Health and wealth among the poor: India and South Africa compared

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Health and wealth are the two most important components of well-being. Rankings of well-being based on income will differ from more comprehensive rankings depending on the way that income and health are related. There are strong bidirectional causal links between income and health so that we cannot understand either without understanding both. What we call the "wealthier is healthier" hypothesis asserts both that income is the main determinant of health, and that the international correlation between income and health is sufficiently tight for income rankings to indicate well-being more broadly. (See, for example, Richard G.A. Feachem (2001) who, like many researchers, cite Lant Pritchett and Lawrence H. Summers (1996) on the causal role of income in protecting health.) Comparisons between India and South Africa provide a good illustration of both the usefulness and the complexities of working with both health and wealth. In 2000, India's per capita income was $2,045 in purchasing power parity (chained) dollars, less than a third of South Africa's, $7,409. Even if we adjust the latter figure for the distribution of income between Whites and Africans in South Africa, Africans in South Africa are at least 50 percent better off than Indians in terms of GDP per capita. Yet life expectancy in South Africa, which in 1990 was 3 years longer than in India, by 2000 was 14 years shorter; and the reversal is even more dramatic if South African Whites are excluded. In this paper, we report direct comparisons of a number of objective and subjective measures of economic and health status in two sites, one in the district of Udaipur in rural Rajasthan, and one in the shack township of Khayelitsha near Cape Town. We are interested in an assessment of the "wealthier is healthier" hypothesis and, more generally, in the feasibility of making international comparisons of well-being using individual level data, and especially the use of subjective measures of health and living standards, whether they reflect objective measures, or are fully adapted to local

expectations. Our results show that the economically better-off South Africans are healthier in some respects, but not in others. They are taller and heavier, but their self-assessed health is no better; they suffer from depression and anxiety to about the same degree; they have a remarkably similar pattern of prevalence of various health conditions; and both adults and children in South Africa are more likely to go without food for lack of money. Even if some of the self-reported deprivations, such as hunger, are assessed relative to different local expectations, the effects on anxiety and mental health are absolute and absolutely comparable. Because health, like well-being, is multidimensional, and because the components of health do not correlate perfectly with one another, nor with income-based measures, income on its own is likely to be misleading as a short-cut measures of international health. Even within places, such as the two examined here, the links between health and wealth are far from universally strong.

1. Health and income in Khayelitsha and Udaipur

We are here concerned with data from two poor populations. The first is a stratified sample of 1,000 households (more than 5,700 persons) in 100 villages in Udaipur district in India, carried out between August 2002 to August 2003, and described by Abhijit Banerjee, Angus Deaton, and Esther Duflo (2004a, b). The second survey is a random sample of 300 households (1,243 persons) collected between March and July 2003 in Khayelitsha, a township of approximately 500,000 people near Cape Town. The township is composed of both houses that receive services (water and electricity) and unserviced shacks. Almost all households in Khayelitsha have a family connection to the Eastern Cape (Transkei, Ciskei), from where their families recently migrated.

Survey instruments for both Udaipur and Khayelitsha were designed to collect information on economic and health status and, while each was adapted to its own environment, the questionnaires were developed in parallel, and contain many identical questions. In Khayelitsha, a 'knowledgeable household member' was first interviewed and asked questions about all persons in the household. All adults identified as household members were then interviewed separately, and asked questions about their physical and mental health, their education, income, earnings and expenditures. In Udaipur, one household member answered a consumption questionnaire that had been used previously by the Indian National Sample Survey. Each member was asked a battery of questions on health and mental health.

A first look at our Indian and South African households is provided in Table 1, where it is apparent that our South African population is economically better-off. Monthly total expenditure per head is estimated to be 220 PPP (2003) dollars per head in Khayelitsha but only 42.8 PPP dollars per head in rural Udaipur. These estimates are likely noisy, but they are not wildly out of line with other survey evidence in India (52.7 $PPP mean expenditures from the 2002–3 round of the National Sample Survey in rural Rajasthan) and South Africa (289 $PPP mean monthly income per household member, 106 $PPP median, among Western Cape African households in the 2001 South African Census). The median PPP value of food expenditure per head, which is probably more accurate, is three times as high in Khayelitsha (58 $PPP) as in Udaipur (18 $PPP). The ownership of household durable goods is more widespread in the richer site; for a group of eight goods in both surveys, the median number owned is one among the Indian households, and three among the South Africans. In Khayelitsha, four times as many households have electricity. Telephones and cell phones (39 percent) and televisions (50 percent) are common in

Khayelitsha, but are rare in rural Udaipur (1 percent and 2 percent).

