THE HEALTH OF THE POOR: WOMEN LIVING IN INFORMAL SETTLEMENTS

G. FINK[1], R. ARKU[2] and L. MONTANA[3]
[1]Department of Global Health and Population, Harvard School of Public Health, Boston, MA, USA
[2]Department of Environmental Health, Harvard School of Public Health, Boston, MA, USA
[3]Carolina Population Center at University of North Carolina at Chapel Hill, NC, USA

Author for Correspondence: *Günther Fink* ***E-mail:*** *gfink@hsph.harvard.edu*

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SUMMARY

Objectives: A large share of the urban population in developing countries lives in informal settlements or "slums" today. This study investigates the association between slum residence and health among adult Ghanaian women residing in the Accra Metropolitan Area.

Methods: Health data collected as part of the Women's Health Study of Accra round II (WHSA-II) was combined with data from the Household and Welfare Study of Accra (HAWS) to compare the health of female slum dwellers to the health of female non-slum dwellers living in the Accra Metropolitan Area. Group means were calculated and multivariate linear regression models were estimated to compare eight domains of health as measured by the short-form 36 (SF-36) questionnaire.

Results: Women living in informal settlements were found to display consistently better health. Conditional on all observable characteristics, women living in informal settlements scored higher on all self-reported health outcomes than women living in non-slum areas. The differences appear largest for general health as well as for the physical role functioning domains, and appear smallest for the social role functioning and bodily pain domains.

Conclusions: The results presented suggest that slum residence does not have a negative effect on self-reported health among women in Accra. Three factors may contribute to the generally positive association between slum residence and observed outcomes: i) self-selection of individuals with strong health into informal settlements and an accordingly small impact of environmental factors on health ii) self-selection of more driven and ambitious individuals into slum neighborhoods who may have a generally more positive view of their health and iii) the geographic placement of slum neighborhoods in central neighborhoods with relatively easy access to health facilities.

Keywords: slums, urban health, informal settlements, short-form 36 (SF-36).

INTRODUCTION

In 2008, the proportion of the world's population living in urban areas reached 50 percent.[1] While past forecasts have overestimated growth rates of urban populations, trends in the past 50 years clearly show the pace of urban growth has increased while the pace of rural growth appears to be leveling off.[2] Urban population growth rates in Africa, on average, are the highest in the world, at 3.2 percent per year.[3]

From a health perspective, urban places generally fare better than rural ones today, with urban gains in both infant and child mortality having outpaced gains in rural areas over the past decades.[4] At the same time, urban inequalities have increased, with large populations living in newly formed informal settlements characterized by limited access to water and sanitation infrastructure, and generally referred to as "slums". According to the United Nations, more than 1 billion people, or about 14 percent of the total global population live in slum areas today.[5] While the general structure and appearance of slum neighborhoods suggests detrimental health effects, few studies have attempted to systematically compare the health of individuals residing in slums to the health of residents of the surrounding non-slum areas. In this study, we combine data from a representative household survey with comparable household data from 37 slum neighborhoods in the Accra Metropolitan Area to estimate the empirical association between slum residence and health outcomes among a representative sample of women aged 18 and older.

DATA AND METHODS

The data for this study come from two independent household surveys: the Women's Health Study of Accra (WHSA), and the Housing and Welfare Study of Accra (HAWS). The WHSA is based on a representative sample of 3200 women living in the Accra Metropolitan Area first interviewed in 2003.[6] The second round of the data (WHSA-II) used in this paper was collected between October 2008 and June 2009.

The HAWS data were collected in a sample of 37 Census enumeration areas (EA) in Accra defined as slums by UNHABITAT in 2003 based on average household characteristics observed during the 2000 Ghana census. All households in the 37 EAs were listed in July and August 2009. Household listing in the Yam Market was interrupted due to political instability in August 2009; the final sample from this EA was selected from the listed segment, representing approximately 30% of the total geographical size of the EA populated with housing structures. A total of 1740 households were randomly selected for interviews.

