# Self-reported health assessments in the 2002 World Health Survey: how do they correlate with education?

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**Objective** To assess the value of self-rated health assessments by examining the association between education and self-rated poor health.

**Methods** We used the globally representative population-based sample from the 2002 World Health Survey, composed of 219 713 men and women aged 25 and over in 69 countries, to examine the association between education and self-rated poor health. In a binary regression model with a logit link function, we used self-rated poor health as the binary dependent variable, and age, sex and education as the independent variables.

**Findings** Globally, there was an inverse association between years of schooling and self-rated poor health (odds ratio, OR: 0.929; 95% confidence interval, CI: 0.926–0.933). Compared with the individuals in the highest quintile of years of schooling, those in the lowest quintile were twice as likely to report poor health (OR: 2.292; 95% CI: 2.165–2.426). We found a dose–response relationship between quintiles of years of schooling and the ORs for reporting poor health. This association was consistent among men and women; low-, middle- and high-income countries; and regions.

**Conclusion** Our findings suggest that self-reports of health may be useful for epidemiological investigations within countries, even in low-income settings.

*Une traduction en français de ce résumé figure à la fin de l'article.* *Al final del artículo se facilita una traducción al español.* الترجمة العربية لهذه الخلاصة في نهاية النص الكامل لهذه المقالة.

## Introduction

There are doubts about the validity of using self-reports of health for assessing population health, particularly in disadvantaged populations. Since self-assessment of health is directly contingent on social experience, it has been argued that disadvantaged groups will fail to perceive and report the presence of illness or health deficits, which may result in misleading assessments of population health.[1] This bias, referred to as "reporting heterogeneity", has been demonstrated using hypothetical scenarios – formally referred to as vignettes – that make it possible to compare self-reports from respondents with different socioeconomic and other personal characteristics.[2] The bias has also been demonstrated by the finding that advantaged populations tend to report higher levels of poor health than disadvantaged populations.[1]

In spite of reporting heterogeneity, a recent meta-analysis of 40 studies found a strong, statistically significant positive association between education and health, such that individuals with higher education reported better health status.[3] We updated the literature review from the meta-analysis to include over 60 publications. Although most of these studies showed a positive association between self-rated health and education, they varied widely in terms of sample size, the specification of the self-rated health and education measures, the choice of the covariate set and the modelling strategy. Also, few studies[4,5] have focused on low- and middle-income countries, perhaps due to doubts about self-rated health assessments.[1,2,6] Thus, there is a need for a study of any association between self-rated health and education in a dataset that is globally representative and designed for making comparisons among as well as within countries.

An association between education and self-rated health would not in itself show whether self-rated health is a precise or valid means of assessing population health. For example, one study has suggested that people in Sweden tend to overrate, and those in Germany to underrate, their health status.[7] However, in both Germany and Sweden, socioeconomic status was found to have a statistically significant positive association with health.[8] Also, even if self-reports of health are not valid for comparing aggregate health among countries, they may still be valid for a within-country comparison.[2,9] In this study, we test the hypothesis that self-reports of health are valid by examining the association between self-rated health and years of schooling in 69 countries.

## Methods

### Data source

The data for this study came from the 2002 World Health Survey, which was conducted in 69 countries, across all continents, between January and December 2002.[10–12] The target population for the World Health Survey was all adults aged 18 years or over who were living in private households. The survey did not cover populations on military reservations, in group quarters or in living arrangements other than private households.

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## Sampling plan

In 10 countries, respondents were selected through a single-stage random sample; in the remaining 59 countries, a multistage stratified sample survey was conducted.[10–12] Populations were stratified by province in each country, and again by county in 58 countries. Sampling units were selected based on a probability proportional to population size, followed by a random selection of households. In most of these countries, enumeration areas (geographical areas canvassed by one representative) and households were used as additional units for stratification. Anyone considered to be a member of the household (i.e. "someone who usually stays in the household, sleeps and shares meals, who has that address as primary place of residence or who spends more than six months living there"), aged 18 years and over was eligible to be a respondent in the survey.[10–12] Within households, respondents were selected using Kish tables, which gave each eligible respondent an equal probability of being selected.

## Population and sample size

From the total study population ($n$ = 275 996),[10–12] we selected men and women aged 25 years or over ($n$ = 228 993), because younger respondents were less likely to have completed their ultimate educational level, which was the primary marker of social disadvantage in this study. From this sample, information was missing on a total of 9280 respondents – 3206 on self-rated health, 7328 on years of schooling and 687 on covariates (Appendix A, available at: http://www.hsph.harvard.edu/faculty/venkata-sankaranarayanan/files/Bull-WHO-2009-Web-Appendices.doc; note: for many respondents, information was missing on multiple variables). Thus, the final analytical sample size was 219 713 respondents from 69 countries.

