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Effect of Income Inequality on Health Status in a Selection of Middle and Low Income Countries

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Abstract: *The relationship between the public health status and income inequality has been taken into consideration in the last two decades. One of the important questions in this regard is that whether the changes in income inequality will lead to changes in health indicators or not. To answer this question, life expectancy is used as a health indicator and the Gini coefficient is used as an income inequality indicator. In this study, the relationship between income inequality and the public health has been investigated by panel data in Eviews software during 2000–2011 in 65 low-and middle-income countries. By using panel data and considering fixed effects and heterogeneity of sections, the relationship between income inequality and public health status is a significant negative relationship.*

Introduction

Economic welfare is undoubtedly the product of economic development process and economic development in its comprehensive sense occurs when the quality of life for all people is improved, in other words, when the public welfare is enhanced, which is among its objectives.

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Public health status is one of the major categories of social welfare. In today's world, health views have become broader and necessarily special attention has been focused on non-medical determinants of health. Each of these determinants greatly affects the health status spontaneously or by affecting each other and leads to some injustice in the health status. This means that the social determinants of health, such as the amount of income, level of education, occupation, nutrition, and social class have a major role in human health, and if they are overlooked they will make it impossible to achieve health objectives and establishment of justice in health. According to the definition of World Health Organization (WHO), health is a state of complete physical, mental and social well-being of an individual. Given this definition, health has physical, mental and social dimensions which are affected by social, economic and biological environment.

People's income in the community and the way of income distribution and income inequality discussion are among social and economic determinants of health in every society. Income inequality suggests the difference between the richest and poorest deciles of society, which is affected by structural factors of economy and social conditions in community.

The categories of income inequality and health are in close interaction with each other. Inequality in income distribution affects individuals' health through a variety of methods. In acute form, inequality in income distribution affects the health of all members of society, and in its more simple form, the inequality reduces the health of the poorest people in a society (Babakhani, 2008). A decrease in income inequality will lead to an increase in income available to individuals and households, so public health is promoted in this way and, on the other hand, an increase in the public health will provide the necessary contexts for society's economic development.

Given the importance of interactions effects between the two major socio-economic issues i.e. income inequality and health, the purpose of this study was to investigate the relationship between income inequality and public health in the selected low-and middle-income countries and developing countries[1] (65 countries) between 2000 and 2011.

The structure of the current paper is as follows: In section 2 literature review is presented. In section 3 the methodology of the research is developed, and in section 4 conclusion and suggestions are presented.

[1] The selection of countries is based on World Bank Country Classification by Income, which are indicated in Appendix.

Literature review

Health

Health is a human right and a basic need of every individual. In today's world of development, any society is judged by the quality of the public health and the amount of equitable distribution of health among different ranges of social classes. An increase in national wealth by itself does not lead to development, but there is an urgent need for health (Angus & Deaton, 2011).

Over the past century, life expectancy has increased up to 30 years in Europe and still continues to grow, which is due to a combination of improved living and working conditions of people, as well as developments in the field of medical care. But between 1970 and 2000, life expectancy has increased in South Asia by only about 13 years that this change in sub-Saharan Africa was about 4 months. Evidence indicates that individual's lower socioeconomic status will lead to a worse health status.

Numerous studies have used life expectancy and mortality rates to assess the general health of communities and factors such as inequality in income distribution, education, expenditures in public health sector, the level of per capita income, savings, gender and age of people are considered as the factors affecting health.

Several studies have indicated that inequality in income distribution has had negative effects on people's health. Moreover, education is also effective on health. Cutler has presented three explanations for the relationship between health and education: (1) Poor health leads to lower levels of school attendance because continuing to live with the disease makes continuing education weak or even impossible. (2) There are positive effects between family backgrounds and academic achievement. (3) More training leads directly to improved health (Emadzadeh *et al.*, 2011). Thus, current evidence suggests that there is a positive correlation between education and health; educated people have better health than those with lower education. The high level of health and the low level of illness and mortality confirm this issue.

