ORIGINAL ARTICLE

The Relationship between Producing Health and Contextual Factors Across Countries: A Panel Data Analysis

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Abstract

Background: There are substantial differences in the health outcomes across countries. Then, assessment of the status of health indicators can give us a valuable information to adjust policies to improve the health status in the world. This paper examines differences and relationships of health status and contextual factors.

Methods: This is a multi-country cross-sectional study performed using secondary data of different sources in 2019. We identified indicators that revealed the relationships of health status and health coverage and also contextual factors by expert panel which consist of two categories of indicators: (1) producing health indicators as dependent variables (Life expectancy, Healthy life expectancy, Maternal mortality ratio, Under-five mortality rate and Universal Health Coverage (UHC) service coverage indicator); (2) contextual indicators as independent variables (Current Health Expenditure, Skilled health professionals density, Population density and Government Type). Also, countries were categorized based on the income level and six regions of World Health Organization (WHO). We used SPSS 20 software for a descriptive analysis and R 2018 software for statistical analysis and also drawing of scatter charts.

Results: Results showed a considerable gap between the average of life expectancy (84.2 vs. 53 years) and healthy life expectancy rate (72-63.3 years). This disparity was observed in the Maternal mortality and Under-5 mortality rate (from 882 to 3 per 100000 live births), (5 is 2.1 and the highest is 127.3). Although there was a marginal correlation between population density indicator and life expectancy, healthy life expectancy, and under-5 mortality rate indicators (±0.2), there was no correlation between population density and maternal mortality rate with UHC (P>0.05).

Conclusion: There is a considerable difference between countries in producing health indicators based on contextual indicators; a comprehensive health system approach that can result in improvement in the health outcome.

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Introduction

The world health organization has defined health as the state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.[1] Health pattern, in the late 20th century, focused on individual's

health and diseases. Gradually, this was replaced by a social pattern, in which health is an outcome of a set of factors such as social, economic, cultural and environmental, housing, employment and society's circumstances. In other words, lately the concept of health has become wider and includes major aspects of human life and his environment (such as environmental, physical, social and economic issues) and is not limited to the lack of disease or individual health.[2]

The context of people's lives determines their health, so blaming individuals for having poor health or crediting them for good health is no longer suitable. Individuals are unlikely to be able to directly control many of the determinants of health. These determinants—or things that make people healthy or not—include the above factors, and many others such as economic and social status, or income levels are linked to better health. The greater the gap between the richest and poorest people, the greater the differences in health. Access to health care services is among other important factors that affect health status.[3-5]

Given the current health inequities between different countries and the emphasis on humans and their needs as guarantees for health, an emphasis has been put on health (health security) as a main element of human safety in ranking both developed and undeveloped countries. Accordingly, on Sep 25, 2015 the United Nations (UN) passed the progress order "Transforming our World: the 2030 Agenda for Sustainable Development".[6] The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by all UN member states in 2015 as a universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by 2030. The 17 SDGs are integrated; that is, they recognize that action in one area will affect outcomes in others, and that development must balance social, economic, and environmental sustainability.[6, 7] Through the pledge to Leave No One Behind, countries have committed to fast-track progress for those furthest behind first. That is why the SDGs are designed to bring the world to several life-changing 'zero', including zero poverty, hunger, AIDS, and discrimination against women and girls. Everyone is needed to reach these ambitious targets. The creativity, knowhow, technology, and financial resources from all of society are necessary to achieve the SDGs in every context.[8] A considerable number of these goals are (directly or indirectly) related to health and its improvement.

To evaluate the status of these goals, researchers have developed 47 indicators for health status.[8] SDGs have set some minimums for health indicators for countries to reach, but evaluating these indicators in various countries has shown a great inequity between them.[8, 9] A child born in a high-income country is at risk of death in the first month, which is only one-tenth the risk for a child born in a low-income country. At the country level, neonatal mortality rates in 2020 ranged from 1 death per 1,000 live births to 44, and the risk of dying before the 28th day of life for a child born in the highest-mortality country was about 56 times higher than in the lowest-mortality country nationwide; infant mortality rates in 2020 ranged from 1 death per 1,000 live births to 44, and the risk of neonatal mortality in the highest-mortality country was about 56 times higher than the lowest-mortality country.[10] Therefore, performance on the UHC effective coverage index increased from 45.8% in 1990 to 60.3% in 2019, yet there is inequality in this index at national-level; UHC effective coverage in 2019 still spanned from 95 or higher in Japan and Iceland to lower than 25 in Somalia and the Central African Republic.[11] Assessment of the causes of inequity and the status of these indicators in countries with different context can provide us with valuable information on identification of determinants of health status; by using them we will be able to adjust policies on national and international level to improve the health status.[12, 13]

With consideration of SDGs and their ultimate goal based on elimination of inequalities in essential health indicators, and also after several years in implementing the SDGs, we aimed to answer the question "Is there still a difference in producing health in countries with different social-economic statuses?" and "How much is the difference?"

