

CASE REPORT

Social determinants of health: poverty, national infrastructure and investment

Nathan T Douthit,¹ Haimanot Kasahun Alemu²¹Medical School for International Health, Ben Gurion University, Be'er Sheva, Israel²Department of Oncology, Addis Ababa University Tinkur Abessa Hospital, Addis Ababa, EthiopiaCorrespondence to
Dr Nathan T Douthit,
ntdouthit@gmail.com

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SUMMARY

This case presentation of a 19-year-old Ethiopian woman diagnosed with nasopharyngeal carcinoma reveals the barriers the patient has to medical treatment, including poverty and a lack of national infrastructure. The patient lives a life of poverty, and the outcome of her illness is a result of her being unable to overcome barriers to accessing health care due to inability to afford transport, lodging and treatment. In this case, the patient's vulnerability to disease due to her poverty is not overcome because of lack of infrastructure. The infrastructure fails to develop because of inadequate investment and other delays in building. The end result is that the patient is vulnerable to disease. Her disease process impacts her family and their contribution to Ethiopia's development.

CASE PRESENTATION

The patient is a 19-year-old Ethiopian woman from a rural area near Gondar. She lives 6 hours by bus from the University of Gondar Hospital, the nearest public hospital. She is one of six children. Her parents are farmers, and have always lived in poverty. Their estimated income is ~3 USD/day. The patient was married and quickly divorced twice at young ages (5 and 12 years) in order to help relieve the financial burden of her family.

When she was 16 years old, she was referred from the health centre in her area to the University of Gondar Hospital, due to swelling of her left sub-mandibular region. She received a biopsy but missed the follow-up appointment to see the results—it had been scheduled for 2 weeks later during the harvest days and the girl's father needed her help. Her symptoms worsened, and she left school due to difficulty concentrating from headache, greater swelling and discomfort when swallowing. Her younger sister also discontinued her education in order to care for her. The girl's poverty prevented her presentation to medical care as she could not afford bus fare and feared she would not be able to pay for the care when she arrived. She turned to the traditional Ethiopian medicine of holy water as a treatment for her disease. Over 2 years later, she returned to the hospital after recurrent emesis for 3 weeks with episodes of blood-tinged vomit. Biopsy was performed, and the patient was diagnosed with metastatic nasopharyngeal carcinoma. The doctors recommended a treatment regimen of Cisplatin and 5-FU (at a cost of ~US\$75 per cycle); however, those drugs were not available in Gondar at the time and would have to be brought from Black Lion Hospital in Addis

Ababa. There was a possibility the government would provide the drugs at no charge in Addis Ababa, but the patient could not afford the transportation fees. Her doctors also thought it likely that she would need radiotherapy, which was available only in Addis Ababa. The girl left the hospital as access to oncological care and further diagnostic testing was not possible due to distance and financial constraints.

The girl's symptoms worsened, and she returned again 4 months later. Physical examination showed a 10×10 cm mass on the left side of her neck with a smaller 2×2 cm mass below it. At that time, a general practitioner in the oncology ward at University of Gondar Hospital was in Addis Ababa, and she arranged for transport of the drugs from a public pharmacy and personally transported them to Gondar where the patient was hospitalised. The drugs were provided at no charge by the government due to the patient's evidence of financial need. The patient received an abrogated round of chemotherapy due to insufficient drugs, and responded well. The radiology department also carried out the imaging at no charge due to the patient's poverty. CT revealed a 5.3×2.8 cm nasopharyngeal enhancing mass extending to the first cervical canal space and compressing the spinal cord. The left carotid artery and jugular vein were occluded by the mass. Additional chemoradiotherapy was recommended, and the patient's father said he would find some way to raise money for travel and medicine. However, on return home, he found himself unable to do so. This was due to many factors, as poor harvest returns plagued his farm and recently the family's few cows had been stolen; also, the patient's father found himself embroiled in a family feud that made him unable to leave the home and unable to try to find alternative methods of raising money for his daughter's transport and treatment.

Currently, one week after her final admission, the patient is uncertain from where her treatment will come, if at all. A foreign oncologist who staffs University of Gondar Hospital has travelled to Addis Ababa for other business and will discuss her case with the doctors at Black Lion Hospital. It is possible that a sufficient number of other patients will not require the calculated dose of these drugs at University of Gondar Hospital and will donate them to this patient in order to pool the medicine for treatment. However, the only way the patient will be guaranteed full, continuous treatment will be for her family to find financial resources for travel, living and providing care in Addis Ababa.