Savings are also effective on health. It means that little health affects saving ability and motivations. Illness has a major effect on medical costs because more funding is spent on an individual's health; the smaller share is allocated to savings. So, people should have greater savings to meet their health needs.

Income inequality

Per capita income is one of the indicators of social well-being and its increase alone will not increase social and economic welfare, unless the income distribution is performed well. Wide inequalities in income distribution will lead to poverty and further gap in social classes. Income inequality indicators are among the most important indicators of income distribution in a society. Income inequality is the negative aspect of income distribution, which means that income inequality indicators show improper income distribution in a society (Raghfar, 2007). To measure inequality in income distribution there are different criteria that in this regard three major indicators include Gini coefficient, Theil index and Atkinson index.

One of the most suitable methods for the analysis of income inequality is the calculation of the Gini coefficient as it is independent of average and is symmetric. In this indicator, the transfer of income from the rich to the poor will reduce the indicator and its value is susceptible to the income distribution in middle groups in society. This scale has also more favorable statistical properties and thus makes it possible to assess the significance of the effect of policy changes on inequality in income distribution or expenses. In the table 1 the common measures for measuring income inequality and the advantages and disadvantages of each are shown.

Table 1. Commonly Used Measures of Income Inequality

Measure	Definition	Advantage	Disadvantage	Data Source
Gini-coefficient	Ranges from 0 (perfect equality) to 1 (perfect inequality); ratio of area between Lorenz curve and a line of perfect income equality	Most commonly used; simple interpretation	Comparability problems; not always constructed identically; lack of good data; not available for many countries/years	LIS; World Bank (Deininger and Squire 1996); WIID; U.S. census
Income Shares	Ratio of income of person at the xth percentile (often the 90th) to a person at the yth percentile (often the 10th)	Easily interpreted; can examine a range of extreme distributions	Lack of good data; not available for many countries/ years	LIS; World Bank (Deininger and Squire 1996); WIID; U.S. census

Table 1 continued

Measure	Definition	Advantage	Disadvantage	Data Source
Atkinson Index	Ranges from 0 to 1; relative position of the poorest is weighted by parameter e that measures society's aversion to inequality	Weighs the relative position of the poorest; allows for a range of e weights	Not commonly used; no consensus on best value for e; lack of good data; not available for many countries/years	LIS; World Bank (Deininger and Squire 1996); U.S. census
Theil Index	Ranges from 0 (complete equality) to infinity; a member of the entropy class of inequality measures	Weighs relative position of poorest; reliable data sets available	Not commonly used; not easily interpreted; based on wages, not income	University of Texas Inequality Project (UTIP)
Robin Hood Index	Ranges from 0 to 1; percentage of income needed to transfer from the richest 50 percent to the poorest 50 percent to obtain equality	Intuitively appealing; less sensitive to highly skewed distributions	Ignores the distribution of income within each 50 percent share; not available for many countries/years	U.S. census

Note: LIS = Luxembourg Income Survey; WIID = World Income Inequality Database.

Source: own work.

In this study, considering the advantages of the Gini coefficient and the availability and completeness of the data associated with it, this indicator is used to measure income inequality.

Health and income inequality

Samuel Preston in 1975, by inserting the health in the desirability of individuals and also assuming that the relationship between income and health is concave, showed that with rising income, health and longevity of the poor will be more affected than of the rich and then will improve income redistribution from the rich to the poor, and public health. The curve showed that there is a negative relationship between income inequality and life expectancy.