Methods

This is a multi-country cross-sectional study performed using secondary data of different sources in 2019. This study aimed to determine the relationship between producing health indicators and contextual indicators of countries.

This study consisted of three key steps. The first step was indicator selection; we conducted a qualitative analysis, i.e. literature review and collecting the experts' opinions to identify the indicators. First, a scoping review of related studies identified a list of related indicators to the objectives of our research.[14] Second, we examined the existence of data associated with each indicator and the reliability of the data source, according to which many indicators were excluded. Finally, the included indicators were reviewed and approved by an expert panel, comprising of the research team plus selected key informants in the field of heath management, policy and economics. Our expert panel selected two categories including producing health indicators as dependent variables and contextual indicators as independent variables. Based on panel opinions, we choose producing health indicators that revealed the relationships of health

status and health coverage in countries based on the SDG_s.[15-18] Finally, five indicators were selected. For another category, we choose four indicators (Table 1).

The reasons for the selection of the contextual indicators were following as below:

- Two indicators of CHE and SHP are regarded as proxies of government obligation to health. Thus, showing a relationship between these two indicators and health indicators can show the governments' obligations to people's health and their health status.[11, 19-22]
- Population density indicator, as an independent context variable, (that is less controllable) is used to determine the relationship between population density and health status of a country.[23, 24]
- Health concerns are different according to values and philosophies of each country (that are displayed in Government type). To answer the question "Is the type of government related to health status of citizens?", we chose the "Government type" indicator.[25]

In summary, nine indicators were chosen as the main variables into two categories for this study. In the second step, regarding using secondary data in the study, we attempted to select valid data via various sources regarding the variety of indicators. The key element in choosing sources was the validity and reliability of the registered data, so that the assessments and comparisons of the study (on international levels) would be correct and close to reality. The data sources used for this study are listed in Table 1.

In the third step, we should identify the countries which had valid data in the selected indicators. Generally, 194 countries were candidate for further analysis based on availability of their data in the book "World Health Statistics Overview 2019". Initially, we intended to enter all the countries into the study, but a number of countries did not report data for the contextual variables; therefore, inevitably 25 countries were excluded regarding lack of valid data. Finally, 169 countries were included for investigating through the study. The research team used a checklist based on the study goals for data gathering. Meanwhile, for a clearer description of indicators, countries were categorized as follows:

1. Categories based on six regions of WHO: We categorized countries based on WHO regions including: Regional Office for Africa (AFRO), Regional Office for the Americas (AMRO), Regional Office for the Eastern Mediterranean (EMRO), Regional Office for Europe (EURO), Regional Office for South East Asia (SEARO), and Regional Office for the Western Pacific (WPRO) (see more details in Supplementary file)

2. Categories based on the income level averages: The 2019 SDG report categorizes countries according to their income groups including: High Income Countries (HICs), Upper-Middle Income Countries (UMICs), Lower-Middle Income Countries (LMICs), and Low-Income Countries (LICs). We calculated the geometric means of each indicator for income groups separately and then compared them with each other (see more details in Supplementary file).

Data Analysis

The relationships between variables were analyzed separately. We measured the correlations between each variable using Spearman Correlation. For measuring the correlation between dependent and independent variables, the correlation coefficient was used. The correlation coefficient is always a number between -1 to +1. A number between 0 and 1 means a positive correlation (the closer to 1 the stronger the correlation); positive correlation means that with increase in one variable, the other also increases. A number between 0 and -1 means a negative correlation (the closer to -1 the stronger the correlation); negative correlations means that with decrease in one variable, the other also decreases. The interpretation of this coefficient is as follows:[26]

- Coefficient between 0 and 0.29 shows a weak correlation
- Coefficient between 0.30 and 0.69 shows an average correlation
- Coefficient between 0.70 and 1 shows a strong correlation

Additionally, to analyze the relationship between producing the health indicators and government type,