Interviewer training and pretesting of the survey instruments were carried out in August 2009. Main fieldwork for the survey began in September 2009, and was completed in March 2010, approximately 9 months after the completion of the WHSA-II survey.

Figure 1 shows the spatial distribution of the 37 slum enumeration areas as well as the areas sampled in the WHSA. Five of the 1741 EAs appeared both in the WHSA and HAWS study. Since we wanted to compare slum dwellers to women in non-slum areas, we excluded the 5 slum EAs from the WHSA sample.

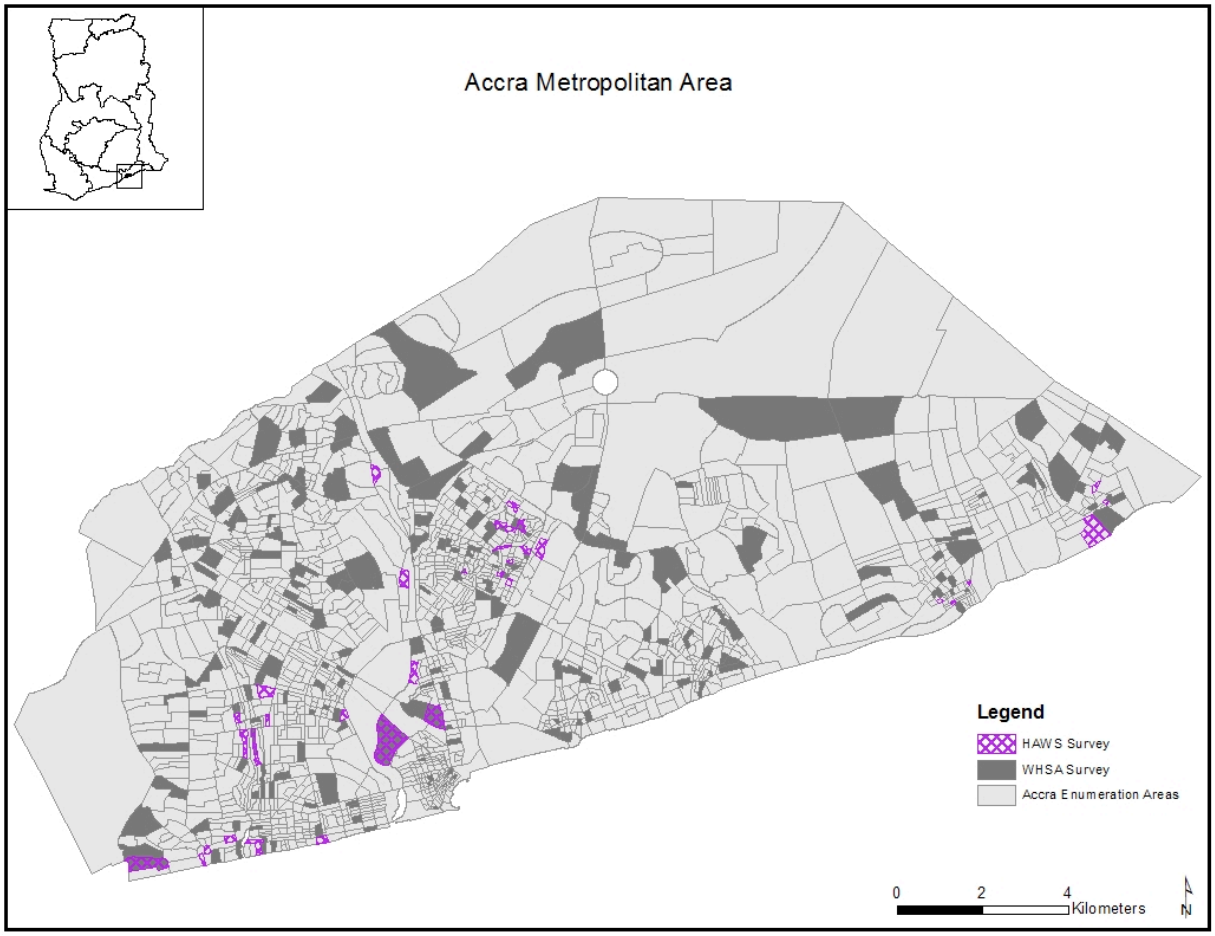

Figure 1 Areas surveyed in WHSA-II and HAWS

While the HAWS questionnaire shared several sections of the questionnaire used in the WHSA-II, separate questionnaires were used for the household and individual women interviews. The household questionnaire included a household schedule of age, sex and educational attainment of all household members, as well as questions on asset ownership and housing characteristics. The individual woman's questionnaire consisted of sections on background characteristics, migration, health insurance, general health, mental health, nutrition, malaria, a full pregnancy history, pre- and post-natal care and immunizations for children born in the last five years, marriage and sexual activity, reproductive health, family planning, and fertility preferences. In addition, heights and weights for all women in the household, and all children under the age of five were collected using height boards for children, portable stadiometers for adults, and SECA solar scales (model 881).

The measuring boards and SECA scales were borrowed from Ghana Statistical Services; the same equipment was used for the DHS surveys. While the WHSA had oversampled elderly women, simple random sampling was used for the HAWS study.

The main health information used in this paper builds on 36 health questions known as the short-form 36 (SF-36), originally developed by RAND for the Medical Outcomes Study.[7-9] The SF-36 questions have been applied in many settings; the International Quality of Life Assessment project has translated the SF-36 tool for use in more than 60 countries around the world (http://www.iqola.org/). The SF-36 module comes with a standard scoring system, which collapses the 36 questions into eight domains: vitality, physical functioning, role-physical, bodily pain, general health, social functioning, role-emotional, and mental health. The eight scales were chosen to reflect the major health indicators as defined by behavioural function and dysfunction, well-being and distress, objective and subjective ratings, and self-evaluation of general health.[10]