## Self-rating of health

Self-rated health was assessed by asking respondents: "In general, how would you rate your health today" with the possible choices being "very good" (1), "good" (2), "moderate" (3), "bad" (4) or "very bad" (5).[13] This scale is similar to the five-point Likert scale of self-rated health, which is a robust predictor of mortality and correlates strongly with other objective health indicators, especially in developed countries.[14,15] We analysed self-rated health as a dichotomous measure of self-rated poor health – "very good", "good" or "moderate" were coded as "0", and "bad" or "very bad" as "1".

## Education

The World Health Survey collected data on respondents' educational attainment in two ways.[13] Respondents were asked to report the highest level of education completed with the following options: "no formal schooling", "less than primary school", "primary school completed", "secondary school completed", "high school (or equivalent) completed", "college/pre-university/university completed" and "postgraduate degree completed". Respondents were also asked to report the number of years of schooling they had completed, including higher education. We used reported years of schooling as an indicator of educational attainment, mainly to overcome the issue of incomparability among countries on the categorical measure of educational attainment. For 22 182 respondents, the number of years of schooling was coded as "missing" in the dataset, even though 16 573 of these respondents had selected "no formal schooling" as a response to the categorical question on educational attainment. We therefore coded these respondents as having zero years of schooling in the analytical dataset. We specified years of schooling as a continuous measure and also separately specified quintiles based on years of schooling, using country-specific distribution of years of schooling.

## Covariates

Age in years and sex were included as covariates in the study (Table 1).

## Statistical analysis

We modelled the log odds of reporting poor health using binary regression with a logit link function and robust error variance, given as:

$$\log it\,(\pi_i) = \log\left(\frac{\pi_i}{1-\pi_i}\right) = \beta_0 + \mathrm{B}X$$

where the quantity $\pi_i/(1-\pi_i)$ is the odds that self-rated poor health for individual $i$ = 1, 0 otherwise; $\beta_0$ represents the log odds of reporting poor health for the reference category (intercept); and B$X$ represents the change in the log odds of reporting poor health for a one unit change in a vector of independent variables (age, sex and education). Where appropriate, the coefficients and standard errors took account of the multistage cluster survey sampling design. Models were fitted using SPSS v 15.0 for Windows (SPSS Inc., Chicago, IL, United States of America). Statistical precision was ascertained using two-tailed Wald tests and the results are presented with 95% confidence intervals (CIs). The logits were exponentiated to odds ratios (ORs) for interpretative reasons.[16] All analyses were adjusted for age and sex; at the global level, they were based on The World Bank income classification of countries and The World Bank geographical regions.[17] The analyses in the pooled global and regional sample included fixed effects for countries, achieved by including an indicator variable for each country. All analyses were repeated separately for men and women.

## Ethical review

The 2002 World Health Survey was conducted under the scientific and administrative supervision of the WHO, and there was an independent ethics review of the World Health Survey protocol. Interviewers obtained informed consent for the survey, in writing, from the respondents.[18] The study was reviewed by the Harvard School of Public Health, whose Institutional Review Board judged the study as exempt from full review because it was based on an anonymous, public use dataset with no identifiable information on the survey participants.

# Results

The global prevalence of self-rated poor health was 9.8%; the mean age in the sample was 45.3 years; 56.2% of the respondents were female and the median schooling across all countries was 6 years (Table 1). There was considerable variation between countries on the prevalence of self-rated poor health and education. The percentage of respondents self-reporting poor health was highest in Swaziland (48.9%) and lowest in Australia, the United Arab Emirates and Uruguay (2.5%).

Table 1. **Data on self-reported assessment of health and on schooling for 69 countries, organized by income level and region**[a]