Many researchers have studied the relationship between income inequality and health. Those researchers have used different methods to find the relationship between public health status and income inequality. But what is discussed most by the researchers is income inequality as an independent

variable, and its effect on health as a dependent variable. Considering that income inequality may affect people's health some hypotheses have been proposed that will be briefly mentioned:

The absolute income hypothesis states that people's health is influenced only by their own income and income distribution has no effect on it. Consistent with this hypothesis, in poor countries the average income is more effective factor compared to income inequality factor that has an effect on public health and income inequality is relatively less effective, while it is contrary in the rich countries (Angus & Deaton, 2011). In poor countries, the average income is considered more effective factor for public health, as in these countries access to health facilities involves a significant share of income, but in the rich and developed countries the widespread availability to health services for all citizens is provided by the government and other social institutions and a high share of income seems not required for using this facilities.

Relative income hypothesis states that people's health can also be affected by other people's income, i.e. if people in addition to their income compare the level of their lives with each other, the income of others can affect their health. This hypothesis says that comparing the income with those who earn higher incomes compared to those who have lower incomes is probably more disturbing than comforting. When the average income in a class grows, it can cause people of that class to be more optimistic about their future (Karen & Rowlingson, 2011). If the change in income inequality is in the direction of increase, this, in turn, will increase the rate of mortality and reduce life expectancy. Wilkinson proposed the relative income hypothesis: within the state the individual's health is associated with his income, while among the states the health is weakly dependent on the average income, however it will be strongly and negatively related to income inequality factor.

The social effect of income inequality implies that income inequality in a society is effective on the health of any person. In societies where income injustice is more serious, the level of social capital and the education level are lower and mutual trust is damaged, leading to lower levels of health in the society. There is also a strong relationship between income inequality and crime, people in societies with high income inequality may be subject to higher rates of crime (which has a direct effect on people's health) and finally unequal societies will more follow the trend of polarization and thus less public resources, such as public health services may be developed in them (Pulok, 2012).

Among the criticisms about a one-dimensional study of the relationship between income inequality and public health is that the role of intermediate variables or confounders is not considered in a one-dimensional relation-

ship. For example, in the relationship between income inequality and health, the positive effect of reduced income inequality on health may be due to increased per capita GDP growth rather than mere reduction in income differences between people in the society. The advantage of multi-dimensional studies is that in such studies other intermediate variables are controlled or calculated and clearer relationships are obtained between income inequality and health than direct examination of total income inequality and health measures. Generally, since 1990s studies related to the examination of the relationship between social determinants of health such as economic development and income inequality and health have been conducted in the form of multi-dimensional studies and by controlling each of them (Leigh, 2007).

In the table 2 some studies are presented due to the results of income inequality measures and obtained results to complete this section.

Table 2. Relationship between income Inequality and health – Literature Review

Author	Income Inequality Measure	Main Outcome Variable	Controlled for Covariates	Study Design	Income Inequality Related To Health?
McIsaac and Wilkinson (1997)	Decile shares of income (LIS data)	Mortality (multiple categories), IMR, potential years of life lost (PYLL)	No	Cross-sectional; correlations only; data from 12 wealthy OECD countries	Yes
Shi *et al.* (1999)	Gini	Mortality, post and neonatal mortality, life expectancy	Yes	Cross-sectional study; U.S. census et al, 1990	Yes
Blakely *et al.* (2000)	Gini (state level)	Self-rated health	Yes (gender, age, race, median household income, state income)	Cross-sectional with time lag; U.S. Current Population Survey (1979-1981, 1983-1985, 1987-1989, 1991-1993, 1995-1997)	Yes