Statistical analysis: The data were analyzed using standard linear regression models, which can be characterized as follows:

$$score_{ih} = \alpha + \beta slum_h + X_i\gamma + X_h\delta + \varepsilon_{ih} \quad (1)$$

where $score_{ih}$ is the health score of person i in household j, β is the coefficient of primary interest, and X_i,X_h are vectors of individual and household characteristics respectively. Since heterogeneous effects were expected across domains, a separate analysis was conducted for all eight domains of health measured in the SF-36. In order to understand the degree to which individual and household characteristics explain the observed health differentials, we also estimated a series of partial models, where either only individual or only household characteristics were controlled for. Last, a subgroup analysis was conducted within the HAWS data, where the population of the Yam Market as one of slums with the worst living conditions in the area was compared to the residents of the larger Accra area surveyed in the WHSA. All analysis was conducted using the Stata© 10 software package.

RESULTS

Table 1 provides descriptive statistics for the WHSA and HAWS samples, respectively. The average age of women in the WHSA sample was 45.8 years, approximately 13 years older than the average women in the HAWS sample.

Educational attainment in both samples was rather modest. In the WHSA, 21 percent of respondents had no formal education, while the same was true for 28 percent in HAWS. Thirteen percent of women in non-slum areas attained tertiary education compared with only three percent of women in slum areas. Eleven percent of women in the WHSA had completed some primary education, while 16 percent completed primary school in HAWS. Seventeen percent of women in the WHSA had completed secondary education compared with 13 percent in slum areas. Junior secondary schooling (JSS) was the most common education attainment in both samples, with 40% (WHSA) and 39% (HAWS) of women in this bracket, respectively.

Both groups were equally likely to be married (49%). Women in the WHSA reported an average of 3.9 pregnancies, while women in HAWS had been pregnant an average of 2.5 times at the time of the interview.

Some difference also emerged with respect to ethnicity: while the Ga and Akan were the dominant ethnic groups in both samples, the Ga were substantially more frequently observed in the WHSA than in the HAWS population.