Household respondents were also asked to rate their own economic status using a question of the form "how would this household classify its financial situation these days," using a ten rung ladder in India, and a five point scale in Khayelitsha. Table 1 shows that these responses are well correlated with measured expenditure per capita, and that the Indian households (correctly) characterized themselves as very poor relative to the Africans. Even so, the Indian and African respondents are clearly not using the same (PPP) scale; even within the poorest category, median PPP expenditures per head are four times larger in Khayelitsha.

Information on the health and literacy of adults in our surveys is presented in Table 2. Until recently, women in rural Rajasthan did not go to school, and more than 90 percent of the women in our Udaipur sample are illiterate. Although almost half of all men can read and write, average completed education is less than three years. The population of Khayelitsha is substantially better educated. Both men and women have more than eight years of schooling on average, and literacy is all but universal.

South Africans are taller (3 cm for men, and 5 cm for women) and heavier. But it is weight for height (the body mass index, or BMI) that shows the largest difference across the two sites. Sixty-three percent of men and 57 percent of women in rural Udaipur have BMI of less than 18.5, which is the international cutoff for *underweight*, WHO Expert Consultation (2004). Few of the South Africans are underweight, but 75 percent of the women are stage 2 (BMI between 25 and 30) or stage 3 (BMI over 30) *obese*. This is consistent with results found for a much larger, nationally representative sample of Africans measured in the 1998 South African Demographic and Health Survey (see Thandi Puoane et al. 2002). The pronounced differences in BMI, both

between countries and between men and women in South Africa, can be seen in Figure 1, which presents the distributions of BMI by country and sex. In both countries, women's BMIs show greater variance than do men's, but the difference in South Africa is especially noteworthy.

Hypertension, in part associated with obesity, is also more prevalent among the South Africans, and somewhat more prevalent among the women than the men within Khayelitsha, although perhaps less than might be expected given the gender differences in obesity. South African townships are already suffering from the post-transitional health problems of diabetes and stroke, which have yet to make an appearance in rural Rajasthan.

Table 2 also shows the distribution of self-reported health status on a standard five point scale in which larger numbers indicate worse health. These distributions are remarkably similar across the two sites, but this surely reflects adaptation or lower health expectations in India and can hardly be taken as an exception to the "wealthier is healthier" rule. Self-reported health status is adapted to people's circumstances, and indeed there are many examples within countries of poorer people reporting *less* morbidity than richer people, in spite of a great deal of evidence to the contrary. (But note that the Indian respondents have no difficulty in self-assessing themselves as poor, though they do not perceive themselves as sick. Perhaps poverty is more readily observable than at least some dimensions of health.)

Using simplified versions of the USDA's questions for measuring food insecurity, household respondents were asked whether there had been a time in the last year where, because of lack of money, an adult missed a meal, or had not eaten for a whole day, or whether a child had missed a meal. In spite of (or conceivably because of) their apparently better nutrition, Africans reported that adults missed meals twice as frequently, went whole days without food more than twice as

frequently, and children went without food nearly four times as frequently as did the Indian children, see Table 1. While it is possible that these results have something to do with the difference between an urban, more-monetized, versus an agricultural less-monetized environment, anecdotal clinical evidence from Khayelitsha maintains that child malnourishment is common, and is often associated with maternal obesity. Figure 2 provides a comparison of child height by age across the two sites, and shows very similar growth. (Results are very similar when children's heights are plotted separately by sex.) The under-nutrition of South African children is as prevalent in Khayelitsha as it is in Udaipur. While these measurements would support equal degrees of hunger for children in both sites, they do nothing to provide an objective explanation for the much greater reported hunger among both children and adults in Khayelitsha, and they stand in stark contrast to the superiority of the South Africans in both income and physical stature.