Table 1: The variables of study

Indicators	Label	Source of data
Producing health indicators (Dependent variables)		SDG annual report 2019
Life expectancy at birth b,c (years)	LE	SDG annual report 2019
Healthy life expectancy at birth (years)	HLE	SDG annual report 2019
Maternal mortality ratio (per 100 000 live births)	Maternal mortality	SDG annual report 2019
Under-five mortality rate (per 1000 live births)	U5 mortality	SDG annual report 2019
Index of effective coverage of health services	UHC	SDG annual report 2019
Contextual Indicators (Independent variables)		
Current Health Expenditure[6] per Capita in PPP (in consent ppp)	CHE	Global Health Observatory (WHO)
Skilled health professionals density (per 10 000 population)	SHP	Global Health Observatory (WHO)
Population density (pop/km2)	Population density	World Bank (WB)
Government Type	Government	CIA fact book 2019

firstly the type of government of the countries were identified, and then analyzed by correlation test; lastly, they were demonstrated as scatter charts. We used SPSS 20 software for a descriptive analysis and R 2018 software for statistical analysis and also drawing of scatter charts.

Results

Descriptive Analysis

As mentioned in the methods section, due to high volume of data divided by countries, we present them in WHO's regional and income level categories. The highest and lowest LE were 84.2 and 53 years, respectively; African region countries (61.2 years) and also low-income countries (61.4 years) had the lowest average. The average of HLE rate was 63.3 years, which is 8.7 years less than the highest life expectancy. Countries in WPRO (68.9 years) and HICs (70.1) had the highest HLE (Table 2). Maternal mortality rate varies from 882 to 3 per 100000 live births globally (SD=6.8). AFRO countries (with 542 deaths per 100000) had the highest and EURO counties (with 16 deaths per 100000) had the lowest maternal mortality. The lowest mortality U5 mortality was 2.1 and the highest 127.3. The lowest to highest order for this rate in WHO regions were EURO, WPRO, PAHO, EMRO, SEARO, and AFRO. In the income level category of the countries, this rate increased according to the income level (Table 2).

UHC rates were highest in EURO countries (78%) and lowest in SEARO countries (44%) with an average of 64% (SD=14.2). In all producing health indicators, average status of the indicators improved along with increase in income in countries (Table 2).

The CHE average is $ 1564.2(SD=1816.7) and the highest numbers belonged to EURO region ($2879.8) and lowest to SEARO ($386). SHP, with an average of 61.3 per 1000 population (SD=53.9) was the highest in EURO (118.7 per 1000 population) and lowest in AFRO (13.7 per 1000 population). The average for population density in the world was 449.2 people per square kilometer (SD=2303.4); this indicator for AFRO (666.7 person in each square kilometer) was the highest and for PAHO (125.5 person in each square kilometer) was the lowest number (Table 2).

21 types of government were detected. Among 169 countries, most of them were govern by a "Presidential republic" system (59 countries), followed by "Parliamentary republic" system (35 countries) in the second and "Parliamentary democracy" system (15 countries) in the third place; with 8 countries with their own unique government types including governments led by communist party, constitutional federal republic, national confidence, constitutional monarchy of the federal parliament, federation of kingdoms, presidential and parliamentary elections, semi-presidential federation and single parliamentary republic (Figure 1).

Analytical Statistics

According to CHE with LE interactive distribution chart divided by WHO regions, the number of countries with high LE increases with an increase in CHE. Most of the PAHO countries are in the first quarter of the chart (low CHE, lower LE); this reveals that there can be exceptions in high CHE and low LE (and vice versa). The CHE with HLE interactive distribution chart also displays the same patterns and results.

Table 2: Descriptive statistics of the variables based on WHO regions and income level groups

Variables	Global				WHO regions						Income level groups			
	Global Average	Upper	Lower	SD	EMRO	AMRO	EURO	AFRO	SEARO	WPRO	HICs	UMICs	LMICs	LICs
Producing health Indicators (Dependent variables)														
Life expectancy	72.0	84.2	53	7.4	69.1	76.8	77.5	61.2	69.5	76.9	79.4	73.8	68.1	61.4
Healthy life expectancy	63.3	76.2	44.9	6.8	59.7	67.5	68.4	53.8	60.4	68.9	70.1	65.1	59.8	53.8
Maternal mortality	216	882.0	3.0	207.6	166	52	16	542	164	41	15.5	60.9	236.4	497.0
U5 mortality	40.8	127.3	2.1	28.9	51.7	14.2	9.6	76.5	38.9	12.9	6.3	18.6	44.6	77.6
UHC	64	79	29	14.2	64	53	78	73	44	55	75	73.2	67.4	53.7
Contextual Indicators (Independent variables)														
CHE	1564.2	10246.1	37.3	1816.7	1473.5	1535	2879.8	440.4	386	1348.6	3462.9	1008.4	422	115.5
SHP	61.3	271.6	1.6	53.9	44.5	44.9	118.7	13.7	32.4	63.9	108.5	59.6	25.7	9.6
Population density	449.2	21644.5	2.1	2303.4	276.2	125.5	531.4	666.7	387.9	469.6	697.5	158.2	117.9	1134.8

