

COMPARATIVE STUDY ON SOCIAL DETERMINANTS FOR HEALTH

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ABSTRACT

The article focuses on comparing some social determinants of health in Northeast Asian Countries to find out similarities and differences in the indicators of the countries. Social determinants of health are a crucial and more important than health care and contribution of health system for health of the population.

The study is comparative and a quantitative study with multi-parameters on social determinants of health in Northern Asian countries. Data of the study is extracted from the report on Human Development Index 2020-2021, WHO, World Health Statistics 2022 and other available internationally recognized secondary data base.

The study consists of comparative analysis of social determinants of health, comparative analysis of environmental determinants of health and comparative analysis of health indicators in the countries of Northeast Asian Countries.

Study concludes that although the countries of the region belong to very high and high human development indexed countries there are big differences in GDP per capita and poverty related indicators that are signs of inequality and disparities in social determinants of health in the region. Environmental determinants in all countries have been worsening from 2020 to 2022, air pollution and climate change indices are big environmental determinants of health in the region that negatively result in health status of the population.

Keywords: Social determinants of health, Environmental determinants of Health, Commercial Determinants of Health and Health indicators and outcomes.

INTRODUCTION:

Health is as multidimensional, multi factorial, transdisciplinary socio-economic and fundamental human rights issues, requires a multisectoral evidence-based and integrated approach policy response and program development. Social determinants of health such as social, economic and environmental factors have a negative and positive impacts in personal, community and population health and inequalities and disparities of population's health between the countries and within a country.

WHO defines social determinants of health as “the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life”. It includes income and social protection, education, unemployment and job insecurity, working life conditions, food insecurity, housing, basic

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amenities and the environment, early childhood development, social inclusion and non-discrimination, structural conflict and access to affordable health services of decent quality(1).

Commission on Social determinants of health, WHO provided recommendations in its' report "Closing the gap in a generation: health equity through action on the social determinants of health" indicating three principles of action /A new global agenda for health equity/ that are (i) improve the conditions of daily lives, tackle the inequitable (ii) distribution of resources: Power, Money and Resources and (iii) measure and understand the problem and assess the impact of action (2).

Research shows that the social determinants can be more important than health care or lifestyle choices influencing health. For example, numerous studies suggest that SDH account for between 30-35 % of health outcomes (3). In addition, estimates show that the contribution of sectors outside health to population health outcomes exceed the contribution from the health sector. In 1999, Michael Marmot and Richard Wilkinson published a book entitled "Social Determinants of Health" and emphasized importance of characteristics in society and social, environmental factors for health disparities (4).

Studies using international comparative data showed the same associations of life expectancy and health along an economic gradient occurring both within populations in countries, as well as in populations between countries (5). The 2001 World Conference on Social Determinants of Health approved Rio Political Declaration on Social determinants of Health (6). Declaration aims to communicate that the social conditions in which an individual exists were key to understanding health disparities that individual may face, and it called for new policies across the world to fight health disparities, along with global collaborations.

Some authors argue that policies related to these social determinants are one way to address disparities and can have substantial impact on preventing illness, injury, and premature death; effective policy initiatives addressing social determinants require better translation of social determinants research (7). Mark Exworthy suggests conceptual models to understand the policy process for tackling the social determinants of health(8).

The first Human Development Report correctly recognized that 'development is much more than just the expansion of income and wealth' and defined human development as 'the process of enlarging people's choices (9) Human Development Index (HDI) and Environmental Performance Index (EPI) are the widely adopted indicators for measuring the sustainable development in socio-economy and environment, respectively. Sustainable development emphasizes the reduction of environmental stress, when improving human welfare and regional equity, and seeks a balance between human development and environmental-ecological cost (10).

The authors provide valuable evidences on associations of the human development inequality (HDI) index with incidence, mortality, and mortality to incidence ratios for eight common cancers among different countries (11)/ Each component of HDI is also strongly correlated with both infant and maternal mortality rates (significance of all values for r , $p < 0.001$), and eliminating life expectancy from HDI does not decrease significantly the predictive power of HDI for infant or maternal mortality rates (12).

There was a positive association between HDI and prevalence of physical inactivity ($\rho=0.27$). Less developed countries showed the lowest prevalence of physical inactivity (18.7%), while physical inactivity was more prevalent among the most developed countries (27.8%) (13). Authors estimate that environmental determinants contribute to disease burden have ranged 13- 90%, WHO estimation of environmental determinants to disease burden is 13-32% (14).

Table 1. Estimation of Global Burden of Disease attributed to environmental determinants (15)

Environmental determinants	Annual deaths		DALYs, millions per 100000 population
	Annual deaths, millions	Annual deaths, %	
Environmental determinants	11.4	21.2	354
Outdoor air pollution	2.9	5.4	70
Indoor Air Pollution	3.3	6.2	92
Occupational exposure	561.000	2.3	75.1
Lead exposure	873.000	1.6	17

The scholars and policy makers have been paid attention to commercial determinants of health for the last decades, emphasizing the importance of defining and conceptualizing, better understanding and regulatory actions on commercial determinants of health. Producing, distributing and selling of unhealthy commodities in the market of developing countries are the example of commercial determinants of health.

Although policy and research papers provide wide range evidences on social determinants of health and their influences on health outcomes, there are some gaps in researching and practical application of evidences on social determinants to particular countries in national and international policy and strategic planning level. This situation requires a need to conduct more research comparing indicators of social determinants of health in order to provide evidences for policy actions to respond to current situation of social determinants.

METHODS AND METHODOLOGY:

This comparative study aims to compare some indicators of social determinants of health in Northeast Asian countries. The study is a comparative study on social determinants of health in the countries of Northeast Asian Region. The countries are Mongolia, Japan, South Korea, China and Russia. North Korea was excluded due to unavailability of data that is needed for comparison. The study is a quantitative study with multi-parameter comparisons. Data of the study is extracted from the report on Human Development Index 2020-2021(16) and WHO, World Health Statistics 2022 (17).

The selected independent variables are HDI, life expectancy, expected and mean years of schooling, GDP per capita, income shares, gender development index, gender inequality index, maternal mortality rate, adolescent birth rate, share seats in Parliament, population at least secondary education, labor force participation, multidimensional poverty index, population count in multidimensional poverty, intensity of deprivation of population in multidimensional poverty, population in severe multidimensional poverty, population vulnerable to multidimensional poverty, contribution of deprivation in dimensions, population living below national poverty line, planetary pressure adjusted HDI, carbon dioxide emission per capita and carbon dioxide emission index.