Figure 3 and Table 3 show the prevalence of 22 health conditions that were asked in both surveys. For the majority of these, prevalence is higher in South Africa, though more notable is the similarity between the two very different sites. The correlation across the reported health conditions in the figure is 0.84.

We also included in both sites questions on depression and anxiety, results for which are reported in Table 4. Substantial percentages of men and women in both sites (30.8 men and 24.3 women in India, and 22.3 men and 30.9 women in South Africa) reported that over the last year they had had a period of a month or longer during which they worried most of the time and, of those, between 38 and 52 percent said that this worrying had significantly interfered with their normal activities. Similarly, indicators of depression (feeling sad, crying a lot, not feeling like

eating) were prevalent in both sites with no evidence of better mental health among the better-educated and better-off South Africans.

II. The Correlates of Health

One way to calibrate the effects of health conditions is to examine their impact on self-reported health status. We can also look at the gradient, the extent to which living standards or education protect health directly, or moderate the effects of various health impairments. To do this, we ran regressions of self-reported health status on the presence of the health conditions in Figure 3, separately and together, with and without variables for education and for economic status. We also examined the relationship between the conditions and the household socioeconomic variables, in order to test whether education and income reduce the likelihood of having these health conditions.

In all of our regressions, women have worse self-reported health status than men; this effect, which is about 0.25 of a unit on a 5-point scale, is robust to controlling for age, socioeconomic status and health conditions. Being literate improves self-reported health status for women, and by the same amount in both sites, about 0.25 of a point on a five-point scale. There is no effect of literacy on self-reported health status for men. In India, the number of durable goods possessed significantly improves self-reported health status while household total expenditure per head (or food expenditure per head) does not; the reverse is true in South Africa. In all of the regressions, in both sites, virtually all health conditions have a significant deleterious effect on self-reported health status, whether or not we control for household expenditures, assets, or education.

Table 5 presents results for regressions run separately for each chronic condition, with

controls for age and sex. When run separately for men and women, there are a few cases in which the symptom has no significant effect, but these are relatively rare conditions, like memory loss for women (but not men) and genital ulcers for men (but not women) in India, and genital ulcers, worms, cough with blood and vomiting for women in South Africa. When all health conditions are jointly regressed on self-reported health status, the coefficients are around one third smaller than when they are regressed one at a time, as is to be expected given co-morbidities. The effects of each condition on self-reported health are typically somewhat larger in India than in South Africa, and are only weakly correlated (0.3) across the two sites; for example, weight loss and a cough with blood have much larger effects on health status in Udaipur, while the reverse is true for hearing problems and for diarrhea, which is much more prevalent among the Indians.

When health conditions are aggregated into an index of the number of health conditions, self-reported health status worsens by a little more than 0.1 unit for each additional health condition. The effect of the index on health status is not modified by any of the socioeconomic status measures, so that there is no evidence that better off or more educated people suffer less than poorer or less educated people, conditional on having one of the health conditions. Nor, in India, are the numbers of health conditions predicted by education, household expenditures, or number of assets, once we control for age, so that prevalence of morbidities does not appear to be lower among the better-off in Udaipur. In South Africa, expenditure per member (but not literacy nor assets owned) predicts a lower number of symptoms, with a doubling of income associated with a 0.3 reduction in conditions. In general, the favorable effects of education and either assets or total expenditure on health status appear to be *direct* effects, and do not operate either on reducing morbidity, or on reducing the consequences of morbidity, once established.

In both communities, the presence of hunger, in the form of reports of meals missed for lack of money by either adults or children, has a powerful effect on reported depression. In India, the probability of reporting a prolonged period of worry or anxiety is increased by 10 percent if any adult in the household has gone for a whole day without food, and by a further 15 percent if it is reported that a child missed a meal.