SD: Standard Deviation; WHO: World Health Organization; AFRO: Regional Office for Africa; AMRO: Regional Office for the Americas; EMRO: Regional Office for the Eastern Mediterranean; EURO: Regional Office for Europe; SEARO: Regional Office for South East Asia; WPRO: Regional Office for the Western Pacific; HICs: High Income Countries; UMICs: Upper-Middle Income Countries; LMICs: Lower-Middle Income Countries; LICs: Low-Income Countries; U5 mortality: Under-five mortality rate (per 1000 live births); UHC: Index of effective coverage of health services; CHE: Current Health Expenditure 6 per Capita in PPP (in consent ppp); SHP: Skilled health professionals density (per 10 000 population)

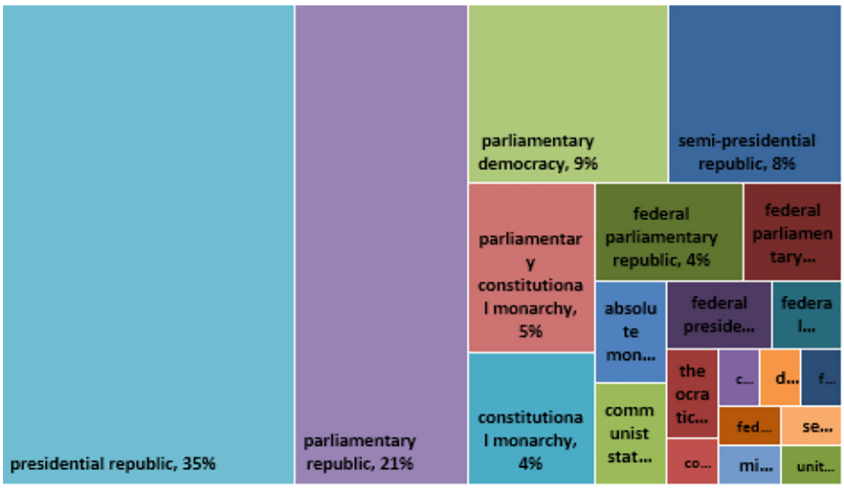

Figure 1: Descriptive statistics of "Government type" variable.

Furthermore, CHE with maternal mortality and U5 mortality rate interactive distribution chart shows that EURO countries are placed in the lower parts of the chart. According to distribution of CHE with UHC interactive distribution chart, UHC demonstrates a strong bond with CHE (Figure 2).

The scatter charts of SHP density with LE and also HLE show a positive relationship between these indicators; in other words, LE increases with an increase in SHP density. The relationship between SHP with maternal mortality and U5 mortality rate was inverse, indicating that (other than some exceptions) there's a weak relationship between SHP and mortality rates, so that mortality rates decrease with an increase in SHP density. On relations with UHC, there has been a strong and positive bond between SHP and UHC (Figure 3).