The selected dependent variables are extracted from WHO World Health Statistics, 2022 are healthy life expectancy at birth in years, 2019, under five mortality rate and neonatal mortality rate per 1000 live births, tuberculosis incidence per 100000 population, 2020, probability dying from any of CVD, cancer, diabetes, between age #) and exact age 70 (%), 2019, suicide mortality rate per 100000 population, 2019, road traffic mortality rate per 100000 population, 2019, age standardized mortality rate attributed to households and ambient air pollution per 100000 population, 2016, mortality rate attributed to exposure to unsafe WASH services per 100000 population, 2016, prevalence of stunting, wasting and overweight in children under five, 2020, prevalence of anemia in women of reproductive age (15-49 years), 2019, proportion of population using safely managed drinking water and sanitation services (5),

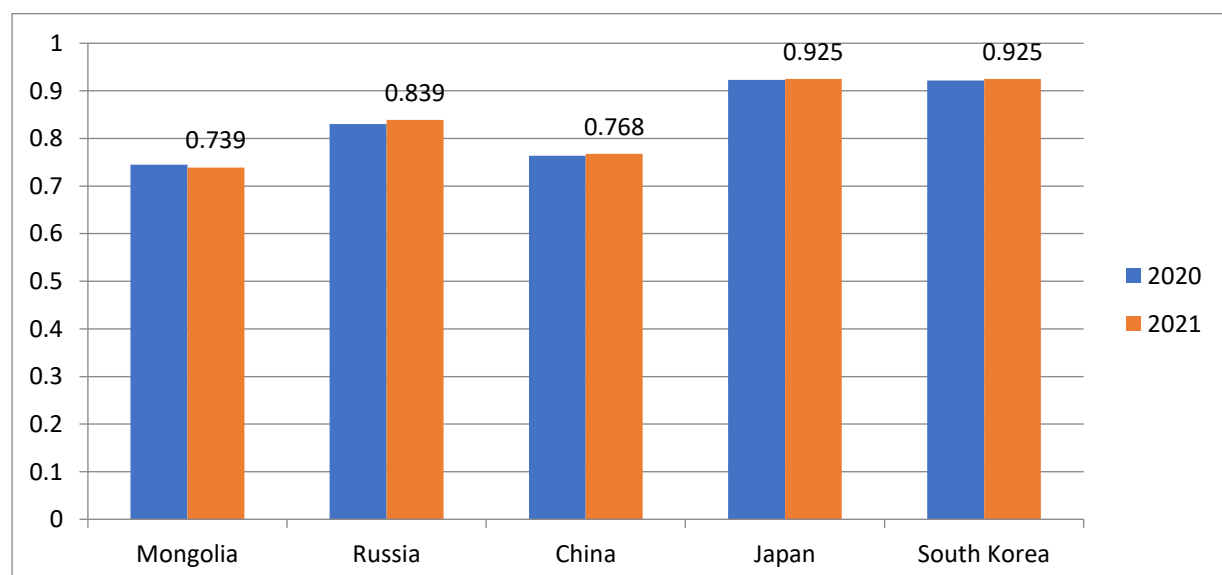
3) Study results

Study results are grouped into three parts: (i) Comparative analysis of social determinants of health in Northeast Asian Countries; (ii) Comparative analysis of environmental determinants of health in Northeast Asian Countries; and (iii) Comparative analysis of health indicators in Northeast Asian Countries.

(i) Comparative analysis of social determinants of health in Northeast Asian Countries

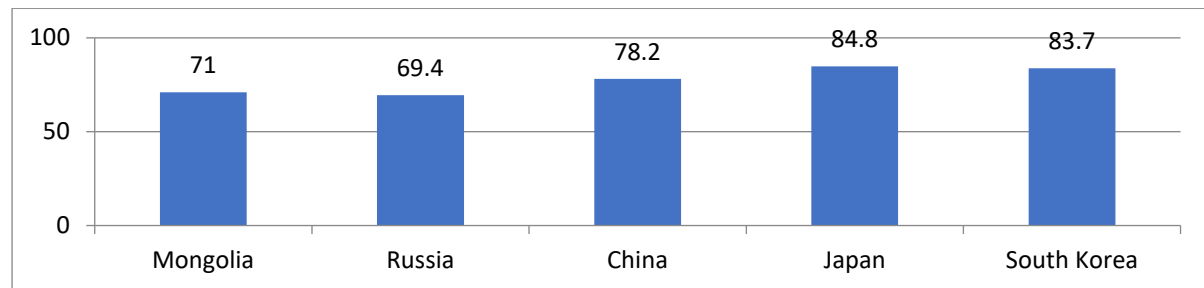
Japan, South Korea and Russia are belonged to very high human development indexed country and Mongolia and China are belonged to high human development indexed country

Graph 1. Human Development Index (HDI) of the selected countries in 2020-2021



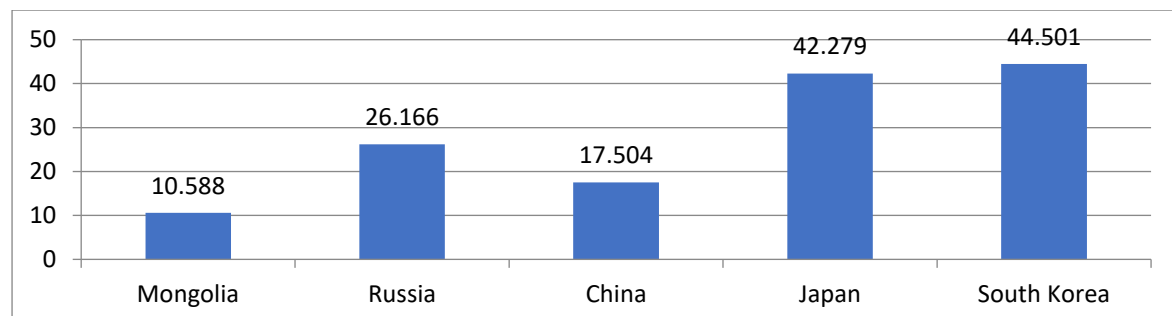
Graph 1 shows that HDI in the selected countries are sustainable in 2021-2022.