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Table 1. Household-level Characteristics: Udaipur and Khayelitsha

	India		South Africa	
	Mean	Median	Mean	Median
Household size	5.63	5.0	4.15	4.0
Number of children 0 - 13	2.39	2	1.16	1.0
Expenditure per member ($PPP per month)	42.8	34.1	220.0	183.9
Food expenditure per member ($PPP per month)	20.9	17.5	71.3	57.5
Structure is electrified (percent)	21.1		84.3	
ASSETS: Percent of households owning:				
Telephone or cell phone	1.4		39.0	
Stove- electric or gas	15.0		44.0	
Stove- wood, coal or paraffin	99.1		81.3	
Television	3.7		50.3	
Radio or stereo	17.1		71.3	
Sewing machine	5.1		6.7	
Car	0.5		8.0	
Bicycle	16.3		2.0	
Number of assets owned	1.58	1.0	3.02	3.0
HUNGER: Percent of households reporting:				
An adult in this household skipped a meal	28.3		59.0	
An adult went all day without eating	11.0		27.0	
A child skipped a meal	10.5		37.9	
SELF-REPORTED FINANCIAL STATUS: Percent of households reporting:		Median expenditure per person ($PPP)		Median expenditure per person ($PPP)
Wealthiest category	0.7	--	0	--
Second highest	1.7	62.8	1.0	596.9
Third highest	10.6	47.2	38.0	229.3
Fourth highest	32.2	38.7	44.0	161.3
Poorest category	54.8	31.2	17.0	121.7
Number of observations	1022	1022	300	300

Notes: Reports of children missing meals is conditional on the presence of a child less than age 14 in the household. Indian estimates were calculated using sampling weights. PPP conversions are made using the 2000 consumption PPPs from the Penn World Tables updated to the dates of the surveys using Indian, South African, and US CPIs.

Table 2. Individual Characteristics, Udaipur and Khayelitsha

	India		South Africa	
	Men	Women	Men	Women
Anthropometrics:				
Mean height (s.d.) in cm	164 (7.6)	152 (7.9)	167 (12.7)	157 (7.9)
BMI<=18.5 (percent)	62.7	56.8	7.2	1.5
25<=BMI<30	0.6	1.6	19.1	27.2
30<=BMI<40	0.1	0.3	5.1	36.4
40<=BMI	0.2	0.2	1.7	11.5
Education:				
Illiterate (percent)	57.2	92.1	6.8	5.5
Years completed	2.9	0.6	8.1	8.7
Self-reported health:				
1. Excellent	12.4	8.7	18.5	10.4
2. Very good	31.9	26.5	24.2	21.0
3. Good	33.2	32.0	32.1	33.9
4. Fair	15.6	25.4	18.2	25.1
5. Poor	6.9	7.4	7.0	9.6
Mean	2.73	2.96	2.71	3.03
Blood pressure:				
Normal	55.0	61.0	48.6	45.3
High-Normal	25.1	23.0	24.7	24.4
Stage 1	14.0	10.3	17.6	17.9
Stage 2	3.8	4.2	6.1	8.3
Stage3 or higher	2.0	1.5	3.0	4.1

Notes: Maximum observations used in calculations for Udaipur are1057 men and 1242 women, and for Khayelitsha are 309 men and 398 women. Indian means were calculated using sampling weights.

Table 3. Physical Symptoms, Udaipur and Khayelitsha

	India			South Africa		
	Men	Women	All	Men	Women	All
SYMPTOMS						
Percent of adults reporting:						
Cold/flu	36.8	31.8	34.1	46.9	52.8	50.2
Fever	30.7	35.9	33.5	51.1	57.0	54.5
Persistent cough	--	--	--	23.0	24.6	23.9
Dry cough	25.5	16.6	20.7	--	--	--
Productive cough	8.8	13.1	11.1	--	--	--
Cough with blood	1.5	1.1	1.3	3.2	3.5	3.4
Chest pain	11.9	12.4	12.2	19.1	22.1	20.8
Body ache	32.3	53.7	43.9	28.2	38.4	33.9
Head ache	37.0	49.6	43.8	33.7	53.3	44.7
Back ache	27.8	40.7	34.8	20.1	30.7	26.0
Vomiting	7.0	10.8	9.1	3.9	4.5	4.2
Diarrhea	15.5	17.5	16.6	7.1	8.8	8.1
Weakness	22.1	26.2	24.3	16.8	16.3	16.5
Worms in stool	2.9	3.3	3.2	3.9	4.0	4.0
Pain in upper abdomen	18.9	27.5	23.6	11.3	16.1	14.0
Pain in lower abdomen	10.1	14.7	12.6	6.5	28.9	19.1
Genital ulcers	0.5	2.2	1.4	0.6	3.0	2.0
Painful urination	11.6	8.8	10.1	6.5	13.1	10.2
Swollen ankles	1.0	2.2	1.6	3.9	8.0	6.2
Severe weight loss	1.7	3.4	2.6	14.2	16.1	15.3
Memory loss	1.2	2.0	1.6	11.7	15.8	14.0
Vision	14.7	15.6	15.2	19.1	21.2	20.3
Hearing	3.3	4.4	3.9	4.5	6.0	5.4
Tuberculosis	3.9	1.4	2.5	10.0	6.3	7.9