Table 2 continued

Author	Income Inequality Measure	Main Outcome Variable	Controlled for Covariates	Study Design	Income Inequality Related To Health?
Bobak *et al.* (2000)	Gini (country level)	Self-rated health	Yes (material deprivation = food, clothing, heating; control, education, income)	Cross-sectional study; representative samples of adults in 1996/1998 in Russia, Estonia, Czech, Lithuania, Poland, Latvia, Hungary	No (not after controlling for material deprivation score)
Clarke and Smith (2000)	Health Concentration Index	Self-reported Health Concentration Index	Yes	Cross-sectional study; Australian National health survey, 1990/ 1995	Yes
Ross *et al.* (2000)	50 percent income share	Mortality	Yes	Cross-sectional study, OLS regression model; Canadian provinces and MSAs, U.S. states and MSAs; Census data 1990-1991	Yes for United States, no for Canada
Lochner *et al.* (2001)	Gini (statelevel in five categories)	Individual risk of mortality	Yes (age, income, race, gender, marital status)	Prospective design; U.S. National Health Interview Survey linked to National Death Index, 1991	Yes (most pronounced for near-poor whites)
Lynch *et al.* (2001)	Gini coefficient, LIS data	Mortality categories, IMR, life expectancy, distrust, organizational membership, control, union, women in government	Yes (GDP and population size)	Cross-sectional; correlations only; OECD countries; World Health Organization (WHO) and world values survey data, from mid-1990s	Yes (for IMR only), no (psychosocial variables show mixed results)

Table 2 continued

Author	Income Inequality Measure	Main Outcome Variable	Controlled for Covariates	Study Design	Income Inequality Related To Health?
Sturm and Gresenz (2001)	Gini	Self-rated health, chronic medical conditions, and mental health	Yes (family income, age, gender, race/ethnicity, family size)	Cross-sectional ecological study; populationbased survey data from nationally representative community tracking study (United States only)	No (not after controlling for education and family income—strong predictors of health in this study)
Blakely, Lochner, and Kawachi (2002)	Gini (high, medium, low categories)	Self-rated health	Yes (individual and metropolitan area)	Cross-sectional; U.S. Current Population Survey data, 1996-1998; census data 1990 for income	Yes (but not after controlling for household income and not at county level)
Mellor and Milyo (2001)	Gini coefficient, income ratios	Life expectancy, allcause mortality, IMR, low-weight births, homicide, suicide	Yes (income, education, year, urban, black)	Cross-sectional for different time periods; 30 countries, 48 U.S. states, 1960s-1990s	No (relationship not consistent, income inequality associated with both better and poorer outcomes)
Osler *et al.* (2002)	Median income share by parish	Mortality risk	Yes (household income, household and demographic characteristics)	Pooled, representative cohort studies (more than 25,000 people followed for 13 years) in Denmark	NO
Shibuya, Hasimoto, and Yano (2002)	Gini	Self-related health	Yes (individual income and demographic characteristics)	Cross-sectional analysis of more than 80,000 Japanese adults in 1995	No

Source: own work.

Methodology of the Research

Research Background

Many studies have been conducted on the relationship between economic growth and health, as well as the relationship between income inequality and health. In a cross-country study, which cross-examined 51 poor and rich countries, by investigating the relationship between GDP per capita and three measures of health (life expectancy at birth, life expectancy at age five and infants' mortality), it was shown that both GDP per capita and income distribution (measured by the Gini coefficient) have a high correlation with health indicators (Kawachi *et al.*, 1998).

Flegg (1982) examined factors influencing the rate of infants' mortality in 46 developing countries. In a regression model, only variables of GDP per capita and the Gini coefficient explained 55% dispersion of infant mortality rates in countries, and both predictive variables were statistically significant (Meleod, 2003). By using metropolitan statistical areas (MSA) Lynch *et al.* (1998), found that income inequality is associated with increased mortality in per capita income levels in the USA. Richard G. and Wilkinson in a review study identified and collected 155 research studies containing 168 analyses on the relationship between income distribution and public health. They divided studies conducted on the relationship between income inequality and health into three category based on the intensity of correlation: (A) Studies in which the relationship is statistically significant and positive, (B) Studies that were somewhat significant, but not completely, (C) Studies in which no significant relationship was observed between the variables. According to their surveys, 87 studies showed a complete relationship between income inequality and health, 44 studies relatively confirmed the relationship and 37 studies rejected the relationship between inequality and health (Wilkinson, 2006).