| Country | No. of survey respondents | No. (after deleting missing data) | Percentage with bad/ very bad health | Mean self-rated health score | Mean age, in years | Percentage female | Median schooling, in years |
|---|---|---|---|---|---|---|---|
| **Total** | **228 993** | **219 713** | **9.8** | **1.333** | **45.372** | **56.15** | **6** |
| **Europe and central Asia** | | | | | | | |
| **High-income countries** | | | | | | | |
| Austria | 943 | 902 | 4.3 | 0.936 | 47.975 | 62.75 | 10 |
| Belgium | 883 | 794 | 6.1 | 1.092 | 48.618 | 55.92 | 14 |
| Denmark | 959 | 956 | 4.5 | 0.938 | 52.194 | 53.03 | 11 |
| Finland | 944 | 935 | 7.1 | 1.402 | 54.966 | 55.19 | 11 |
| France | 890 | 768 | 4.5 | 1.074 | 46.936 | 58.46 | 14 |
| Germany | 1 147 | 1 090 | 8.5 | 1.309 | 53.401 | 60.28 | 10 |
| Greece | 916 | 914 | 8.9 | 1.138 | 53.820 | 50.11 | 9 |
| Ireland | 867 | 521 | 4.8 | 0.789 | 47.942 | 60.08 | 13 |
| Israel | 1 079 | 1 059 | 5.9 | 0.956 | 48.345 | 57.98 | 14 |
| Italy | 908 | 891 | 6.4 | 1.313 | 51.210 | 58.25 | 11 |
| Luxembourg | 620 | 601 | 5.2 | 1.120 | 48.296 | 50.58 | 12 |
| Netherlands | 825 | 757 | 4.7 | 1.147 | 51.407 | 72.52 | 12 |
| Norway | 884 | 866 | 6.7 | 0.989 | 50.760 | 50.58 | 12 |
| Slovenia | 514 | 507 | 11.7 | 1.466 | 50.998 | 54.04 | 12 |
| Spain | 5 960 | 5 827 | 10.2 | 1.354 | 54.758 | 59.19 | 8 |
| Sweden | 908 | 893 | 15.5 | 1.309 | 53.732 | 58.90 | 12 |
| United Kingdom | 1 072 | 1 047 | 9.1 | 1.196 | 53.944 | 63.13 | 11 |
| **Upper middle-income countries** | | | | | | | |
| Croatia | 932 | 929 | 18.7 | 1.573 | 54.097 | 59.96 | 12 |
| Czech Republic | 828 | 811 | 12.8 | 1.499 | 51.083 | 55.86 | 12 |
| Estonia | 928 | 924 | 15.9 | 1.780 | 52.308 | 63.96 | 12 |
| Hungary | 1 262 | 1 254 | 14.9 | 1.643 | 53.034 | 59.25 | 11 |
| Latvia | 764 | 745 | 24.2 | 1.976 | 54.486 | 68.32 | 11 |
| Slovakia | 1 950 | 1 324 | 7.5 | 1.323 | 42.821 | 69.79 | 13 |
| **Lower middle-income countries** | | | | | | | |
| Bosnia and Herzegovina | 917 | 917 | 16.1 | 1.420 | 50.097 | 58.34 | 11 |
| Kazakhstan | 4 111 | 4 102 | 6.0 | 1.561 | 43.275 | 65.77 | 13 |
| Russian Federation | 4 070 | 3 900 | 20.4 | 1.901 | 53.577 | 64.69 | 12 |
| Turkey | 9 681 | 9 664 | 10.4 | 1.502 | 45.277 | 56.33 | 5 |
| Ukraine | 2 522 | 2 475 | 27.1 | 2.061 | 50.689 | 65.29 | 12 |
| **Low-income countries** | | | | | | | |
| Georgia | 2 441 | 2 436 | 24.3 | 1.916 | 52.228 | 57.88 | 11 |
| **Middle East and north Africa** | | | | | | | |
| **High-income countries** | | | | | | | |
| United Arab Emirates | 984 | 962 | 2.5 | 0.759 | 40.366 | 47.71 | 13 |
| **Lower middle-income countries** | | | | | | | |
| Morocco | 4 184 | 4 163 | 27.0 | 1.879 | 44.883 | 58.32 | 0 |
| Tunisia | 4 214 | 4 057 | 10.8 | 1.324 | 45.786 | 55.11 | 6 |
| **South Asia** | | | | | | | |
| **Lower middle-income countries** | | | | | | | |
| Sri Lanka | 5 642 | 5 098 | 5.2 | 1.111 | 44.717 | 54.30 | 8 |
| **Low-income countries** | | | | | | | |
| Bangladesh | 4 528 | 4 499 | 19.7 | 1.757 | 42.616 | 52.12 | 2 |
| India | 8 140 | 7 560 | 17.7 | 1.477 | 43.064 | 52.34 | 2 |
| Nepal | 6 979 | 6 970 | 10.9 | 1.386 | 43.280 | 56.30 | 0 |
| Pakistan | 5 031 | 4 884 | 5.6 | 1.118 | 41.646 | 45.70 | 0 |
| **East Asia and Pacific** | | | | | | | |
| **High-income countries** | | | | | | | |
| Australia | 1 621 | 1 619 | 2.5 | 0.804 | 49.991 | 58.62 | 12 |

(Table 1, cont.)