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It has been reported that Ethiopian women with cervical cancer who travelled to Addis Ababa for radiotherapy spent an average amount of US\$378.8 on treatment and living expenses.¹ While the patient may be in severe enough poverty to qualify for free treatment, she will have to find money for her living and travel expenses. That amount represents an unattainable goal since the patient and her sister are even unsure of where they will find the money to pay for bus fare home, a cost equivalent to about US\$4 each.

GLOBAL HEALTH PROBLEM LIST

This patient's medical problem is further complicated by the cycle of

- ▶ Poverty;
- ▶ Lack of treatment options and social infrastructure;
- ▶ Failure to invest in social infrastructure;
- ▶ The effects of disease on a vulnerable population.

GLOBAL HEALTH PROBLEM ANALYSIS

Poverty

In 2010, the United Nations Development Program refined the concept of the human development index.² The intent was to shift focus away from income only and turn instead to the capability to develop. It was based on three core capabilities: to survive, measured by life expectancy at birth; to be knowledgeable, measured by mean and expected years of schooling; and to access a decent standard of living, measured by gross national income per capita.³ In 2015, Ethiopia ranked 174 out of 188 in the UNDP Human Development Index, making the country one of the poorest in Sub-Saharan Africa. The UNDP also reports that 88.2% of the population are multidimensionally poor based on health, education and standard of living metrics.⁴

The problem of poverty is a global one. The World Bank classifies ~3.5 billion people as living in low income (LIC) or low-middle-income countries (LMIC) in areas such as Asia, Eastern Europe, Africa, South and Central America, and the Pacific Rim.⁵ The low income of these countries certainly has adverse outcomes on health.^{6–8} The poor are vulnerable because they have no means to provide for their own health.⁶ Also, a higher burden of poverty has been shown to tend towards less public spending on healthcare.⁹ This shows that poverty exacerbates poor health and vice versa.^{10–13}

Poverty has many different roots including a history of 'pernicious institutional dynamics' such as slavery or colonisation, lack of natural resources, government corruption or armed conflict.^{14 15} Because these populations are vulnerable to attacks of disease as a result of their poverty, a strong societal infrastructure is necessary to ensure their ability to access healthcare at times of disease and personal disaster. According the Asian Development Bank, "Infrastructure is synonymous with economic development".¹⁶ To relieve poverty and impact health, this infrastructure must include education, transport and economic opportunity.¹⁷ From independence in 1962 to the mid-1980s, Uganda suffered from political turmoil, conflict and economic mismanagement. The government increased their public expenditure (in constant 1997 prices) from 264 billion shillings in 1982 to 1043 billion shillings in 1999. This is an annual growth rate of more than 8.4%. They increased their spending on education as a per cent of government expenditure from 20.07% to 35.5%. They spent 6.8% of expenditure on health, well above the African average of 4% in 1999, and their absolute spending on health increased more than threefold. As a result of road building and maintenance programmes, the average distance of a household from a tarred road fell from

32 km in 1997 to 22 km in 1999.¹⁸ By 2003, 27% of the rural population of Uganda lived within 2 km of an all-season road and the country has continued to invest in transportation.¹⁹ In 1996, 2.7 million people were enrolled in school, which grew to 6.6 million people by 1999 and reached 8.4 million by 2010.^{18 20} In 2008–2012, 92.5% of the male population was enrolled in a primary school, compared to 95.2% of the female population.²¹ These efforts resulted in a decrease in poverty, from 56% to 35%, from 1992 to 1999, which further decreased to 19.5% in 2012.^{18 21} Although a mismanaged healthcare system did not allow for growth in many health indicators during that time frame, the alleviation of poverty has led to recent improvement in their health indicators including a 53% reduction in mortality of those under 5 years of age, since 2000.^{22 23} Although the spending habits of the Ugandan government have changed in recent years, their example from a generation ago shows that this type of public expenditure can be very helpful in combating poverty and generating opportunity for economic advancement.