Much larger differences were observed across the two groups with respect to assets. In the WHSA sample, 53% of households reported water piped into their dwelling, 58% had private toilet facilities, and 34% had a separate bathroom. The same was true for 9% (water), 18% (toilet), and 14% (separate bathroom) of households in slum areas, respectively. The differences were smaller with respect to portable assets such as radios, TVs, computers and refrigerators. The fraction of households owning most of these assets was large across both groups, with close to three quarters of individuals reporting ownership of a TV or radio in the household. The most commonly held asset were cell phones, with 91% and 75% of households reporting ownership in the WHSA and HAWS samples, respectively.

Table 2 shows summary statistics for the eight health domains captured in the SF-36. Given that the scores within these domains were normalized, the mean values of all the variables was close to 50, with standard deviations between 8 and 16.5 across the eight domains. The largest degree of variation was observed in the physical functioning and emotional role functioning domains. Even though all domains were positively correlated, the degree of correlation varied, and ranged between 0.28 for mental health and physical functioning, and 0.57 for vitality and mental health as shown in Table 3.

Table 1 Comparison of individual and household characteristics in the WHSA and HAWS samples

	WHSA II N = 2554		**HAWS N=1986**	
Individual characteristics				
Age, *mean (SD)*	45.84	(17.7)	33.15	13.9
No education, *N (%)*	527	(20.6)	548	(27.6)
Primary education, *N (%)*	299	(11.7)	315	(15.9)
Junior secondary, *N (%)*	1014	(39.7)	782	(39.4)
Senior secondary, *N (%)*	445	(17.4)	255	(12.8)
Tertiary education, *N (%)*	257	(10.1)	65	(3.3)
Married, *N (%)*	1260	(49.4)	964	(48.5)
Akan, *N (%)*	839	(32.9)	591	(29.8)
Ga, *N (%)*	1035	(40.6)	523	(26.4)
Ewe, *N (%)*	353	(13.9)	218	(11.0)
Times pregnant, *mean (SD)*	3.86	(3.9)	2.45	(2.5)
Household characteristics				
# of rooms *mean (SD)*	2.52	(2.5)	1.84	(1.3)
Own bathroom, *N (%)*	874	(34.3)	278	(14.0)
Own kitchen, *N (%)*	53	(2.1)	12	(0.6)
Private water, *N (%)*	1349	(52.9)	174	(8.8)
Private toilet, *N (%)*	1483	(58.1)	359	(18.1)
Mobile phone, *N (%)*	2324	(91.0)	1491	(75.1)
Fridge, *N (%)*	1888	(74.0)	1042	(52.5)
Radio, *N (%)*	2200	(86.1)	1456	(73.4)
TV, *N (%)*	2123	(83.2)	1475	(74.3)
Computer, *N (%)*	370	(14.5)	64	(3.3)
Car, *N (%)*	414	(16.2)	56	(2.9)

Table 2 Summary statistics for each of the eight SF 36 health domains

	Mean	**St.dev**	**Min**	**Max**
Vitality	57.7	8.0	20.9	70.8
Physical functioning	51.5	9.6	14.9	57.0
Bodily pain	51.7	9.8	19.9	62.1
General health perceptions	51.2	9.2	16.2	63.9
Physical role functioning	50.2	13.8	17.7	56.9
Emotional role functioning	48.3	16.4	9.2	55.9
Social role functioning	50.7	9.4	13.2	56.8
Mental health	51.7	8.4	7.8	64.1

Notes: Based on the combined WHSA and HAWS samples of 4540 women.

Table 3 Correlation across health domains

	Vitality	Physical functioning	Bodily pain	General health	Physical functioning	Emotional functioning	Social functioning
Vitality	1.00						
Physical functioning	0.55	1.00					
Bodily pain	0.50	0.46	1.00				
General health	0.56	0.55	0.44	1.00			
Physical role functioning	0.46	0.55	0.45	0.41	1.00		
Emotional functioning	0.30	0.25	0.29	0.16	0.37	1.00	
Social role functioning	0.41	0.46	0.44	0.29	0.46	0.55	1.00
Mental health	0.57	0.29	0.32	0.36	0.28	0.32	0.32

Notes: Based on the combined WHSA and HAWS samples of 4540 women.