| Country | No. of survey respondents | No. (after deleting missing data) | Percentage with bad/very bad health | Mean self-rated health score | Mean age, in years | Percentage female | Median schooling, in years |
|---|---|---|---|---|---|---|---|
| **Upper middle-income countries** | | | | | | | |
| Malaysia | 5 250 | 5 133 | 3.8 | 1.082 | 44.174 | 57.08 | 9 |
| **Lower middle-income countries** | | | | | | | |
| China | 3 674 | 3 665 | 8.4 | 1.279 | 47.230 | 51.35 | 7 |
| Philippines | 8 381 | 8 355 | 4.0 | 1.398 | 42.550 | 54.53 | 9 |
| **Low-income countries** | | | | | | | |
| Lao People's Democratic Republic | 4 060 | 4 053 | 4.2 | 0.931 | 41.767 | 52.73 | 3 |
| Myanmar | 4 996 | 4 996 | 2.9 | 1.074 | 44.578 | 57.31 | 5 |
| Viet Nam | 2 983 | 2 954 | 7.7 | 1.526 | 43.382 | 55.48 | 7 |
| **Sub-Saharan Africa** | | | | | | | |
| **Upper middle-income countries** | | | | | | | |
| Mauritius | 3 385 | 3 362 | 15.0 | 1.356 | 45.184 | 52.71 | 7 |
| **Lower middle-income countries** | | | | | | | |
| Namibia | 3 288 | 3 014 | 7.2 | 1.027 | 42.863 | 59.85 | 7 |
| South Africa | 1 877 | 1 864 | 8.5 | 1.085 | 41.833 | 53.17 | 9 |
| Swaziland | 2 403 | 1 496 | 48.9 | 2.280 | 43.800 | 57.69 | 7 |
| **Low-income countries** | | | | | | | |
| Burkina Faso | 3 608 | 3 545 | 8.2 | 1.215 | 41.504 | 51.03 | 0 |
| Chad | 3 640 | 3 379 | 14.9 | 1.439 | 42.172 | 53.18 | 0 |
| Comoros | 1 411 | 1 407 | 18.4 | 1.563 | 47.535 | 57.00 | 0 |
| Congo | 1 939 | 911 | 14.8 | 1.399 | 42.052 | 53.57 | 5 |
| Côte d'Ivoire | 2 403 | 1 827 | 11.1 | 1.347 | 41.007 | 43.90 | 0 |
| Ethiopia | 3 775 | 3 750 | 6.5 | 0.972 | 41.953 | 51.01 | 0 |
| Ghana | 3 304 | 3 194 | 8.2 | 1.097 | 45.084 | 55.57 | 4 |
| Kenya | 3 449 | 3 339 | 9.5 | 1.266 | 42.653 | 58.16 | 8 |
| Malawi | 3 766 | 3 647 | 5.8 | 0.819 | 42.337 | 56.73 | 5 |
| Mali | 3 291 | 2 642 | 8.5 | 1.154 | 46.544 | 44.13 | 0 |
| Mauritania | 3 051 | 2 778 | 5.0 | 1.187 | 43.419 | 62.85 | 0 |
| Senegal | 2 581 | 1 981 | 9.8 | 1.368 | 43.383 | 49.92 | 0 |
| Zambia | 2 848 | 2 799 | 8.4 | 1.104 | 41.208 | 53.48 | 7 |
| Zimbabwe | 3 024 | 2 966 | 13.8 | 1.548 | 42.999 | 64.70 | 7 |
| **Latin America and the Caribbean** | | | | | | | |
| **Upper middle-income countries** | | | | | | | |
| Mexico | 32 130 | 32 129 | 6.5 | 1.280 | 45.136 | 57.47 | 6 |
| Uruguay | 2 689 | 2 674 | 2.5 | 1.024 | 48.692 | 51.80 | 10 |
| **Lower middle-income countries** | | | | | | | |
| Brazil | 4 209 | 4 167 | 10.5 | 1.509 | 45.613 | 56.83 | 5 |
| Dominican Republic | 3 758 | 3 733 | 10.4 | 1.440 | 45.785 | 53.28 | 6 |
| Ecuador | 3 873 | 3 526 | 10.6 | 1.471 | 44.930 | 55.53 | 6 |
| Guatemala | 3 836 | 3 749 | 12.0 | 1.495 | 44.686 | 61.48 | 2 |
| Paraguay | 4 063 | 4 057 | 3.2 | 1.059 | 44.939 | 54.57 | 6 |

[a] Based on The World Bank classification.
Data source: World Health Survey 2002.

Median years of schooling was highest in Belgium, France and Israel (14 years) and lowest in Burkina Faso, Chad, the Comoros, Côte d'Ivoire, Ethiopia, Mali, Mauritania, Morocco, Nepal, Pakistan and Senegal (0 years). At the country level, there was no correlation between the percentage of the population self-reporting poor health and the median years of schooling ($r = -0.091$; $P = 0.459$). However, at the individual level, there was a statistically significant negative correlation between the years of schooling and self-rated poor health ($r = -0.143$; $P < 0.0001$). At the country level, there was also no correlation between the percentage of the population reporting poor health and life expectancy in 2002 ($r = -0.198$; $P = 0.103$).