Lack of treatment options and social infrastructure

Without the aforementioned infrastructure, however, the poor will be vulnerable to poor health, especially as the burden of disease changes in low-income countries. Non-communicable disease in general and cancer in particular are on the rise in the developing world. Roughly four of five deaths from non-communicable disease occurred in the developing world in 2008.²⁴ By 2020, mortality rates from cancer are expected to increase approximately fivefold in the same population.²⁵ By 2030, non-communicable diseases are expected to account for one-half of the disease burden in low-income countries.²⁶ This is largely due to an ageing population and adoption of a Western lifestyle including decreased physical activity, poor diet and increased tobacco usage, in the developing world.^{24–27} This patient's illness reveals the weakness of the existing infrastructure and underpreparedness of the developing world to deal with non-communicable disease.

With a growing population of over 90 million, Ethiopia only has one cancer referral centre, Black Lion Hospital. It is a 600-bed institution with 18 beds allocated for cancer treatment. The hospital is located in the capital, Addis Ababa, and employs 201 physicians. Of these, there are two haematologists, four medical oncologists, four radiotherapists, two surgical oncologists, one paediatric oncologist and three palliative pain specialists. There is one CT scanner, one MRI and insufficient access to radiotherapy and other treatments. Long waiting periods and increasing demand for services also affect the centre. The hospital saw 2000 adults with cancer in 2010. The most common cases treated are breast, cervical and head and neck cancers. Owing to the high need, the wait for oncological consultation is estimated to be over 6 months.²⁸ Patients must provide for their own transportation, lodging and food, and pay for treatment in Addis Ababa, which can be prohibitively expensive.¹ Ethiopia is not alone. For radiotherapy, only 4 of 139 LICs and LMICs have adequate units. Of those countries, 55 have no radiation therapy facilities.²⁹ Another study revealed that, of 56 African countries, none have adequate cancer screening; 49 have cancer pathology services and 20 have radiotherapy services.³⁰

Many developing countries still require direct payments from patients at the time of service, which can prohibit the poor from using the service and bankrupt them even further when they finally seek medical treatment at the last moment, as in the case of the patient mentioned above.³¹ Also, the lack of transportation and housing options can be prohibitive for patients.¹

Social factors such as poverty, inadequate transport, educational deficits and lack of access place patients such as the girl described above at a disadvantage in health. Investment in healthcare and societal infrastructure can overcome these issues.³² It has been shown that access to health is improved by road infrastructure and that education improves health, and, additionally, that agricultural research and development can also create a healthier population.^{7 16 33–36}

While not a direct comparison to our case, the Chinese example can show that infrastructure building and health care are correlated. In 1985, China was 9 years removed from the turmoil of the cultural revolution. There were over 100 million Chinese living in poverty. Infrastructure including roads and agricultural research was weak, education was neglected and the poverty level was increasing. To address the issue of their infrastructure, the Chinese government built over 400 000 km of road, provided phone access to 16 million rural inhabitants and saw the amount of electricity consumed in rural areas rise from 18 billion to 180 billion kilowatts between 1975 and 1997. They also invested in agricultural research and mandated 9 years of education.³⁷ These efforts were shown to reduce income inequality and decrease rural poverty.^{38 39} China has also seen improvement in health outcomes. By 2004, they had increased life expectancy to 71 years, and seen maternal, infant and under five mortality rates drop to 0.05%, 1.8% and 2.0%, respectively.⁴⁰ More recently, cancer treatment has also improved. In 1986, the Office of Cancer Prevention and Control was established and successfully made efforts to reduce mortality among vulnerable populations, specifically in rural areas. In 2002, a national cancer registry was established in order to provide research and focus on cancer control efforts.⁴¹ The second stage of the national cancer control programme has succeeded in decreasing smoking prevalence.⁴² China now has more than 200 cancer hospitals, 30 tertiary-level hospitals for cancer and many general hospitals with cancer departments. There are 25 600 oncologists, and the number of oncology beds doubled between 2005 and 2010, now standing at 134 395. While still inadequate, China is scaling up its cancer treatment centres,

announcing a recent plan to greatly increase the number of healthcare delivery facilities throughout the country. China is also making efforts to decrease the price of antineoplastic drugs and increase the equity of its healthcare system in order to further decrease disparities.⁴¹ The example of China shows that good health for a poor population can be achieved by investment in infrastructure.