Graph 2. Life expectancy of the selected countries in 2020-2021



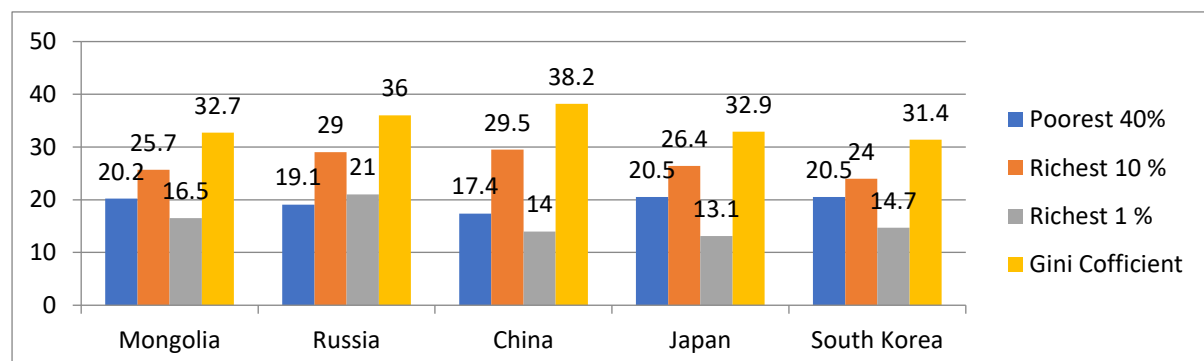
Japan and South Korea have longer life expectancy than average life expectancy of the countries with very high human development index (78.5). China has longer life expectancy than average life expectancy of the countries with high human development index which is 74.7. In contrast, Mongolia and Russia have shorter life expectancy than average life expectancy of the countries with high human development index.

Graph 3. GDP per capita of the selected countries in 2020-2021



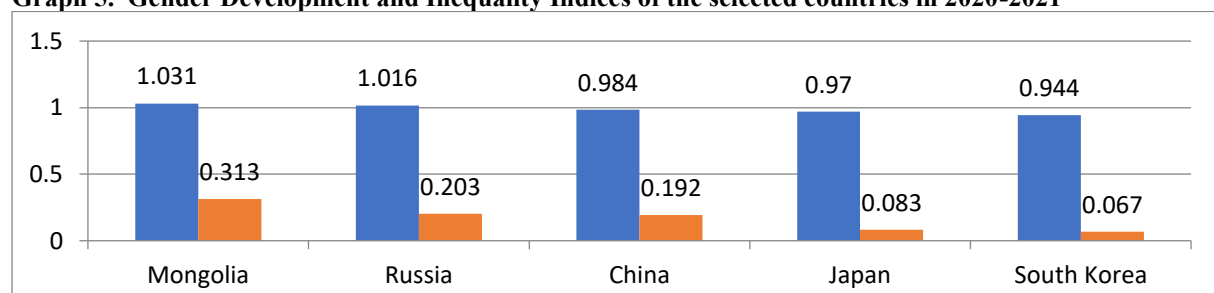
GDP of Japan and South Korea are higher than average of the countries with very high human development index (43.752), Russia has lower GDP to compare with GDP average of very high human development indexed countries and China has higher and Mongolia has lower GDP to compare with GDP average of high human development indexed countries (15.167).

Graph 4. Income shares of the selected countries in 2020-2021



GINI coefficient is higher in China and Russia, the lowest in South Korea. Income shares of the richest 11 per cent of the population range from 38.2 to 50 percent and income shares of poorest 40 % population range 13.1 to 20.5 % in these countries

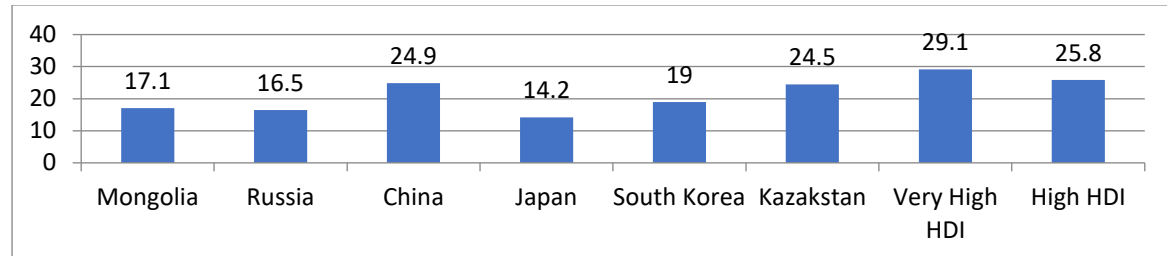
Graph 5. Gender Development and Inequality Indices of the selected countries in 2020-2021



Gender development index of Russia and Mongolia is higher, Japan and South Korea are lower to compare to average of the countries with very high human development index which is 0.986. China has higher GDI to

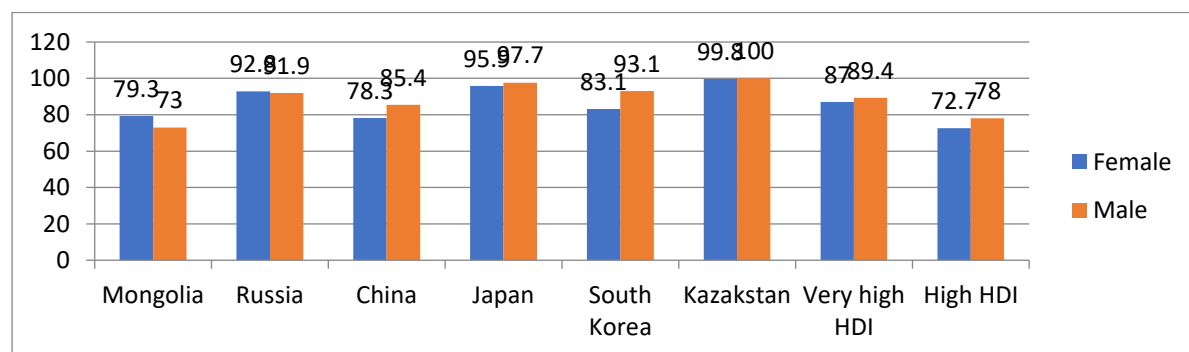
compare with average GDI of the countries with high human development index. GII is a composite metric of gender inequality using three dimensions: reproductive health, empowerment and the labour market. Mongolia has the highest GII and South Korea has the lowest GII index in the region.