In pooled models adjusted for age and sex, there was an inverse association between years of schooling and self-rated poor health (OR: 0.929; 95% CI: 0.926–0.933) (Table 2). A similar relationship was observed for men and women in the age-adjusted

Table 2. **ORs reflecting the change in the odds of self-reporting poor health with every one-year increase in schooling, in 69 countries grouped by income level and region**[a]

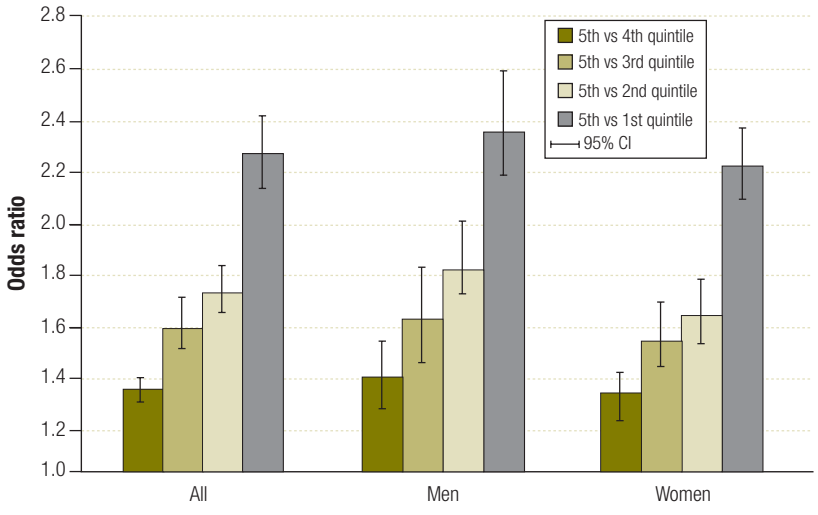
| | All | | Men | | Women | |
|---|---|---|---|---|---|---|
| | OR[b] | 95% CI | OR[b] | 95% CI | OR[b] | 95% CI |
| **All countries** | **0.929** | **0.926–0.933** | **0.933** | **0.927–0.939** | **0.927** | **0.922–0.932** |
| **National income** | | | | | | |
| High | 0.910 | 0.897–0.923 | 0.905 | 0.884–0.927 | 0.913 | 0.897–0.930 |
| Upper middle | 0.923 | 0.914–0.932 | 0.925 | 0.911–0.939 | 0.922 | 0.911–0.934 |
| Lower middle | 0.920 | 0.914–0.926 | 0.921 | 0.911–0.931 | 0.920 | 0.912–0.927 |
| Low | 0.948 | 0.942–0.955 | 0.951 | 0.942–0.960 | 0.945 | 0.936–0.954 |
| **Region** | | | | | | |
| Europe and central Asia | 0.903 | 0.895–0.910 | 0.907 | 0.894–0.921 | 0.903 | 0.893–0.912 |
| Middle East and north Africa | 0.942 | 0.929–0.956 | 0.939 | 0.920–0.959 | 0.944 | 0.926–0.963 |
| South Asia | 0.939 | 0.930–0.949 | 0.944 | 0.932–0.957 | 0.933 | 0.919–0.948 |
| East Asia and Pacific | 0.925 | 0.911–0.939 | 0.931 | 0.909–0.953 | 0.919 | 0.901–0.938 |
| Sub-Saharan Africa | 0.949 | 0.941–0.957 | 0.948 | 0.936–0.960 | 0.949 | 0.938–0.960 |
| Latin America and the Caribbean | 0.928 | 0.921–0.936 | 0.926 | 0.913–0.939 | 0.930 | 0.920–0.939 |

CI, confidence interval; OR, odds ratio.
[a] Based on The World Bank classification.
[b] Adjusted for age and country fixed effects.
Data source: World Health Survey 2002.

pooled sample of all countries (Table 2). Compared to individuals in the highest quintile of years of schooling, those in the lowest quintile were twice as likely to report poor health (OR: 2.292; 95% CI: 2.165–2.426). There was also a dose–response relationship, in both men and women, between quintiles of years of schooling and the ORs for self-reporting poor health (Fig. 1).

The inverse association between years of schooling and self-rated poor health was observed in countries of all income levels (Table 2). Comparing countries, the ORs for reporting poor health for every one-year increase in schooling ranged from 0.910 (95% CI: 0.897–0.923) for high-income countries to 0.948 (95% CI: 0.942–0.955) for low-income countries. Again, a similar association (between years of schooling and the odds of self-reporting poor health) was observed for men and women (Table 2). Comparing regions, the ORs representing the change in the odds of reporting poor health for every one-year increase in schooling ranged from 0.903 (95% CI: 0.895–0.910) for countries in Europe and central Asia to 0.949 (95% CI: 0.941–0.957) for countries in sub-Saharan Africa. The strength of the association was similar for men and women in all regions (Table 2).

Fig. 1. **Self-reporting of poor health in each schooling quintile, in a pooled sample of 69 countries from the 2002 World Health Survey**




CI, confidence interval.
[a] Adjusted for age and country fixed effects.