Scatter charts of population density with LE

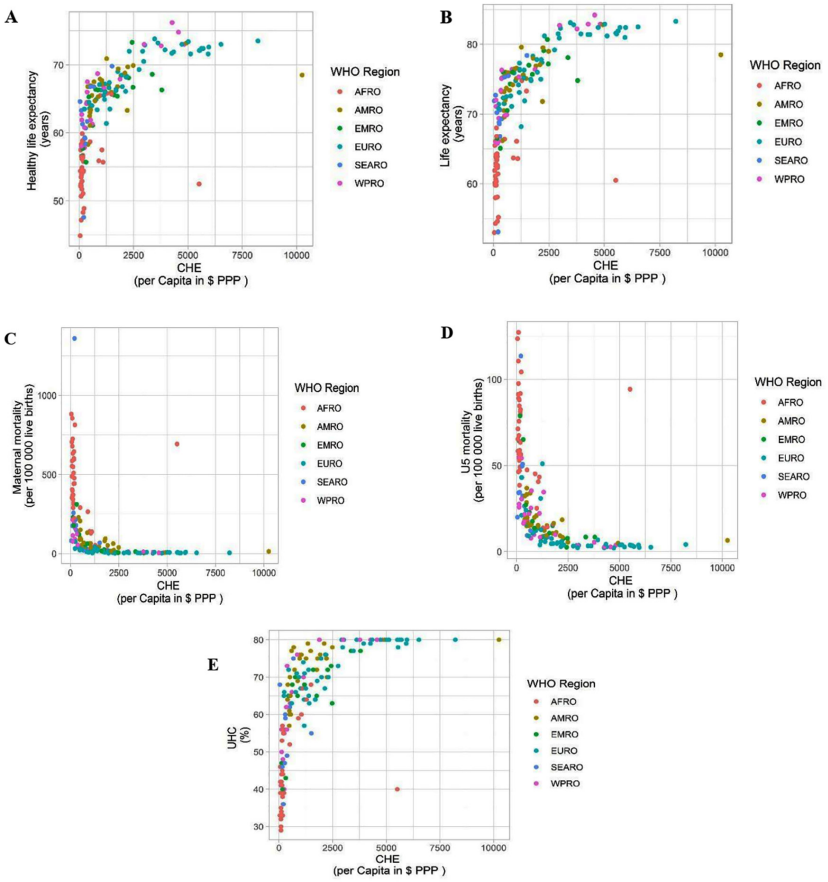

Figure 2: Distribution of CHE and producing health indicators based on WHO regions. WHO: World Health Organization; AFRO: Regional Office for Africa; AMRO: Regional Office for the Americas; EMRO: Regional Office for the Eastern Mediterranean; EURO: Regional Office for Europe; SEARO: Regional Office for South East Asia; WPRO: Regional Office for the Western Pacific; U5 mortality: Under-five mortality rate (per 1000 live births); UHC: Index of effective coverage of health services; CHE: Current Health Expenditure 6 per Capita in PPP (in consent ppp)

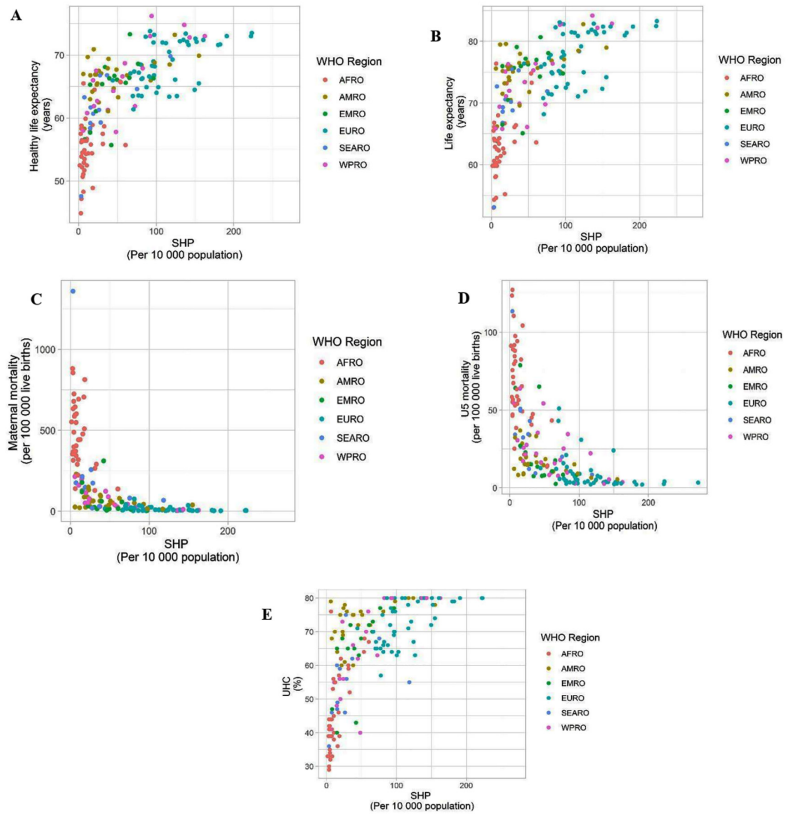

Figure 3: Distribution of SHP and producing health indicators based on WHO regions. WHO: World Health Organization; AFRO: Regional Office for Africa; AMRO: Regional Office for the Americas; EMRO: Regional Office for the Eastern Mediterranean; EURO: Regional Office for Europe; SEARO: Regional Office for South East Asia; WPRO: Regional Office for the Western Pacific; U5 mortality: Under-five mortality rate (per 1000 live births); UHC: Index of effective coverage of health services; SHP: Skilled health professionals density (per 10 000 population)

and HLE do not reveal a strong relationship, and the countries were highly scattered. In WHO region category, most countries were placed in the middle of the chart. In population density with maternal mortality and U5 mortality rate scatter charts, countries are mostly in the lower and middle parts of the chart with no strong relationships between population density and mortality rates. Results of population density with UHC indicators are similar to LE charts. Additionally, a lack of relationship between distribution of countries and variables is detected (Figure 4).