Notes: Number of observations for the Indian survey range from 1050 to 1055 for men, and from 1238 to 1242 for women. Number of observations for the South African survey are 309 for men, and 398 for women. Indian means are weighted using sampling weights.

Table 4. Depression and Anxiety, Udaipur and Khayelitsha

	India				South Africa			
	Men		Women		Men		Women	
	Some or most of the time	Most of the time	Some or most of the time	Most of the time	Some or most of the time	Most of the time	Some or most of the time	Most of the time
DEPRESSION Percent of adults reporting they								
Cried a lot	7.4	0.2	30.2	1.4	11.3	1.3	27.9	4.8
Felt sad	31.9	8.0	49.0	4.5	37.2	4.5	38.9	6.0
Did not feel like eating	25.3	0.9	39.4	1.3	31.4	5.5	35.4	3.8
Sleep was restless	21.2	1.8	36.1	2.0	44.3	6.8	47.2	6.8
Did not feel like working	28.7	2.4	46.7	2.4	--	--	--	--
Could not get going	--	--	--	--	31.7	3.6	37.9	3.0
Everything was an effort	--	--	--	--	39.5	11.0	47.7	10.8
ANXIETY Percent of adults reporting	Men		Women		Men		Women	
A period of 1 month or longer worried most of the time	30.8		24.3		22.0		30.9	
Conditional on worrying: this interfered with normal activity*	46.0		37.6		52.3		46.2	

*Among those who report a period of one month or longer of worry, reported is the fraction who said this interfered with their ability to carry out normal activities “a lot.” Indian means are weighted using sampling weights.

Table 5. The Impact of Symptoms on Self-reported Health Status

	INDIA	SOUTH AFRICA		INDIA	SOUTH AFRICA
SYMPTOM:			SYMPTOM:		
Cold/flu	0.51 (0.05)	0.33 (0.08)			
Fever	0.58 (0.05)	0.35 (0.08)	Worms in stool	0.73 (0.15)	0.62 (0.20)
Persistent cough	--	0.53 (0.09)	Pain in upper abdomen	0.53 (0.06)	0.42 (0.12)
Dry cough	0.55 (0.06)	--	Pain in lower abdomen	0.45 (0.07)	0.38 (.011)
Productive cough	0.76 (0.08)	--	Genital ulcers	0.54 (0.21)	0.70 (0.29)
Cough with blood	1.13 (0.24)	0.51 (0.22)	Painful urination	0.59 (0.08)	0.58 (0.13)
Chest pain	0.67 (0.08)	0.50 (0.10)	Swollen ankles	0.78 (0.20)	0.49 (0.17)
Body ache	0.58 (0.05)	0.43 (0.09)	Severe weight loss	0.76 (0.07)	0.36 (0.11)
Head ache	0.56 (0.05)	0.38 (0.08)	Memory loss	0.41 (0.21)	0.41 (0.12)
Back ache	0.58 (0.05)	0.53 (0.09)	Partial paralysis	1.23 (0.33)	0.65 (0.23)
Vomiting	0.56 (0.08)	0.47 (0.20)	Vision	0.41 (0.08)	0.49 (0.10)
Diarrhea	0.34 (0.07)	0.52 (0.15)	Hearing	0.51 (0.15)	0.62 (0.18)
Weakness	0.74 (0.06)	0.55 (.011)	Tuberculosis	0.73 (0.16)	0.80 (0.15)

Notes: OLS regression coefficients reported, with standard errors in parentheses. Indian regressions are weighted using sampling weights. Results reported are for OLS regressions run separately for each condition, with controls for age and sex. Results are similar when run separately by sex, and when ordered probits are run in place of OLS regressions. The number of observations for the South African regressions is 697, and for the Indian regressions ranged from 1822 to a maximum of 1825.