Deaton (2003), by reviewing the effect of income inequality on the health of people in rich and poor countries showed that income inequality is not the only factor influencing people's health. In the other case study, Subramanian and Kawachi (2004), examined the results of multilevel studies on the relationship between income inequality, poverty and public health. They found that despite considering control variables in different studies, income differentials are still a serious threat to the public health. In a study, Leigh *et al.* (2007) investigated the relationship between income inequality and mortality in 12 developed countries during 1920–2000 by panel data and their results show that the share of income does not affect public health.

Babakhani (2008), in his article entitled "Economic development, income inequality and health in Iran" examined the positive relationship between reduced income inequality and increased economic development and health during 1976–2006 by using regression test. In a survey of 46 wealthy and non-wealthy countries, Brown and Preuss (2008), showed that income inequality does not a direct negative effect on the public health in wealthy countries. Cutler *et al.* (2008), in a study of socioeconomic status and health in developing and industrial countries during 1986–1995, showed that economic and social variables significantly affect public health. Buckerman *et al.* (2009) investigated the effect of income inequality on health indicators in Finland during 1993–2005 by using regression method and their results suggest that there is a significant and negative relationship between people's mental health and income inequality.

An investigation of interaction between income inequality and health is studied by Pajouyan and Vaezi (2009) for 30 provinces in Iran during 1982-2006 by using panel data and fixed effects method. The results show that the public health is affected by income inequality and there is a negative correlation between them. Emadzadeh *et al.* (2009) in their study using panel data model and random coefficient model showed that income inequality has an inverse effect on health in selected OIC[2] member countries during 1980–2005. Drabo (2010) investigated the relationship between health indicators, environment variables and income inequality in 90 developed and developing countries between 1970 and 2000. The results of this study suggest that income inequality has a negative effect on health and environmental quality.

Idrovo *et al* (2010) in a cross-country study in 110 countries showed that social capital and income inequality have a direct effect on life expectancy. Elgar (2010) in a study examined the relationship between income inequality and public health in 33 countries. He investigated government expenditures on health, life expectancy and youths' mortality as health indicators of young people and his results show that income inequality has a negative relationship with government expenditures on health and life expectancy and a positive relationship with youth's mortality.

Mellor and Milyo (2010) studied the effect of income inequality on individual health status in the United States during 1995–1999. They indicated that there is no significant relationship between income inequality and individual health status.

Ismaili *et al.* (2011) reviewed the relationship between income inequality and public health in a group of Islamic countries by using regression model. Their results suggest that income distribution has no significant

[2] Organization of Islamic Conference

effect on people's health, but the income level has a significant positive effect on health.

Ghanbari *et al*. (2011) studied the relationship between income inequality and public health by using life expectancy and mortality rate as health indicators, in 125 countries during 1995–2007 by panel data and showed that with increased income, life expectancy increases and mortality rate decreases and there is no significant relationship between income inequality and health indicators.

Torre and Miriskila (2011) investigated the relationship between income inequality and public health in 21 developed countries for a period of 30 years by using panel data and showed that there is a positive and significant relationship between income inequality and mortality in men and women. Pop *et al.* (2012) in a study in which they reviewed 140 countries during 1987–2008 by using the regression model, found a negative effect of income inequality on life expectancy.

Pulok (2012) examined the relationship between income inequality and health in 31 low-and middle-income countries during 1982–2002 by using panel data. The results of this study show that there is a positive effect between health and income distribution. Nilsson and Bergh (2012) in a study investigated the relationship between income inequality and individual health in Zambia during 2004–2005, and by using linear regression showed the negative effect of income inequality on individual health. Motafaker Azad *et al.* (2013) studied the effects of income distribution on indicators of life expectancy and mortality rate in children under five years during 1976–2007 by using co-integration method and concluded that improvement in income distribution can enhance health standards in Iran.

Model introduction

In the current study the relationship between income inequality and health in low-and middle-income countries by using regression models was investigated. To achieve this goal, at first the relationship between research variables by using Pulok model (Pulok, 2012) is as follows:

$$LOG(H) = LOG(GI) + LOG(GDP) + LOG(ED) + LOG(HE) \qquad (1)$$

where:
H – life expectancy,
GI – Gini coefficient,
GDP – gross domestic product,
ED – expenditures for general education,
HE – health costs.