Based on the correlation test results, CHE indicator had a strong correlation with LE, HLE, and UHC indicators ($r>0.7$). Also, it has a strong negative correlation with maternal mortality and U5 mortality rate ($r<-0.7$). According to hypothesis significance test, the study hypothesis on the existence of a meaningful correlation between CHE and the producing health indicators is confirmed ($P<0.05$) (Table 3).

SHP has a strong correlation with LE, HLE, and UHC indicators ($r>0.7$) and a strong negative correlation with maternal mortality and U5 mortality rate ($r<-0.7$). According to hypothesis significance test, the study hypothesis on the existence of a meaningful correlation between SHP and the producing health indicators is confirmed ($P<0.05$) (Table 3).

According to the correlation test results, log population density has a weak correlation with LE, HLE, and UHC ($r>0.2$). This indicator has a weak negative correlation with maternal mortality and U5 mortality rate ($r<-0.2$). According to the hypothesis significance tests, the study hypothesis on the existence of the correlation between population density indicator and the producing health indicators, there is a small meaningful correlation between population density indicator and LE, HLE and U5 mortality rate indicators ($P=0$). Also, There's no correlation between the population density and maternal mortality rate and UHC ($P>0.05$) (Table 3).

On the interpretation of the relationship between government type and producing health indicators (Figure 4), it must be noted that the dependency range is from 0 to 1 (0 a dark orange and 1 a dark blue). For LE, HLE, and UHC indicators, due to being desirable indicators (meaning that an increase in the indicator means a better situation), the closer the number is to 1, there is more correlation between them and the analyzed indicators. Maternal mortality and U5 mortality, due to being undesirable indicators, the lower the indicator, the better the situation; the closer the number is to 0, there is more correlation between them and the analyzed indicators.