Graph 6. Share seats in Parliament /SDG 5.5/ of the selected countries in 2020-2021



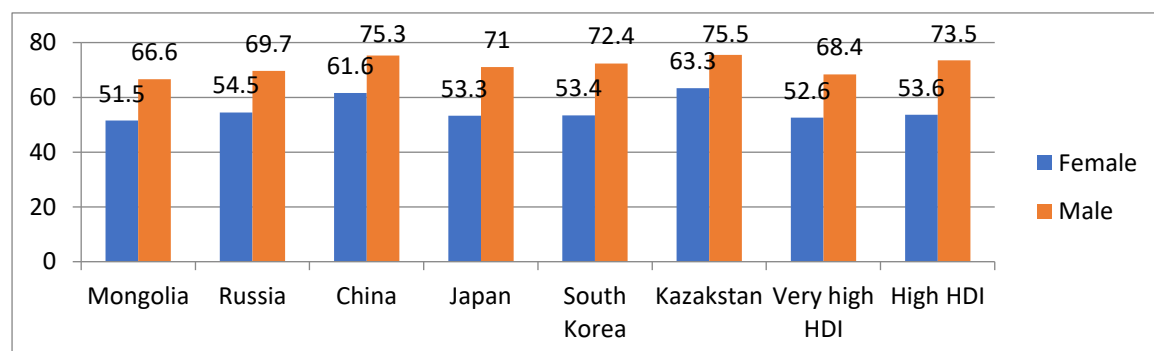
Share seats in Parliament of all countries in the region are lower than average seats of the countries with very high and high human development index. China has the highest share seats in Parliament in the region.

Graph 7. Population at least some secondary education of the selected countries in 2020-2021



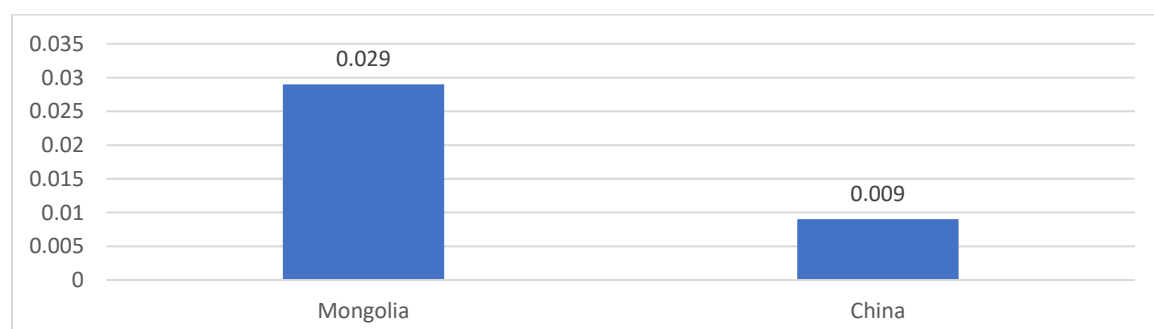
Population at least some secondary education is higher in all countries in the region except Mongolia that has lower rates for male population to compare with average of high human development indexed countries.

Graph 8. Labor force participation rate of the selected countries in 2020-2021



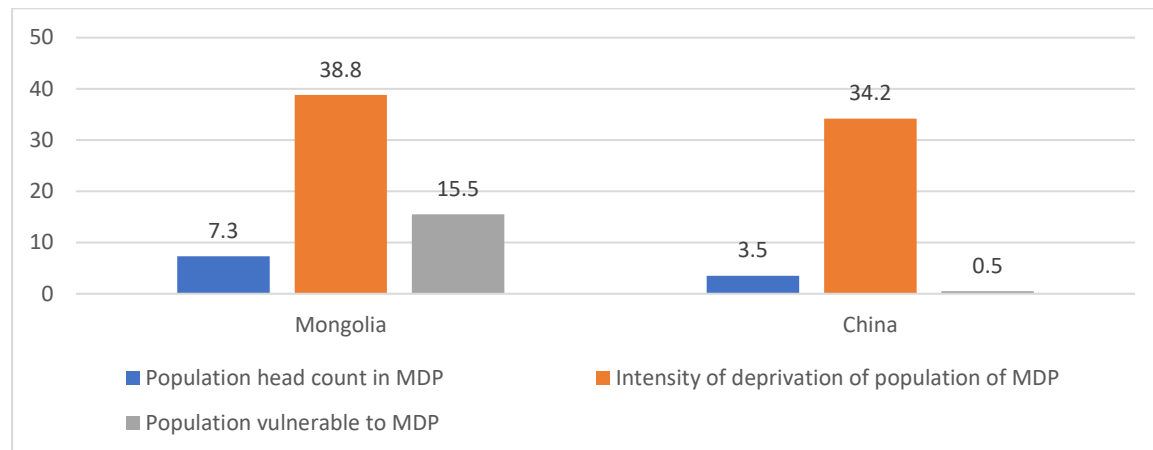
Labor participation is higher in all countries in the region except Mongolia that has lower rates for female population to compare with average of high human development indexed countries.

