, 2012	2701	17	3480	21
Italy	28 454	2003, 2004, 2006, 2007, 2011	4313	16	5353	18
Ivory Coast	1657	2003	1014	4	672	9
Japan	31 323	2011	494	3	538	2
Kazakhstan	10 469	2003	1139	8	2190	16
Kenya	1440	2003	1070	3	1418	12
Korea (Republic of)	25 339	2011	572	2	708	1
Laos	2041	2003	1601	1	1740	2
Latvia	15 647	2003	195	17	406	29
Lithuania	17 599	2003, 2001	325	13	528	21
Luxembourg	73 350	2003	278	17	278	15
Malawi	729	2003	1088	8	1481	7
Malaysia	12 942	2003	1688	10	1945	13
Mauritania	2227	2003	831	8	1279	18
Mauritius	11 560	2003	1131	7	699	9
Mexico	12 893	2003, 2007	8 016	15	10913	22
Morocco	3 973	2003	896	6	511	24
Myanmar	1507 †	2003	1825	1	2461	2
Namibia	5739	2003	954	9	1400	15
Netherlands	38 106	2003, 2004, 2007, 2011	4433	14	5586	17
Norway	48 583	2003, 2005, 2008, 2012	8417	12	8504	11
Pakistan	2317	2003	1323	7	798	10
Paraguay	4353	2003	1528	15	1639	18
Philippines	3382	2003, 2011	3182	3	3340	5
Poland	16 455	2006, 2007, 2011- 2013	2086	22	2694	29
Portugal	22 037	2003, 2011-2013	1515	19	2081	21
Russian Federation	14 767	2003, 2007, 2011	2727	16	5067	26
Slovakia	20 403	2003, 2012	767	22	1294	17
Slovenia	27 225	2003, 2011	1741	26	2190	22
South Africa	9604	2003, 2007, 2011	2145	30	2763	43
Spain	28 353	2003, 2004, 2006, 2007, 2011	5517	20	7284	21
Sri Lanka	4203	2003	1868	3	1832	5
Swaziland	5293	2003	487	34	661	39
Sweden	34 301	2003-2007, 2011, 2012	4275	15	5005	17
Switzerland	38 160	2004, 2006, 2007, 2011	3241	13	3782	13
Taiwan ‡	33 130	2011, 2012	834	5	816	6
Turkey	12 406	2011	3721	15	3382	20
Ukraine	6734	2003	459	11	965	22
United Arab Emirates	51 361	2003	426	23	372	23
United Kingdom	33 718	2003, 2011	656	17	937	22
United States	43 070	2003 -2012	32 715	30	45 425	32
Uruguay	11 412	2003	1115	15	1225	18
Zambia	1278	2003	647	8	660	13

† UN has not published GDP values for 2008 for Myanmar. Myanmar is categorised as a "low human development country". Hence, we used the mean GDP value for low development countries.
‡ UN has not published GDP values for 2008 for Taiwan. Taiwan is categorised as a "very high human development country". Hence, we used the mean GDP value for very high human development countries.

A research study on obesity has just been completed covering 70 countries, including a number of high-income countries (Kinge *et al.*, 2015), with data spanning the period 2002–2013 (Table 1). The results confirm that obesity, education and GDP are indeed related,

however their association is relatively complex. The prevalence of obesity increases with GDP, but, and this is the novelty, only (or, at least, much more severely) among individuals with lower levels of education: there is no statistically significant increase in obesity among those with higher education. In practice, this means that in countries with low GDP obesity is more prevalent among those with high education, while in countries with high GDP it is relatively more frequent among those with low education (Figure 1).

The study also found that the relationship appeared to be more marked among women than among men, even if it did not actually test whether the differences between genders were statistically significant.

Possible explanations

A possible explanation of the rationale behind this finding is suggested directly by Jonas Minet Kinge[1], one of the authors of the research.

"When countries become richer, changes in living conditions occur that predominantly affect the weight of those with low education. For example, earlier studies suggest that low education in poorer countries is associated with limited resources available for excess food consumption, and more physically demanding work. These conditions limit obesity among those with low education in developing countries.

In rich countries with economies based largely on service and technology industries, most people can afford calorie-rich foods and there are, overall, fewer jobs with physically demanding work. This boosts the prevalence of obesity among those with lower education in high GDP countries."

The reason why the association was found to be more pronounced in women than in men is less clear: the most likely explanation is that that women and men often have different educational backgrounds and professions, and that they experience different norms and ideals from their society.

About the study

The researchers collected data about individuals' education, age, gender, height and weight from 70 different countries, and analyzed the association between obesity and GPD by education, using different statistical methods. Both absolute and relative educational categories were used, and the results did not change appreciably.

It is important to emphasize that the study did not study causality: the researchers could not determine, for example, whether it is education or GDP that affects obesity or vice versa. Neither could they rule out that the results were influenced by other factors not included in the study. Another limitation of the study is that it used self-reported height and weight, which is not optimal but is considerably more practical, when it comes to data collection.

The study was conducted in collaboration between researchers at the Norwegian Institute of Public Health, the University of Oslo and the University of Bergen in Norway, and Columbia University in the USA.

References

Kinge JM, Strand BH, Vollset SE and Skirbekk V (2015) Educational inequalities in obesity and

gross domestic product: evidence from 70 countries. *Journal of Epidemiology and Community Health*, doi: 10.1136 / Jech-2014-205353

[1]Kinge is a researcher at the Norwegian Institute of Public Health and also Associate Professor at the Department of Health Management and Health Economics at the University of Oslo.