The inverse association between years of schooling and self-rated poor health was observed in all countries, even though the relationship did not always attain conventional levels of statistical significance (Fig. 2). Countries where the ORs for reporting poor health for a one-year increase in schooling was greater than 0.959 (i.e. a relatively small effect) were Australia, Bosnia and Herzegovina, Burkina Faso, Chad, the Congo, Côte d'Ivoire, Ethiopia, Ghana, Malawi, Morocco, Myanmar, Nepal, Senegal, Sweden and Zambia. This pattern was replicated for men and women (Appendix B, available at: http://www.hsph.harvard.edu/faculty/venkata-sankaranarayanan/files/Bull-WHO-2009-Web-Appendices.doc).

The country-specific association between quintiles of years of schooling and self-rated poor health was also as expected. With the exception of Burkina Faso and Chad, in countries in the lowest quintile of years of schooling people were consistently more likely to self-report poor health than in those in

the highest quintile. Country-specific results showing the OR for self-reporting poor health by quintiles of years of schooling, stratified by men and women, are presented in Appendix C (available at: http://www.hsph.harvard.edu/faculty/venkata-sankaranarayanan/files/Bull-WHO-2009-Web-Appendices.doc).

To test sensitivity, we repeated the key analysis (Table 2, Fig. 1, Fig. 2) without dichotomizing self-rated health but instead using the entire 5-year scale item in an ordered multinomial regression. Patterns of association between self-rated health and years of schooling remained the same, and mirrored the results for the binary regression models (Appendix D, available at: http://www.hsph.harvard.edu/faculty/venkata-sankaranarayanan/files/Bull-WHO-2009-Web-Appendices.doc).

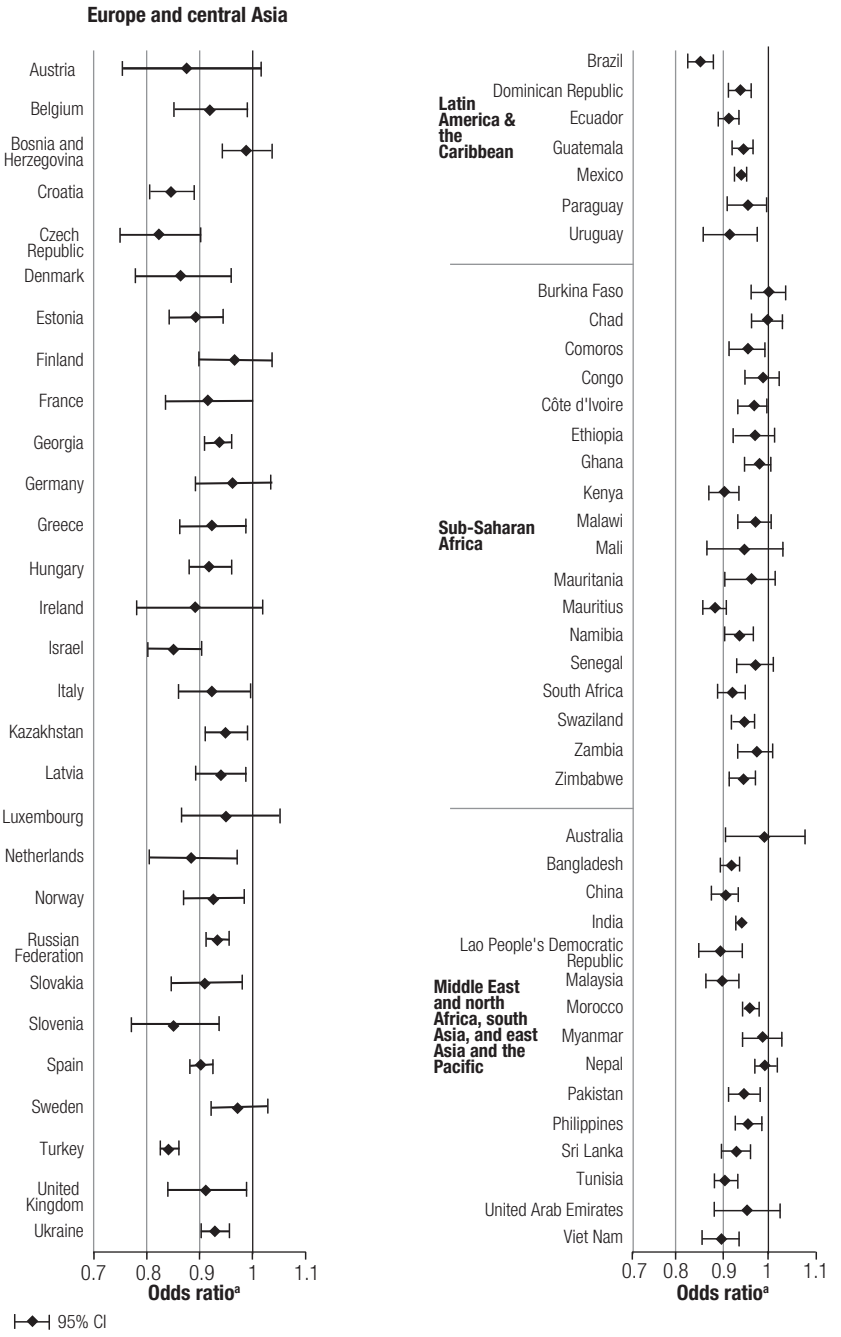
## Discussion

Analysis of a globally representative and comparable, disaggregated dataset from 69 countries showed that adults (both men and women) with lower levels of education were consistently more likely to self-report poor health than those with higher levels of education. This finding was not dependent on a country's level of economic development or on regional geography.