Graph 9. Multidimensional Poverty index of Developing countries



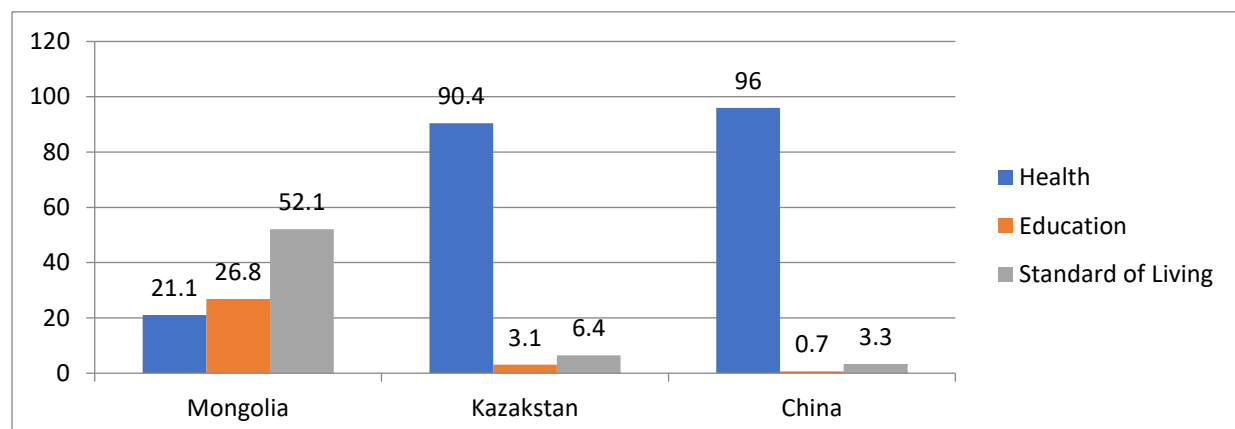
An index that measures the percentage of households in a country deprived along three dimensions –monetary poverty, education, and basic infrastructure services – to capture a more complete picture of poverty. This index relevant to Mongolia and China in the region according to the report that indicates Mongolia has the highest multidimensional poverty index in the region.

Graph 10. Population head count and intensity of deprivation population of Multidimensional Poverty and population vulnerable to in multidimensional poverty of Mongolia and China, in percent



Population head count in multidimensional poverty, population vulnerable to this and intensity of deprivation population of Multidimensional Poverty are higher in Mongolia as shown in the Graph 10.

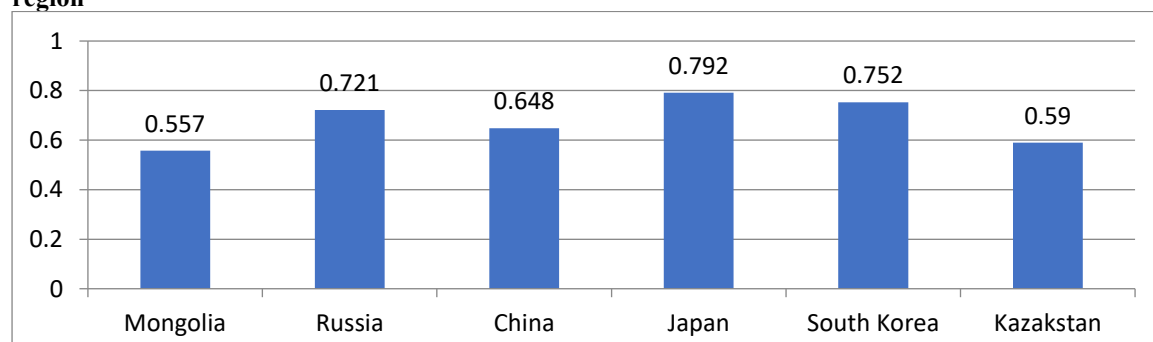
Graph 11. Contribution of deprivation in dimension



The countries are different in contribution of deprivation in dimension, in case of Mongolia standard of living are main contributing factor, health and education play important role for multidimensional poverty as well. In contrast, health is a major factor for multidimensional poverty in China.

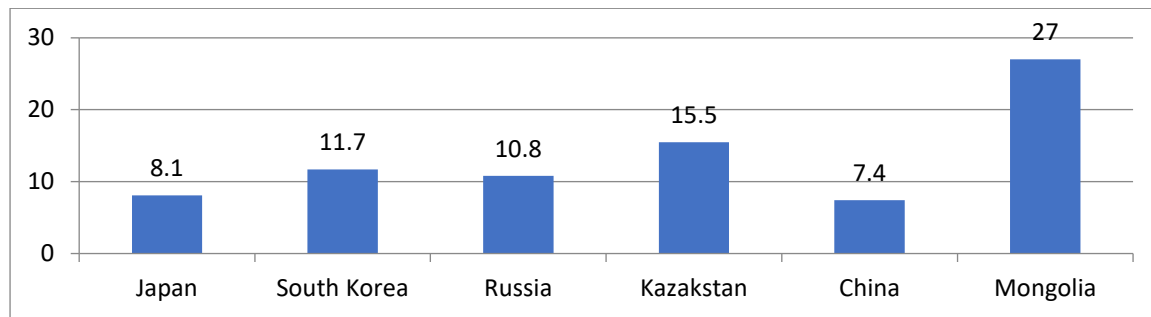
(ii) Comparative analysis of environmental determinants of health in the countries of Northeast Asian Countries

Graph 12. Planetary pressures- adjusted Human Development Index in the countries of Northeast Asia region



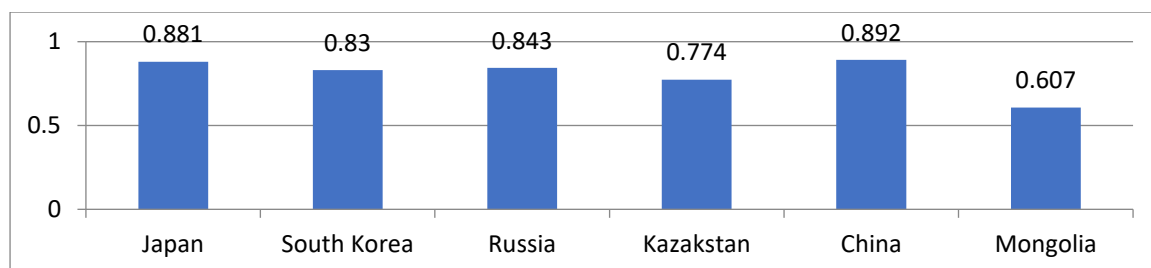
Planetary-pressure adjusted Human Development Index is the highest in Japan (0.792), higher in South Korea and Russian Federation and the lowest in Mongolia (0.557),

Graph 13. Carbon Dioxide Emissions Per Capita in the countries of Northeast Asia region