Model analysis and estimation

Empirical findings are presented in this section to review the effect of income inequality on health in 65 low-and middle-income countries during 2000–2011. Required data are derived from the World Bank website. In the related experimental findings by using Eviews software, initially bound F-test or Hausman test was performed. Then, basing on test results, an appropriate approximation is estimated.

Unit root test

As can be seen in the table 3 , based on Levin, Lin and Chu statistics, the null hypothesis, which is the existence of unit root in all variables in this study at the high confidence level 99 % is confirmed. In other words, basing on this test, all variables used in this study are stationary at the high confidence level 99%.

Table 3. Stationary evaluation of research variables at confidence level

ED	GI	HE	GDP	H	Unit Root Test
0.0000	0.0001	0.0000	0.0000	0.0000	Prob (Levin, Lin & Chu)

Source: Research findings.

F-Limer test

According to the theoretical bases of the test, if the calculated F is greater than F in the table, then the null hypothesis is rejected and therefore the constrained regression is not valid and different intercepts should be considered in estimation.

Table 4. Fixed effects test

Prob	d.f.	Statistic	Effects Test
0.0000	(64.641)	399.43	Cross-Section F

Source: Research findings.

Because the probability is less than 5%, the pooled estimate is rejected and fixed or random effects are confirmed.

Hausman test

To distinguish between fixed or random effects, the Hausman test is used.

Table 5. Hausman test

Prob	d.f.	Statistic	Effects Test
0.03	41	10.39	Cross-Section Random

Source: Research findings.

According to the above table, the calculated F is greater than F in the table, so that the probability (F) based on software output (and Table 5) is smaller than 0.05, so the fixed effects model should be used to estimate. Thus, according to F-Limer test and Hausman test, fixed effects are acceptable estimation.

The results of model estimation

According to Table 4, the coefficient of determination is estimated 98% that shows independent variables could explain 98% dependent variable changes.

As seen in the above estimate, the Gini coefficient (GI) with a coefficient of 0.5 was significant at the 5% error level and has a negative effect on life expectancy in low-and middle-income countries. This means that the increase in the Gini coefficient will lead to decrease in life expectancy.

GDP has also a positive and significant effect on life expectancy so that if GDP increases 1%, life expectancy will increase 0.71%.This suggest that higher GDP is associated with increased life expectancy during the observation period in this sample of countries. Improvement in economic growth will lead in improvement in real per capita income that results in health status improvement. It means that an improvement in the economic growth as a main determinant of economic development with other determinants, such as income distribution together, induces a healthier society.

Public expenditure on education also has a significant positive effect on life expectancy, such that if the cost of public education increases by 1%, life expectancy increases by 0.52%. This implies that higher public expenditure on education causes higher life expectancy over this study. One of possible reason for this finding is that education in its many forms impacts

on environments and social relations, changing the nature of the contexts people inhabit and also enhancing the resilience of individuals and other agencies to protect themselves against potential shocks to health (Feinstein *et al*., 2006).

Health expenditures also have a significant positive effect on life expectancy such that if health expenditures increases by 1%, life expectancy increases by 0.15%. This result indicates that an increase in health expenditure leads to increased life expectancy in those countries. In general, increased health care spending leads to increased availability of health care resources (per capita number of doctors, nurses, MRI units ,..), which induces higher rate of life expectancy.

According to the above mentioned results, GDP and Gini coefficient are the most important significant variables that affect life expectancy in this sample of middle and low income countries.

Overall, GDP, public expenditure on education and health expenditure, had significant and positive effects on life expectancy. This means that in this group of countries the higher the rate of GDP, expenditure on general education and health expenditure, the more likely it is that people will live longer and healthier lives.