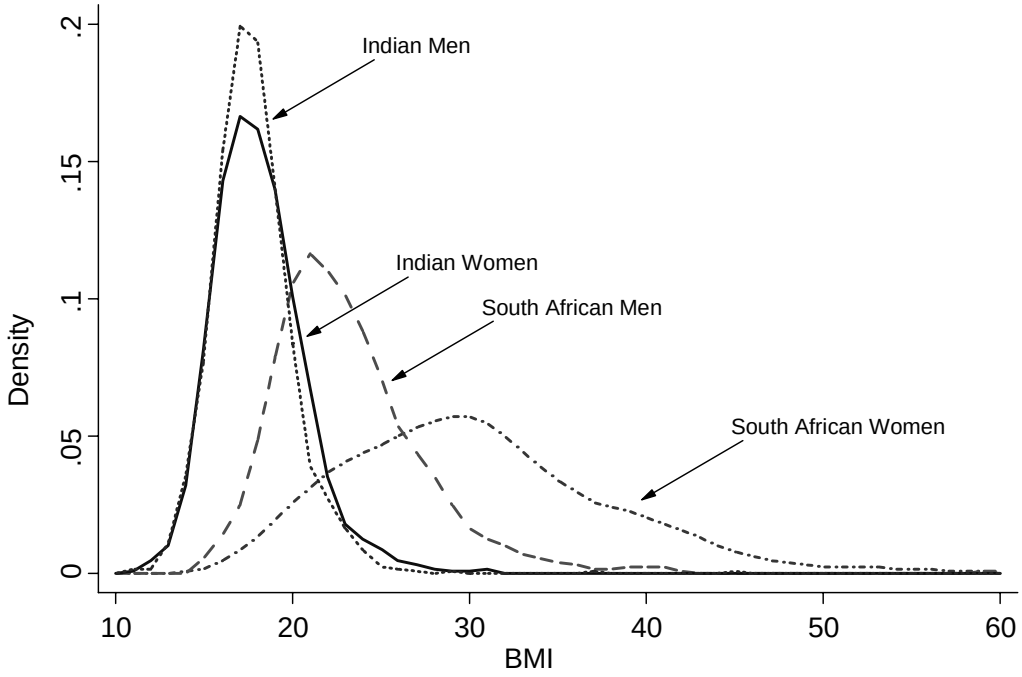

Figure 1: Body-Mass Index of Indians and South Africans

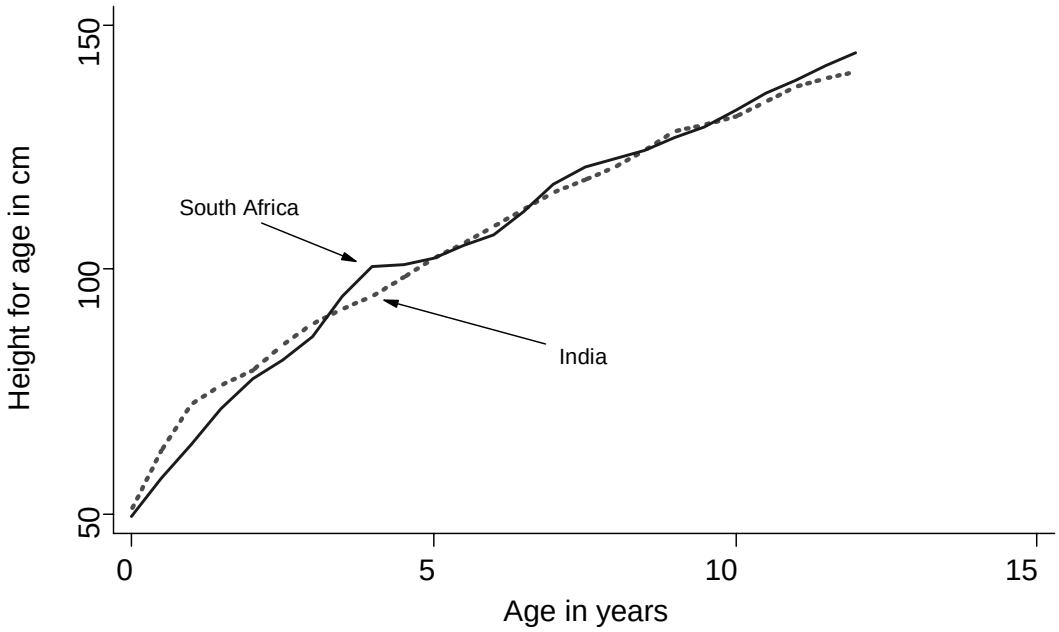