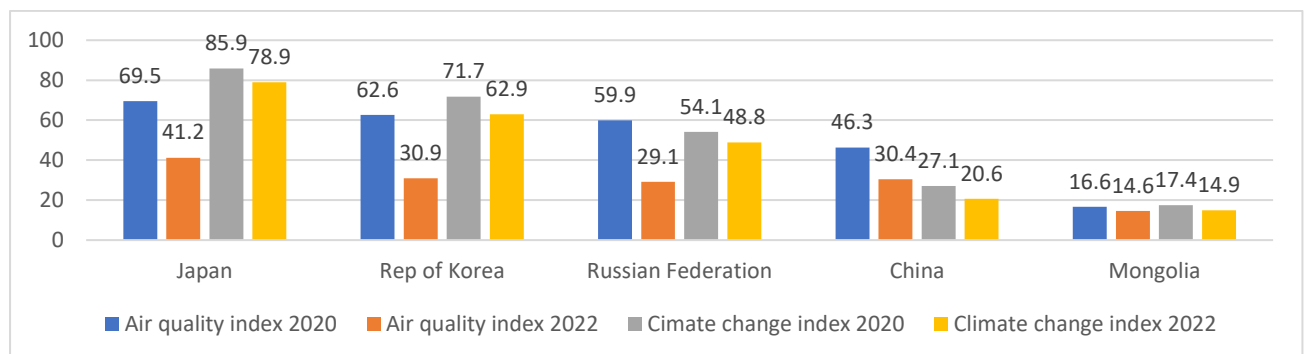
Mongolia has the highest carbon dioxide emissions per capita in the region while China has the lowest.

Graph 14. Carbon Dioxide Emissions Index in the countries of Northeast Asia region



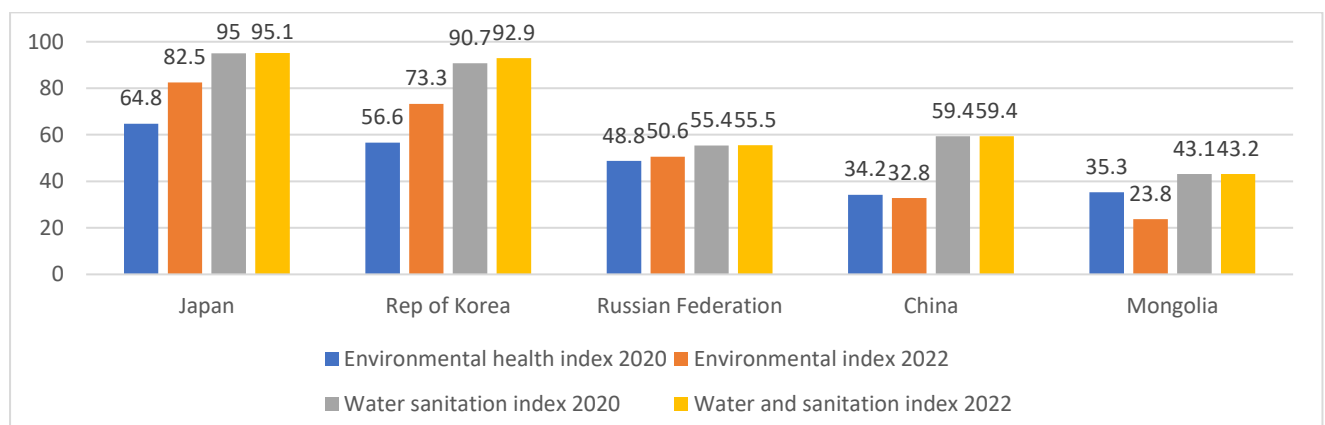
Mongolia has the lowest carbon dioxide emissions index in the region while China has the highest index.

Graph 15 Air quality and Climate change indices of Northeast Asian countries, in 2020 and 2022



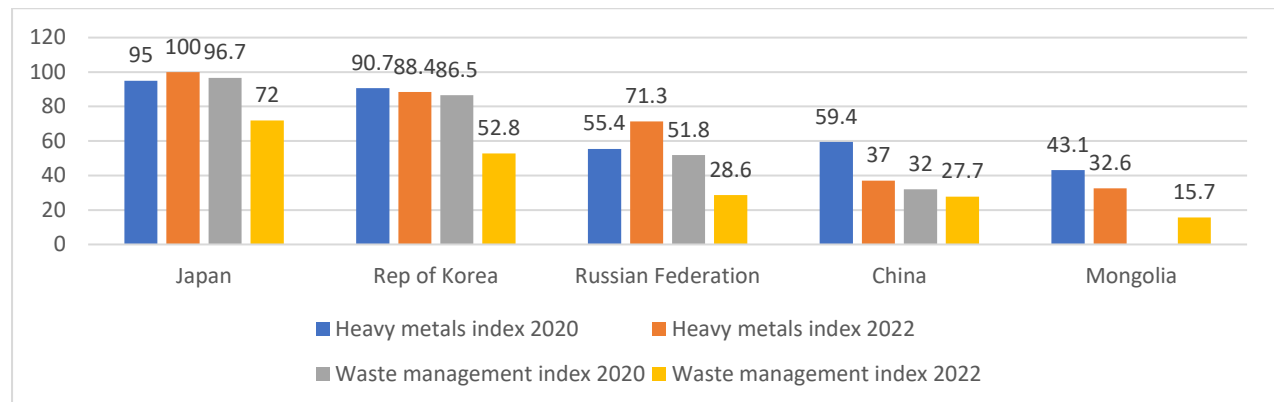
Air quality and Climate change indices have been declining in all countries in this region in 2020 and 2022.

Graph 16.. Environmental health and water sanitation indices of Northeast Asian countries, in 2020 and 2022



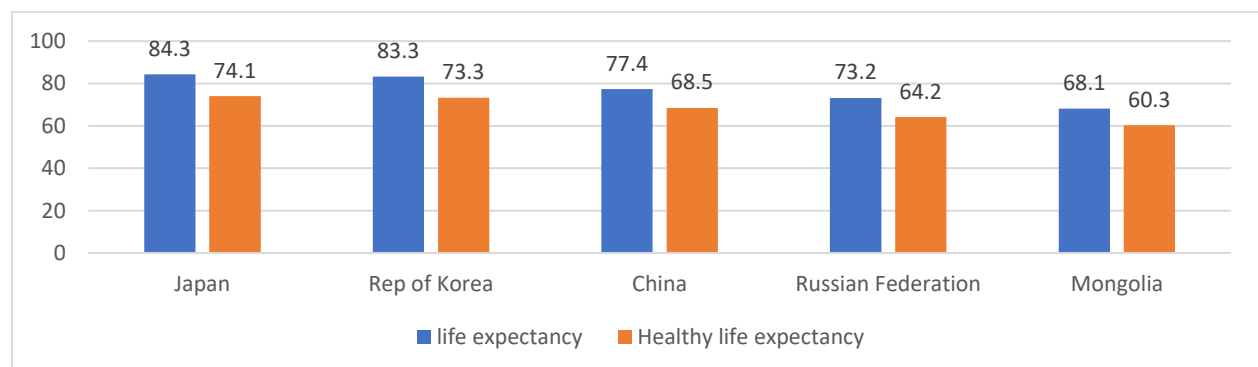
Environmental health and water sanitation indices have been improved in Japan, republic of Korea and Russian Federation while climate change index has no changes in China and water sanitation index has declined in Mongolia.