Table 4 Average health scores by subgroup

	WHSA: N=2391		HAWS: N=2017		Difference	
	Mean	Std.dev	Mean	Std.dev.	Mean	p-value
Vitality	55.68	7.96	60.35	7.25	4.67	0.00
Physical functioning	49.29	10.54	54.30	7.43	5.01	0.00
Bodily pain	50.52	9.73	53.25	9.68	2.73	0.00
General health perceptions	48.96	9.71	54.10	7.44	5.13	0.00
Physical role functioning	47.53	15.50	53.55	10.28	6.02	0.00
Emotional role functioning	47.52	16.85	49.23	15.81	1.71	0.00
Social role functioning	50.24	9.82	51.36	8.79	1.12	0.00
Mental health	51.37	8.38	52.16	8.39	0.79	0.00

Table 4 shows average health scores for the eight domains separately for the two subsamples analysed. Compared to the general population of Accra, slum dwellers scored higher on all eight health domains assessed in the SF-36. We tested for equality of means across the two groups, and strongly rejected the null in all cases, with p-values < 0.01 for all eight domains.

Table 5 shows the results of the multivariate analysis. Column 1 shows the unconditional group comparison, while column 2 shows the differences adjusted for respondent characteristics. On average, the estimated group differences declined substantially once respondents' characteristics such as age, education, marital status and ethnicity was controlled for. The same was not true when household characteristics alone were controlled for (Model III). Conditional on the objective standard of living, the differential between women in the slum areas and women in non-slum areas appeared larger than when these differences were not controlled for.

When both individual and household characteristics were controlled for (Model IV), the estimated group differences were smaller than in the unadjusted models, but positive and significant for all health domains expect social role functioning.

While the magnitude of these differences varied, the estimated coefficients were large when compared to other factors. A point estimate of 3.0 on vitality suggests that the average woman in her 50s living in a slum perceived herself as "vital" as the average woman in her early 30s in other parts of Accra, keeping all other aspects the same.

Table 5 Adjusted and unadjusted health differentials

	Model I **Unadjusted**	**Model II** **Women con-trols**	**Model III** **Asset controls**	**Model IV** **All controls**
Vitality	4.669***	3.001***	4.838***	3.015***
	(0.23)	(0.24)	(0.27)	(0.27)
Physical functioning	5.014***	1.410***	4.855***	1.382***
	(0.28)	(0.24)	(0.33)	(0.27)
Bodily pain	2.731***	0.826***	2.723***	0.631*
	(0.29)	(0.32)	(0.34)	(0.36)
General health perceptions	5.132***	2.975***	5.679***	3.305***
	(0.26)	(0.27)	(0.31)	(0.31)
Physical role functioning	6.016***	3.926***	5.970***	3.751***
	(0.40)	(0.44)	(0.48)	(0.49)
Emotional role functioning	1.712***	1.072*	2.702***	1.770***
	(0.49)	(0.56)	(0.58)	(0.63)
Social role functioning	1.117***	-0.427	1.409***	-0.221
	(0.28)	(0.31)	(0.33)	(0.34)
Mental health	0.794***	0.274	1.549***	0.715**
	(0.25)	(0.28)	(0.30)	(0.31)

Notes: All regressions are based on 4540 observations. Each cell shows the point estimate as well as the associated standard error obtained from a standard linear regression model. Model I shows unadjusted group differences. Model II shows differences adjusted for respondent's age, education, marital status, ethnicity and number of pregnancies. Model III shows differences adjusted for household asset holdings. Model IV shows differences adjusted for both respondent and household characteristics.