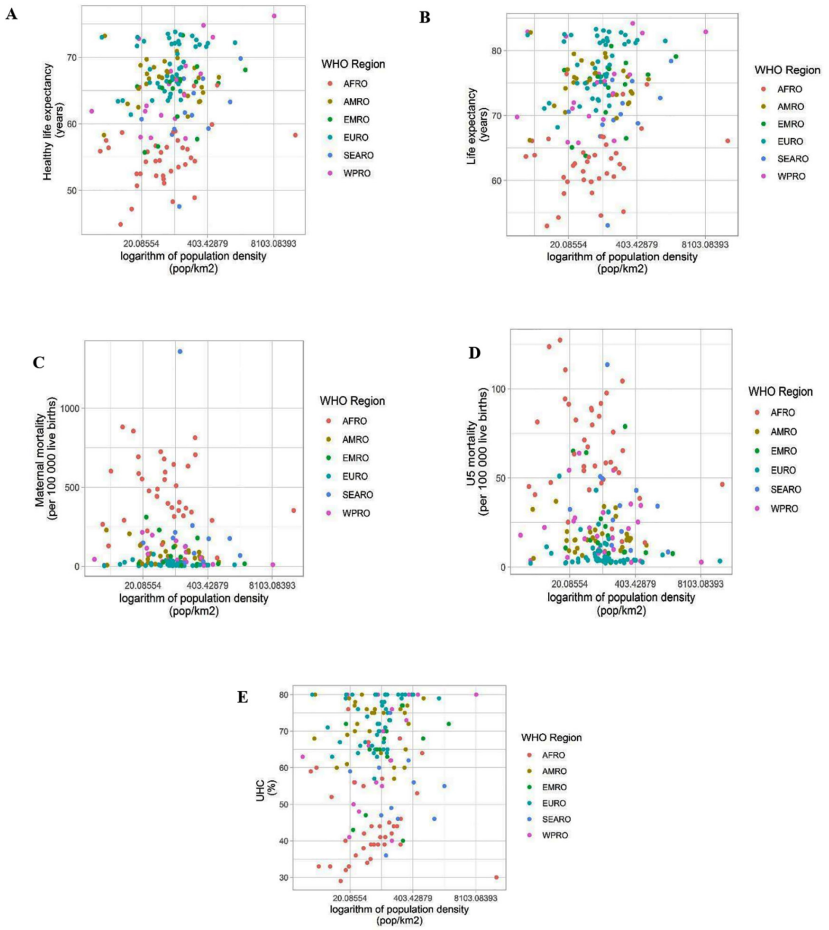

Figure 4: Distribution of Logarithm population density and producing health indicators based on WHO regions. WHO: World Health Organization; AFRO: Regional Office for Africa; AMRO: Regional Office for the Americas; EMRO: Regional Office for the Eastern Mediterranean; EURO: Regional Office for Europe; SEARO: Regional Office for South East Asia; WPRO: Regional Office for the Western Pacific; U5 mortality: Under-five mortality rate (per 1000 live births); UHC: Index of effective coverage of health services

Table 3: The relationship between dependent and independent variables

	Life expectancy		Healthy life expectancy		Maternal mortality		U5 mortality		UHC	
	Correlation	P value	Correlation	P value	Correlation	P value	Correlation	P value	Correlation	P value
CHE	0.86	0	0.85	0	-0.85	0	-0.87	0	0.85	0
SHP	0.76	0	0.78	0	-0.86	0	-0.83	0	0.78	0
Population Density (Log)	0.26	0	0.27	0	-0.21	0.01	-0.24	0	0.18	0.02

WHO: World Health Organization; AFRO: Regional Office for Africa; AMRO: Regional Office for the Americas; EMRO: Regional Office for the Eastern Mediterranean; EURO: Regional Office for Europe; SEARO: Regional Office for South East Asia; WPRO: Regional Office for the Western Pacific; U5 mortality: Under-five mortality rate (per 1000 live births); UHC: Index of effective coverage of health services; CHE: Current Health Expenditure 6 per Capita in PPP (in consent ppp); SHP: Skilled health professionals density (per 10 000 population)

According to the findings of this study, in countries with government types of "Federal parliamentary democracy" and "Single parliamentary republic", health indicators show a better status; meanwhile, in countries with "Semi-presidential republic", health indicators show a worse status (Figure 5).

Discussion

Results showed a considerable difference was observed between the averages of LE, HLE, maternal mortality, and U5 mortality rate across countries. Contextual variables like CHE, SHP, and population density had a significant relationship with producing health indicators. There are a few studies about the relationship between contextual variables of countries with health indicators. In these studies, similar to the findings of the current study, a meaningful and significant correlation was found between the amount of money that countries invest on people's health and health indicators, so that by investing more in health sector, an improvement in health indicators was seen.[26-29]

In the current study, a weak correlation was found between population density indicator with LE

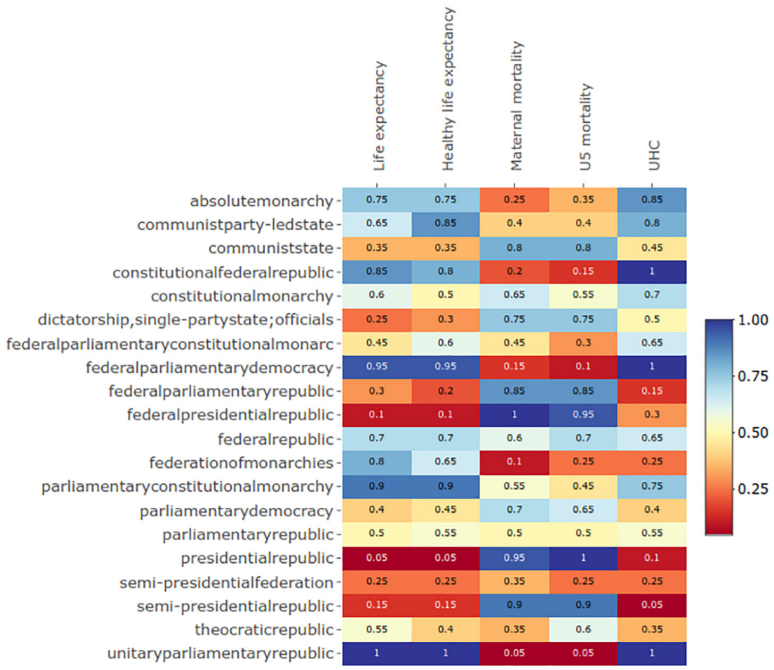

Figure 5: The relationship between "Governance type" and producing health indicators. U5 mortality: Under-five mortality rate (per 1000 live births); UHC: Index of effective coverage of health services

and HLE. There are few studies on the relationship between population density and health indicators. The results in a similar study conducted in Netherlands indicated that population density, on average, resulted in higher mortality rates.[30] Also, Beenackers et al. reported that generally higher population density was modestly related to increased mortality, while in dense cities with good infrastructure high population density may negatively impact the mortality.[31] In sum, it seems that more research is required about consequences of population density on health.