Graph 17. Heavy metals and Waste management indices of Northeast Asian countries, in 2020 and 2022



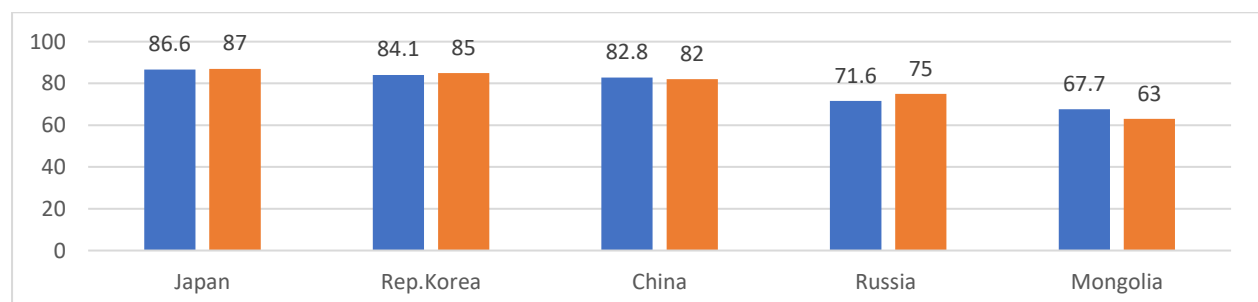
(iii) Comparative analysis of health indicators in the countries of Northeast Asian Countries.

Graph 18. Life expectancy⁵ and Healthy life expectancy of the population in Northeast Asian countries. 2019⁶



Healthy life expectancy is the highest in Japan and Republic of Korea, the lowest healthy life expectancy is in Mongolia.

Graph 19.. Health Index and Universal Health Coverage Index of the selected countries, 2021 and 2019

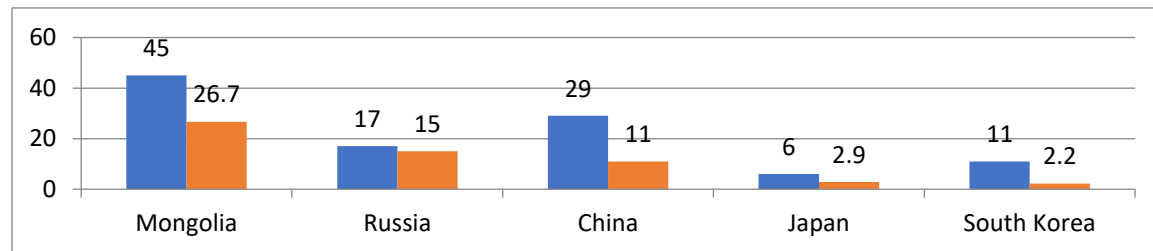


As shown in Graph 17, Japan, Republic of Korea and China have the highest health and universal health coverage index while Russia has lower indices of health and universal health coverage to compare with Japan, Republic of Korea and China and better to compare Mongolia. Mongolia has the lowest health and universal health coverage index.

⁵ Life expectancy and Healthy life expectancy Data by country
<https://apps.who.int/gho/data/node.main.688>

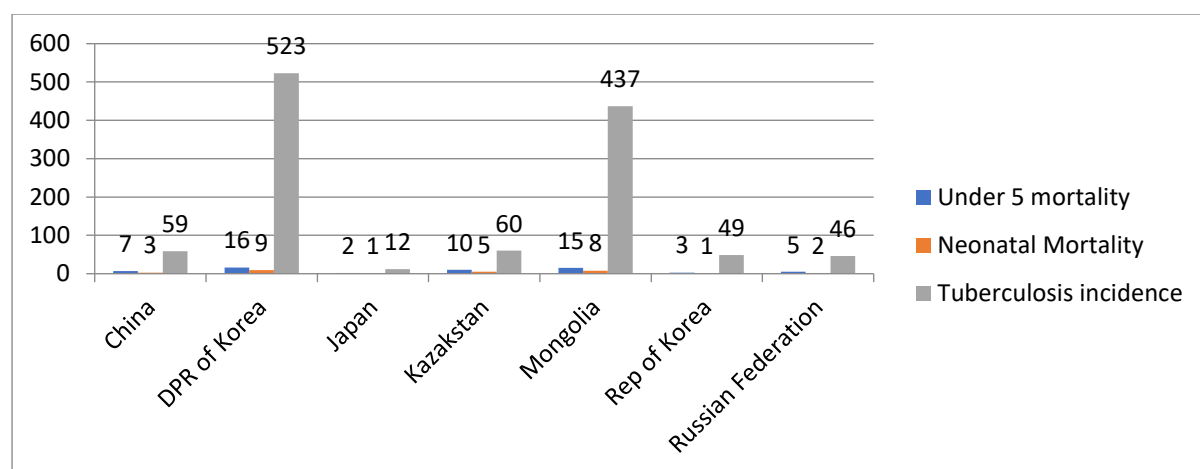
⁶ World Health Statistics 2022 Monitoring health for the SDGs Sustainable Development Goals
9789240051140-eng.pdf

Graph 20. Maternal Mortality /SDG 3.1/ and Adolescent Birth Rate /SDG 3.7/ of the selected countries in 2020-2021