On the other hand, the negative effect of Gini coefficient on life expectancy demonstrates that higher income inequality will lead to lower life expectancy and therefore income inequality is harmful to health.

Table 6. Model Results

Variable	coefficient	t-student	Prob.
C	3.8	154	0.00
LOG(GI)	-0.5	-2.17	0.03
LOG(GDP)	0.71	11.92	0.00
LOG(ED)	0.52	1.97	0.05
LOG(HE)	0.15	2.26	0.02
R^2	0.98		
D.W	1.9		

Source: own estimation.

Conclusions

In recent years, improved health is a necessary condition for economic development, because health improvement is considered as a factor to increase economic facilities of production, increases public potential income and can lead to economic development with reduction of the rate of depreciation of human capital through education.

At the same time, health is considered as a commodity and capital goods. From commodity perspective, people seek to have health, as in this case they will enjoy more their quality of life. From capital goods perspective, the relationship between time and health is so that if people's health condition is good, they will have fewer sick days and more days to work and earn. Hence, in this study, some low-and middle-income countries were evaluated for 12 years in the context of panel data and fixed coefficients model.

In this study, the Gini coefficient and life expectancy were used as income inequality and health indicator respectively and it was tried to examine the relationship between income inequality and health status in selected low-and middle-income countries by using panel data and fixed effects. As shown, increased per capita income will lead to increased life expectancy and an increase in the Gini coefficient (income inequality) will reduce life expectancy. By using panel data and considering fixed effects and heterogeneity of sections, the relationship between income inequality and public health was statistically significant that is consistent with the theoretical foundations.

The results of this study suggest that inequality in income distribution has an inverse effect on health status and communities with more unequal distribution of income, experience worse health status that this result is consistent with studies of Pulok (2012) and Emadzadeh *et al.* (2011). Per capita income and expenses spent on education that will lead to gain more knowledge in the field of observing hygiene principles have a positive effect on health status of the communities under studied. As a result of appropriate policies and their implementation by governments, they are an effective factor in the field of health and treatment for improving health and treatment indicators in each country.

What is certain is that to improve health one should not only rely upon the primary care system, but should focus on the assumptions of improving income inequality condition, as improvement in income distribution will lead to increasing standard of living of large segments of the population through improvements in their health, nutrition and education that will result in increased efficiency in production and boost their motivation to participate in programs for economic and social development in society.

Among the policies to improve the unequal distribution of income in countries, the policy of a significant increase in health and health care system where these facilities are not available can be cited.

The results also showed that increased government expenditures on education and enhanced expenditures in health sector will lead to increased life expectancy and health level in society, that this case should be considered in policy making.

These findings suggest that improving childhood health may lead to superior socioeconomic outcomes later in life in addition to current health improvements. Moreover, the government efforts would be better directed at general schooling. Since the societies with large income inequalities may lack the capacity to promote health and successful aging, improving income distribution, increasing, the share of health expenditure from GDP and investment in general education are valuable to experiment with policies targeted along these lines.

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Appendix

Table A-1. List of Countries

Albania	Fiji	Mexico	Tajikistan
Argentina	Georgia	Mongolia	Tanzania
Armenia	Ghana	Morocco	Thailand
Azerbaijan	Guatemala	Namibia	Togo
Bangladesh	Guinea	Nepal	Tunisia
Belarus	Hungary	Nicaragua	Turkey
Bolivia	India	Niger	Ukraine
Brazil	Indonesia	Pakistan	Zambia
Bulgaria	Iran	Panama	
Cambodia	Jamaica	Paraguay	
Cameroon	Kazakhstan	Peru	
Chad	Kenya	Philippines	
Colombia	Kyrgyz Rep.	Romania	
Costa Rica	Madagascar	Rwanda	
Cote d'Ivoire	Malawi	Senegal	
Dominican Republic	Malaysia	Sierra Leone	
Ecuador	Maldives	South Africa	
Egypt	Mali	Swaziland	
El Salvador	Mauritania	Syrian Arab Rep.	