Figure 2: Heights by Age for Children in India and South Africa

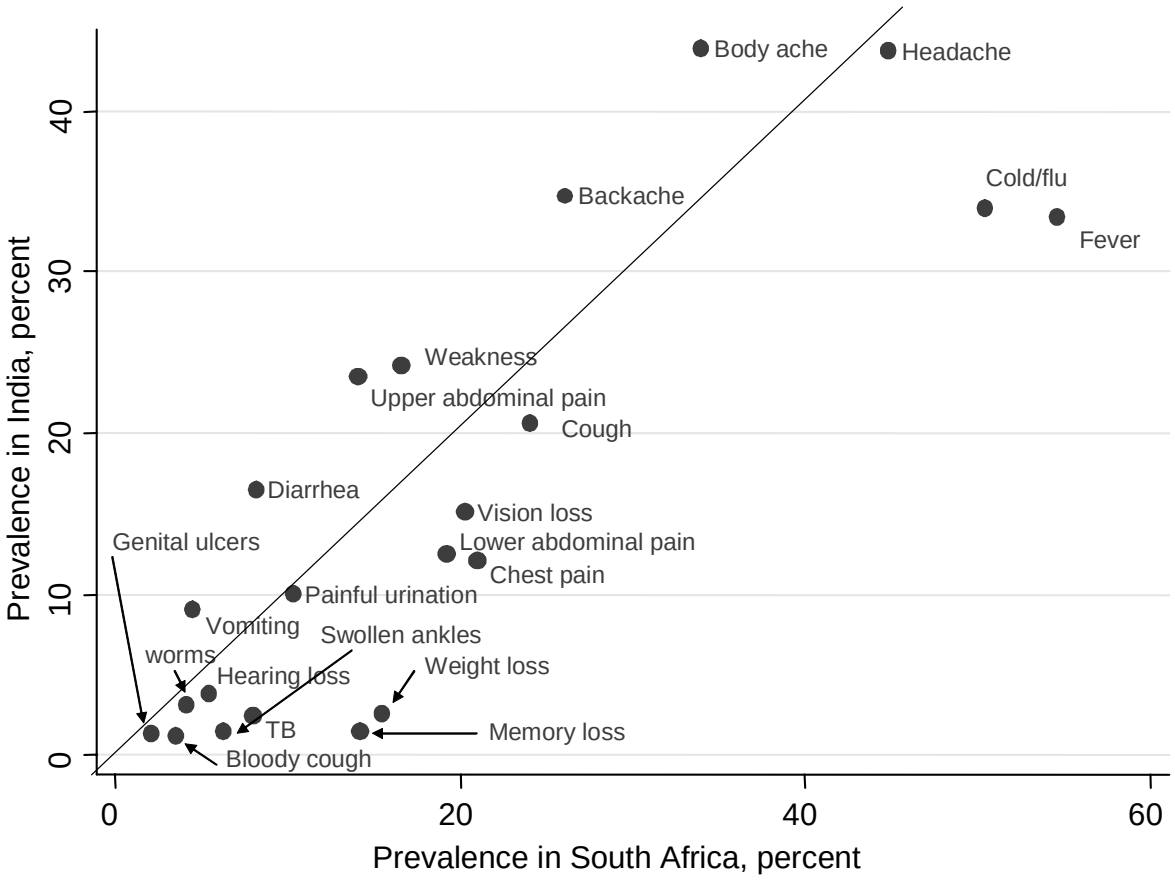

Figure 3: Prevalence of Chronic Conditions in India and South Africa