Failure to invest in infrastructure

Despite agreeing to the Abuja declaration in 2001, however, less than 10 African countries budget the targeted 15% of their spending on health.⁴³ In 2015, it was shown that LICs and LMICs spend significantly less of their already limited gross domestic products (GDPs) on healthcare (10.8% and 10.2%, respectively) than upper-middle-income or high-income countries do of their higher GDPs (12.5% and 13.5%, respectively). This brings the out-of-pocket expenditure to a prohibitively high level (42.3% and 40.4% for LICs and LMICs, respectively). It is also shown that healthcare spending leading to impoverishment is almost entirely concentrated in the lowest-spending quintile of countries. This quintile also contains a high median 41.2% of people who self-reported no spending on healthcare in a given year.⁴⁴ Despite improvement in public health spending in recent years, it was, respectively, still only 37.3% and 38.3% of total amount spent on health by LICs and LMICs (compared to 55.6% and 68.3% by upper-middle income countries and high-income countries, respectively). These numbers are despite the fact that net official developmental assistance doubled to low-income countries over the same period.⁴⁵ Reasons for the lack of investment in these countries include poor planning, armed conflict and high-level corruption.

Many of these countries do not plan to allot public spending in health services, equity programmes and other social goods. Of 22 LICs reviewed, less than 1/3 had actionable plans regarding employment, equality in education, gender equality in political representation and violence, maternal health and HIV/AIDS health, natural resource protection, and governance emphasising human rights and minority rights.⁴⁶ The WHO showed that,

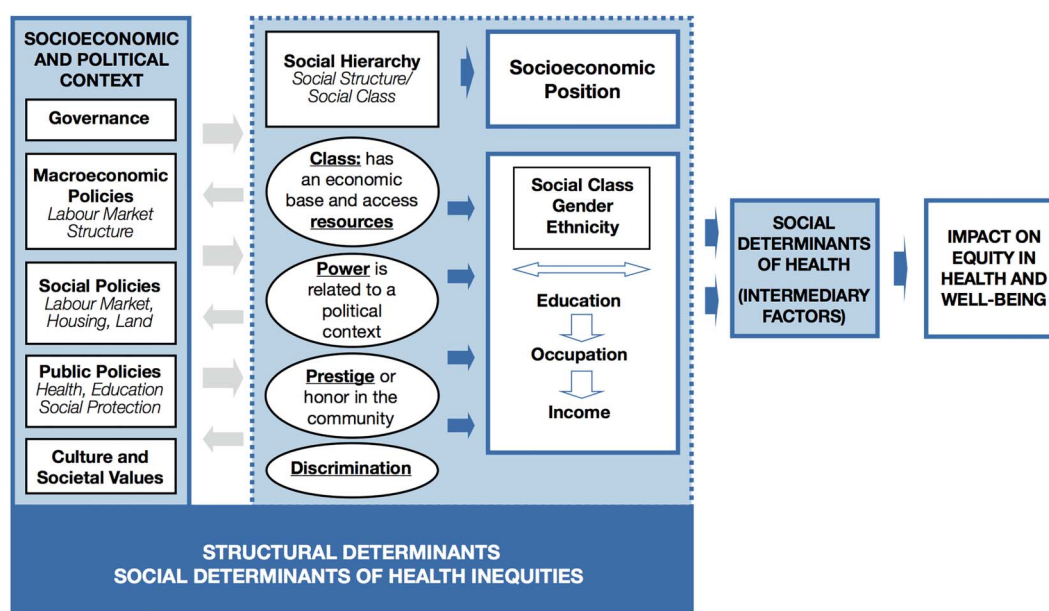


Figure 1 Reprinted from A Conceptual Framework for Action on the Social Determinants of Health: Social Determinants of Health Discussion Paper 2, Solar O, Irwin A. Chapter 5—CSDH Conceptual Framework, 35, Copyright (2010).

despite improvement, low-income countries spend less of their GDPs on education compared to other country groups (4.1% compared to 5.4% in high-income countries).⁴⁵