Special Study Yam Market: The Yam Market, as the popular name "Sodom and Gomorrah" suggests, is not only the most (in-) famous slum of the city under threat of demolition, but most likely also the largest slum area with an estimated population of over 50,000 slum dwellers. Table 6 compares the Yam market women to the general HAWS population. As the table shows, the Yam Market area was characterized by a high degree of poverty; on average, women were young with very limited education: 57% of the Yam market residents never attended school, and only 6% went beyond junior secondary schooling. Strong differences also emerged with respect to the ethnic background; only 20% of the Yam market residents belonged to the three dominant ethnicities in Accra, while 48% associate themselves with the Mole and Dagbani ethnicities traditionally resident in the Northern part of the country.

Not one single respondent in the Yam Market reported to have access to private water, a private toilet, or a private kitchen; only 3 out of 235 respondents from the area indicated to have access to their own bathroom. Table 7 shows the health differences between the Yam market and the general slum population. Once both individual and household characteristics were adjusted for (Model IV), women in the Yam Market scored on average about half a standard deviation higher than women living in other slums. These differences were statistically significant for all outcomes other than social and emotional role functioning; the largest differences were found for vitality and physical role functioning.

Table 6 Average characteristics of Yam Market vs. other slums population

	Yam Market N = 235		**Other Slums N=1751**	
Individual characteristics				
Age, *mean (SD)*	25.86	(8.1)	34.13	(14.2)
No education, *N (%)*	134	(57.0)	414	(23.7)
Primary education, *N (%)*	46	(19.6)	269	(15.4)
Junior secondary, *N (%)*	41	(17.4)	741	(42.3)
Senior secondary, *N (%)*	12	(5.5)	241	(13.8)
Tertiary education, *N (%)*	0	(0.4)	64	(3.7)
Married, *N (%)*	95	(40.9)	867	(49.6)
Akan, *N (%)*	31	(13.6)	559	(32.0)
Ga, *N (%)*	5	(2.6)	518	(29.6)
Ewe, *N (%)*	6	(3.0)	211	(12.1)
Times pregnant, *mean (SD)*	1.40	(1.4)	2.59	(2.6)
# of rooms *mean (SD)*	1.15	(1.2)	1.93	(1.9)
Own bathroom, *N (%)*	3	(1.3)	274	(15.7)
Own kitchen, *N (%)*	0		11	(0.7)
Private water, *N (%)*	0		175	(10.0)
Private toilet, *N (%)*	0		359	(20.5)
Mobile phone, *N (%)*	104	(44.7)	1387	(79.2)
Fridge, *N (%)*	47	(20.4)	994	(56.8)
Radio, *N (%)*	124	(52.8)	1333	(76.1)
TV, *N (%)*	103	(43.8)	1373	(78.4)
Computer, *N (%)*	0		63	(3.7)
Car, *N (%)*	0		56	(3.3)

Table 7 Health effects of Yam Market residence

	Model I	**Model II**	**Model III**	**Model IV**
	Unadjusted	**Women controls**	**Asset controls**	**All controls**
Vitality	5.751***	3.894***	7.544***	4.427***
	(0.53)	(0.65)	(-0.60)	(0.70)
Physical functioning	7.093***	2.315***	8.999***	2.504***
	(0.69)	(0.67)	(0.77)	(0.71)
Bodily pain	4.456***	2.637***	5.705***	2.601***
	(0.65)	(0.83)	(0.74)	(0.88)
General health perceptions	6.667***	3.630***	9.500***	4.522***
	(0.65)	(0.78)	(0.73)	(0.83)
Physical role functioning	8.195***	5.926***	10.02***	6.148***
	(1.02)	(1.29)	(1.17)	(1.38)
Emotional role functioning	-1.963*	-1.265	1.226	0.756
	(1.16)	(1.55)	(1.33)	(1.65)
Social role functioning	0.598	-1.166	2.229***	-0.62
	(0.67)	(0.83)	(0.76)	(0.89)
Mental health	1.895***	1.743**	4.611***	3.252***
	(0.56)	(0.73)	(0.64)	(0.78)

Notes: All regressions are based on 2554 observations from the WHSA and 235 observations from the Yam Market collected as part of the HAWS study. Each cell shows the point estimate as well as the associated standard error obtained from a standard linear regression model. Model I shows unadjusted group differences. Model II shows differences adjusted for respondent's age, education, marital status, ethnicity and number of pregnancies. Model III shows differences adjusted for household asset holdings. Model IV shows differences adjusted for both respondent and household characteristics.