Within each country, we found little reporting heterogeneity (or bias), in that disadvantaged individuals did not appear to underreport poor health when compared to advantaged individuals. Nevertheless, it is possible that disadvantaged individuals underestimate the extent of their poor health. Furthermore, the level of reporting heterogeneity by level of education may differ among countries, making it difficult to compare the magnitude of the association between education and self-reporting of poor health among countries. Thus, as a validation of the self-rated health measure, our findings must be interpreted with caution.

In spite of these limitations, our results suggest that the magnitude of underestimation of poor health by those with low education is not so large as to be misleading. A more thorough test would be to examine the predictive capability of self-rated poor health for objective outcomes such as mortality. Indeed, self-rated poor health is a robust predictor of mortality in the context of industrialized countries.[14,15,19] Evidence from Bangladesh[5] and Indonesia[20] suggests that these associations might also be true in developing countries. However, variations in self-rated health may not mirror variations in mortality, because the former captures more than objective physical health; for example, it also incorporates important dimensions of mental health.[18]

Fig. 2. **Self-reporting of poor health for every one-year increase in years of schooling, in a pooled sample of 69 countries from the 2002 World Health Survey**




[a] Adjusted for age and sex.

We deliberately restricted the number of covariates for this analysis to facilitate comparisons within and among countries. For example, besides age and sex, there are likely to be differences in how individuals perceive their health, depending on whether they live in urban or rural locations that have different levels of health awareness and expectations. We chose not to include distinctions between urban and rural

areas among countries because of the considerable variation in definitions of these terms. Nevertheless, the consistency of our findings across multiple geographical regions and different levels of economic development suggests that findings would probably be similar across urban and rural areas within a country. We also used only one factor – low level of education – as a chronic measure of social disadvantage. Previous research suggests that education is less likely than income, wealth or occupation to be a consequence of adult health.[21] Also, education is likely to be a determinant of other socioeconomic markers such as income, wealth and occupation. Had we used other markers of an individual's socioeconomic status, it would have been difficult to make straightforward comparisons among multiple countries.

This study fills a critical gap by providing baseline global assessments of the association between education and self-rated health. The 2002 World Health Survey is the most recent international survey purposefully designed to obtain comparable data on health and related determinants across countries in all world regions. Therefore, we could not examine whether the pattern for 2002 was reproduced in more recent years. However, associations between education and health have been shown to be pervasive and to change slowly. Therefore, the main finding of our paper is unlikely to have changed substantially since the 2002 World Health Survey. As more recent and comparable data become available, future studies should examine whether the association continues.

Although self-reports of health may not always accurately capture variations in absolute health across countries, doubts about the use of self-reported health measures to study health disparities within countries, especially developing countries, should be reappraised. The ease, speed and economy of collecting self-reports of health (even with a single item global question such as the one used here) make such collection attractive for rapid appraisals. Also, collecting self-reports of health will make it easier to empirically assess epidemiologic associations between various exposures and health, especially in countries where objective health data are lacking and where subjective health data have been viewed with considerable scepticism. ■

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## Résumé

### Auto-évaluations de l'état de santé dans le cadre de l'Enquête sur la santé dans le monde de 2002 : quelle corrélation existe-t-il entre ces évaluations et le niveau d'éducation ?

**Objectif** Évaluer la valeur des auto-évaluations de l'état de santé en étudiant l'association entre niveau d'éducation et auto-déclaration d'un mauvais état de santé.

**Méthodes** Nous avons utilisé un échantillon représentatif de la population mondiale tiré de l'Enquête sur la santé dans le monde 2002 et composé de 219 713 hommes et femmes, âgés de 25 ans et plus et appartenant à plus de 69 pays, pour étudier l'association entre niveau d'éducation et auto-déclaration d'un mauvais état de santé. Dans un modèle de régression binaire faisant appel à une fonction de lien logit, nous avons utilisé l'auto-déclaration d'un mauvais état de santé comme variable binaire dépendante, et l'âge, le sexe et le niveau d'éducation comme variables indépendantes.