While not currently the case in Ethiopia, armed conflict is a concern for many countries in the region. It has been shown that “Two thirds of all armed conflicts take place in African countries with the highest poverty rates.... [T]he lower the GDP per capita in a country, the higher the likelihood of armed conflict”. This cycle is prevalent in Africa, which has a recent history of economic deprivation and armed conflict in many states, making it vulnerable to sudden economic shocks.^{47 48} Half of the world’s poor will live in states characterised by fragility, conflict and violence, by the year 2030.⁴⁹ Armed conflict results in a failure to invest a nation’s public infrastructure, which includes education, disaster relief planning and health.⁵⁰ It can also devastate a nation’s physical capital and human resources.^{51–53} These effects can have ramifications for over a decade following conflict.^{48 54 55} Reasons for conflict are varied but linked to common problems in developing countries.^{53 56}

Another problem is rampant high-level corruption. According to the UNDP, “All too often, even when resources are allocated, they do not reach the actual beneficiaries because of a lack of accountability in the distribution or use of funds”.⁵¹ It has been stated that 20–40% of official development assistance is stolen through high-level corruption.⁵⁷ The African Union reported, in 2011, that 25% of the GDP of African states is lost to corruption every year.⁵⁸ Higher levels of corruption have been linked to illiteracy, lack of access to clean drinking water and deficiencies in other basic public services.⁵⁹

The effects of disease on a vulnerable population

In the case mentioned above, the patient is seen as already vulnerable due to her poverty, lack of access to care and lack of education in her family. As her disease begins, however, she is unable to gain access to treatment, due to poor infrastructure including lack of educational and economic opportunity, lack of transport and inadequacy of ‘safety net’ options for the poor. After that, she is required to stop school, which further depletes her opportunity for economic advancement. Later, she is unable to assist in her family’s labour, decreasing their agricultural production and the contribution of her family to the economy. The disease also removes her sister from education, drives her parents further into poverty and removes opportunity for sustainable development within the country of Ethiopia. This type of process can risk security for other nations and can diminish international trade, and may impose an even heavier burden on the poor populations.^{60 61}

Ethiopia is making efforts to decrease poverty, to strengthen infrastructure and to reallocate their public spending. They have invested in public services such as safety nets, roads and agricultural production.⁶² The Black Lion Hospital has partnered with Norwegian and American universities in order to establish an oncology training programme to increase the number of oncologists in Ethiopia.⁶³ This partnership is attempting to increase the number of doctors produced by the country, to strengthen the health system.⁶⁴ They have begun pilot programmes for community based and social health insurance.^{65 66} These interventions are positive steps towards protecting patients, such as the girl described above.

Social determinants of health clearly impact health equity (see figure 1).⁶⁷ Our patient is vulnerable to the effects of ill health due to her social status. The Declaration of Alma Ata reminds us that health is a state of “complete physical, mental and social

wellbeing”, and that the “promotion and protection of the health of people is essential to sustained economic and social development and contributes to a better quality of life and world peace”.⁶⁸ To break the cycle seen in the patient described above, systems of transparent, honest and democratic governance must be created in which all the people have the voice to create a political will to improve their situation, including both, their social determinants of health and delivery of healthcare.^{50 68 69} The declaration’s ninth point emphasises that “All countries should cooperate in a spirit of partnership and service to ensure primary health care for all people since the attainment of health by people in any one country directly concerns and benefits every other country”.⁶⁸ Physicians must advocate for the resolution of social problems that lead to poor health as well as be involved in the delivery of healthcare.

Patient’s perspective

I understand the disease is not from God or Satan, but is something that happens to all people, I was just the unfortunate one to get it. I strongly desire to continue medical treatment, but am aware that that may not be possible. I want to know if it will be, because the best use of my time if not receiving medical treatment would be in holy water. Thank you for your willingness to tell my story, and I hope that perhaps it will help other people in my position.

Learning points

- ▶ Poverty creates vulnerable patient populations in the developing world.
- ▶ These populations are made even more instable by fragile or non-existent infrastructures in their developing countries.
- ▶ The lack of investment in these global populations (exacerbated in some locations by combinations of poor planning, armed conflict, natural disaster and corruption) increases their risk for a catastrophic outcome.
- ▶ This catastrophic outcome is bad for the patient, their family, their nation and the global community.
- ▶ Steps must be taken to decrease poverty, strengthen infrastructure and invest in people in order to avoid these catastrophes.

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