Another variable investigated was SHP density that was significantly correlated with LE and HALE. This positive correlation has been confirmed by another studies.[32] Clearly, based on the Millennium Development Goals (MDGs), the minimum level of SHP is estimated 2.5 health workers per 1,000 population.[33] In general, countries with higher GDP per capita and incomes have more health workers; for instance, the United States is among the countries with the highest income per capita and the greatest density of health workers per 1000 population, while most countries in sub-Saharan Africa have the lowest income per capita as well as the lowest health worker density.[28-30, 34] Therefore, increasing investment into main categories of health workforce can be an important strategy for improving health outcomes, especially in developing and undeveloped countries.

Further, there are few studies on the relationship of government types in countries and their health status. According to the findings of this study, countries with "Federal parliamentary democracy" and "Single parliamentary republic" have better situation in health indicators; furthermore, countries with "Semi-presidential republic" have worse health indicators compared to others. The considering dispersion in correlations of health indicators with government types can be due to the variety of government types. Meanwhile, since "Government type" is a qualitative variable, a better demonstration of its correlation with health status cannot be done.

A study carried out in global level on mapping 123 million neonatal, infant, and child deaths between 2000 and 2017 found that gains in child survival served as an important proxy for improvements in overall population health. Global progress in reducing child mortality has been declared as one of the greatest success stories of global health. The advances in child survival have been far from universally achieved, spatial in LMICs. They observed large subnational variation within countries in which overall U5-mortality was either high or comparatively low. Successful reductions in child mortality were also observed throughout entire countries.[35]

Measuring UHC in 204 countries showed that "globally, performance on the UHC effective coverage index improved from 45·8 (95% uncertainty interval 44·2–47·5) in 1990 to 60·3 (58·7–61·9) in 2019, yet country-level UHC effective coverage in 2019 still spanned from 95 or higher in Japan and Iceland to lower than 25 in Somalia and the Central African Republic". Based on this study, UHC effective coverage index in HICs and in AMRO and EURO is higher than others. The findings of this study confirm our results.[11]

"Global age-sex-specific fertility, mortality, HLE, and population estimates in 204 countries and

territories, 1950–2019: a comprehensive demographic analysis for the Global Burden of Disease Study 2019" is another study which has been done by Global Burden of Diseases (GBD). According to this study, global LE increased from 67·2 years in 2000 to 73·5 years in 2019. The total number of deaths increased from 50·7 million in 2000 to 56·5 million in 2019. Globally, HLE increased from 58·6 years in 2000 to 63·5 years in 2019. HLE increased in 202 out of 204 countries and territories in this duration. This study showed that LE in HICs and EURO was the highest and in AFRO was the lowest;[36] our study obtained the same results.

From long ago until now, the relationship between government type and health status has been taken into consideration. It is important how much countries value health. More progress will depend on greater strength in public sector rather than private sector which worsen the inequities.[37]

Conclusion

Overall, the results of a study confirmed a considerable difference between the countries in producing health indicators and also the relationship between contextual variables with producing health indicators across countries. There is a significant correlation between the CHE, population density, and SHP with health indicators, namely LE and HLE, maternal mortality, U5 mortality. Also, countries with "Federal parliamentary democracy" and "Single parliamentary republic" type of government have better status in health indicators. It seems contextual variables are a comprehensive health system approach that improves the health indicators.

Limitation

Dependent variables (e.g., LE, HLE) depend on not only three mentioned independent variables but also other factors. We just consider some important and measurable independent variables, so the present analysis is narrow in scope.

Highlights

There is a considerable difference between countries in producing health indicators.

There is a significant relationship between the density of SHP in the health sector and producing health indicators.

There is no significant relationship between population density and producing health indicators.

In countries where the government type is "Federal parliamentary democracy" as well as countries with a "Single parliamentary republic", health indicators show better conditions.

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Authors" Contribution

AR.O and AH.T were involved in the conception and designing the study. E.M and Zh.N performed literature review, data gathering and interpretation of data. M.M analyzed the data. AH.T and AR.O wrote the manuscript and acted as the corresponding authors. E.M and Zh.N supervised the development of work, and MM.K assisted in data interpretation and manuscript evaluation.

Ethical Approval

No ethical approval was required as all the data analyzed were publicly available.

Conflict of Interest: None declared.

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