**Résultats** A l'échelle mondiale, nous avons relevé une association inverse entre le nombre d'années de scolarité et l'auto-déclaration d'un mauvais état de santé (Odds ratio, OR : 0,929 ; intervalle de confiance à 95 %, IC : 0,926-0,933). Par rapport aux individus du quintile totalisant le plus grand nombre d'années de scolarité, ceux appartenant au quintile de plus bas niveau d'éducation avaient une probabilité deux fois plus forte de se déclarer en mauvaise santé (OR : 2,292 ; IC à 95 % : 2,165-2,426). Nous avons observé une relation dose-réponse entre les quintiles d'années de scolarité et les Odds ratios correspondant à la déclaration d'une mauvaise santé. Cette association apparaissait de manière cohérente chez les hommes et les femmes, dans les pays à faible revenu comme dans ceux à revenu moyen et élevé et dans les différentes régions.

**Conclusion** Nos résultats laissent à penser que les auto-évaluations de l'état de santé peuvent être utiles aux investigations épidémiologiques dans les pays, y compris dans les pays à faible revenu.

## Resumen

### Autoevaluaciones de la salud en la Encuesta Mundial de Salud 2002: correlación con el nivel educativo

**Objetivo** Determinar la utilidad de las autopuntuaciones de la salud estudiando la relación entre el nivel educativo y el nivel de salud declarado por las personas.

**Métodos** Utilizamos la muestra poblacional representativa a nivel mundial de la Encuesta Mundial de Salud 2002, constituida por 219 713 hombres y mujeres de más de 25 años de 69 países, a fin de examinar la relación entre el nivel educativo y los problemas de salud autopuntuados por las personas. Aplicando un modelo de regresión binaria con una función de enlace logit, usamos la mala salud cuantificada por los propios interesados como variable dependiente binaria, y la edad, el sexo y la educación como variables independientes.

**Resultados** Se observa a nivel mundial una relación inversa entre los años de escolarización y la autopuntuación de la mala salud (riesgo relativo aproximado, OR: 0,929; intervalo de confianza del 95%: 0,926–0,933). En comparación con las personas del

quintil superior de años de escolarización, las situadas en el quintil inferior presentaban el doble de probabilidades de declarar problemas de salud (OR: 2,292; IC95%: 2,165–2,426). Observamos una relación dosis-respuesta entre los quintiles de años de escolarización y los OR de declaración de mala salud, y esa relación se observó tanto en hombres como en mujeres; en países de ingresos bajos, medios y altos; y en todas las regiones.
**Conclusión** Nuestros resultados parecen indicar que las autoevaluaciones de la salud pueden ser de utilidad para las investigaciones epidemiológicas en los países, incluso en los entornos de ingresos bajos.

## ملخص

### التبليغ الذاتي عن التقييمات الصحية في المسح الصحي العالمي لعام 2002: كيف يرتبط ذلك بالتعليم؟

**الغرض:** قياس مقدار التقييمات الصحية المقدرة ذاتياً عن طريق فحص الترابط بين التعليم والتقدير الذاتي لسوء الصحة.
**الطريقة:** استخدم الباحثون عينة عالمية مُمثلة للسكان من المسح الصحي العالمي لعام 2002، وتكونت العينة من 219713 رجلاً وامرأة من 69 بلداً في عمر 25 سنة أو أكبر، وذلك لفحص الترابط بين التعليم والتقدير الذاتي لسوء الصحة. وفي نموذج تحاف ثنائي بوجود دالة ارتباط لوغاريتم الأرجحية Logit، استخدم الباحثون التقدير الذاتي لسوء الصحة كمتغير ثنائي تابع، واعتبر العمر والجنس والتعليم متغيرات مستقلة.
**الموجودات:** على الصعيد العالمي، كان هناك ارتباط عكسي بين سنوات الدراسة في المدارس والتقدير الذاتي لسوء الصحة (نسبة الأرجحية odds ratio: 0.929؛ فاصلة الثقة 95%: 0.926 – 0.933). ومقارنة مع الأفراد في الكميات الجزئية الأعلى لسنوات الدراسة في المدارس، كان من الأكثر ترجيحا بمقدار الضعف للمنتمين إلى الكميات الجزئية الأقل لسنوات الدراسة أن يبلغوا عن سوء الصحة (نسبة الأرجحية: 2.292؛ فاصلة الثقة 95%: 2.165 – 2.426). واكتشف الباحثون وجود علاقة الجرعة-والاستجابة بين الكميات الجزئية لسنوات الدراسة ونسب الأرجحية للتبليغ عن سوء الصحة. وكان الارتباط ثابتاً بين الرجال والنساء؛ وبين البلدان المتوسطة والمرتفعة الدخل؛ وبين الأقاليم.
**الاستنتاج:** تشير نتائج الدراسة إلى أن التبليغات الذاتية عن الصحة يمكن أن تفيد في التقصيات الوبائية في البلدان، وحتى في المواقع المنخفضة الدخل.

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