DISCUSSION

The results presented in this paper have yielded two main results: first, it is clearly true that slum dwellers fare worse with respect to their living conditions; lack of access to water and sanitation, as well as the lack of access to private bathrooms lowers self-reported health, and makes slum dwellers undoubtedly worse off compared to the average Accra resident. The second result is more surprising: all results presented suggest that these wealth and asset differences are more than compensated by other factors affecting slum dwellers. This is partially explained by the younger age of slum dwellers; differences in observable characteristics do, however, explain only a minor part of the total difference observed, which raises the question regarding the true causal mechanisms underlying the observed positive slum effects. Even though our data does not allow us to provide a definite answer to this question, two mechanisms appear plausible: self-selection and geographic advantage. The self-selection hypothesis has a long tradition in the migration literature; migration is an individual choice, and as such likely reflects individual traits such as health, general optimism, entrepreneurship or ambition, all factors which are likely to affect actual, and even more so, the self-reported health measures analyzed in this paper. Even though self-reported health measures appear to predict clinical health outcomes well within the larger WHSA data, one could argue that slum residence systematically alters perceptions of health and thus induces bias in the observed differences. The second argument is one of geographic placement. Just like the individual selection into migration is not random, the emergence of slum areas reflects factors attracting mobile population groups. Most Accra slums are in the rather central parts of town, with rapid access to public transport and markets, but also relatively easy access to drug shops and hospital if outside medical help is needed. All of these factors are likely to contribute to the actual and perceived health of slum dwellers. The good news is that on average slum dwellers seem to do well health-wise; further research will be needed to determine the causal mechanisms underlying these patterns.

CONCLUSION

Using data from WHSA and HAWS we found that slum residence was positively associated with self-reported health as measured by the short form 36 (SF-36) questionnaire. While some differences were explained by the younger age of slum residents, positive associations remained even when a large number of individual and household characteristics were accounted for. Further research will be needed to establish the causal impact of slum residence on short and long-term measures of health in modern urban settlements in the region.

REFERENCES

1. UNDP. World Urbanization Prospects: The 2009 Revision. United Nations Population Division; 2011.
2. Bloom DE, Canning D, Fink G, Khanna T, Salyer P. Urban Settlement: Data, Measures, and Trends. In: Beall J, Huha-Khasnobis B, Kanbur R, . , 2010., editors. *Urbanization and Development: Multidisciplinary Perspectives*: Oxford University Press; 2007.
3. UNFPA. State of the World Population 2007: Unleashing the Potential of Urban Growth. *UNFPA, New York* 2007;**45**.
4. Montgomery MR, Balk D. The Urban Transition in Developing Countries: Demography Meets Geography. In: Birch E, Wachter S, editors. *Global Urbanization in the 21st Century*: University of Pennsylvania Press 2007.
5. UN–HABITAT. *State of the World's Cities 2006/7*. London: Earthscan Publications Ltd.; 2007.
6. Hill AG, Darko R, Seffah J, Adanu RMK, Anarfi J, Duda RB. Health of Urban Ghanaian Women as Identified by the Women's Health Study of Accra. *Int J Gynaecol Obstet* 2007;**99**(2): 150-6.
7. Ware JE, Kosinski M. Interpreting SF&-36 summary health measures: A response. *Qual Life Res* 2001;**10**(5): 405-13.
8. Ware JE, Sherbourne CD. The MOS 36-item short-form health survey (SF-36): I. Conceptual framework and item selection. *Med Care* 1992;**30**(6): 473-83.
9. Ware Jr JE. SF-36 health survey update. *Spine* 2000;**25**(24): 3130.
10. Ware J, Snow K, Kosinski M, Gandek B. *SF-36® Health Survey Manual and Interpretation Guide*. Boston, MA: New England Medical Center; 1993.