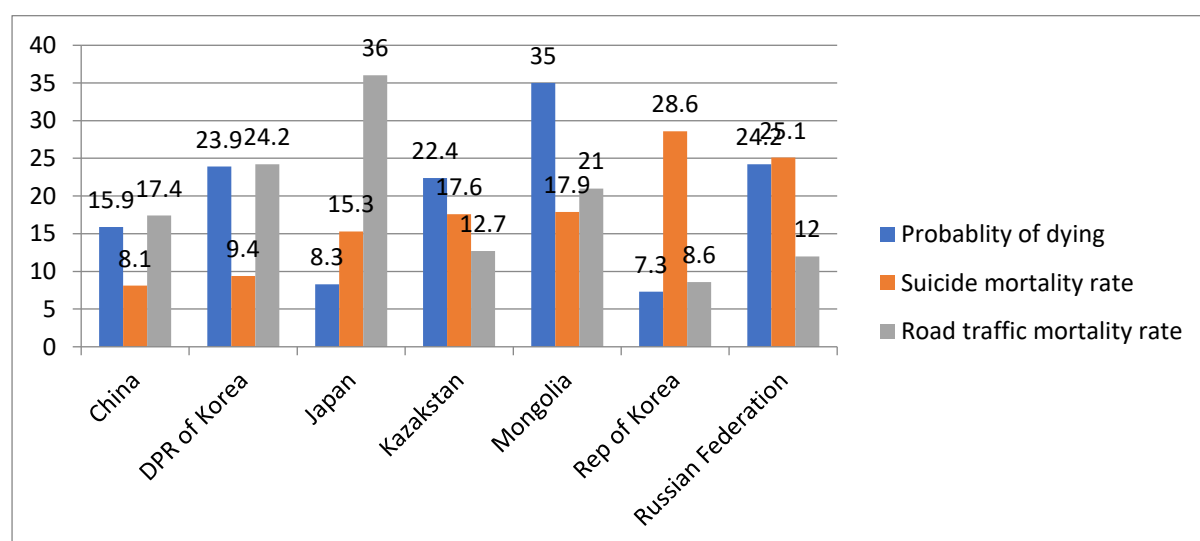
Maternal mortality and adolescent birth rates are the highest in Mongolia, the lowest maternal mortality rate is in Japan and the lowest adolescent birth rate is in South Korea.

Graph 21. Comparison of Under-five and Neonatal mortality, Tuberculosis incidence per 100000 population in selected countries, 2020



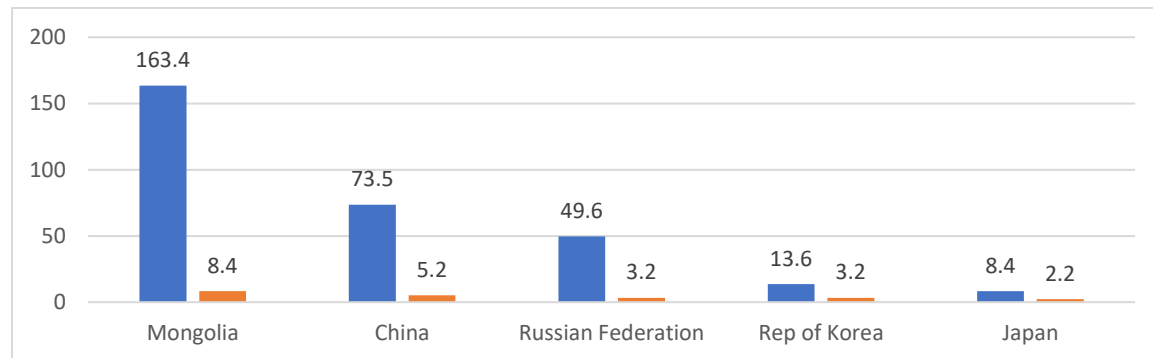
Under five and neonatal mortality rates and tuberculosis incidence per 100000 population are the highest in Mongolia while Japan, Republic of Korea and Russian Federation are having the lowest and lower under five and neonatal mortality rates and tuberculosis incidence per 100000 population.

Graph 22. Comparison of probability of dying from any of CVD, cancer, diabetes between age 30 and exact age 70 and Suicide and Road traffic accident mortality rate (per 1000000 population in selected countries, 2019)



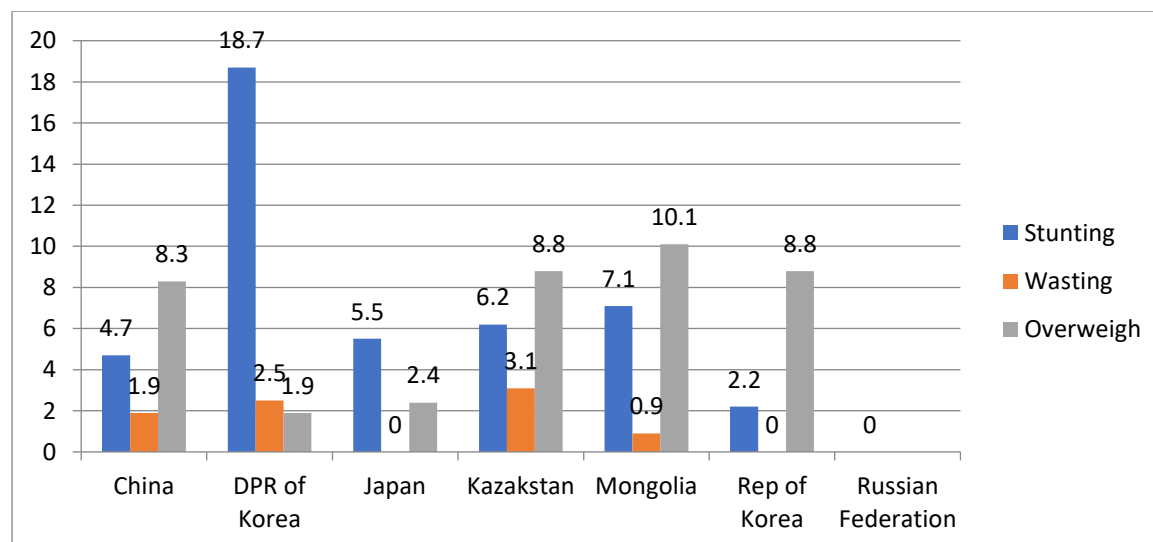
Probability of dying from any CVD, cancer, diabetes between age 30 and exact age 70 is the highest in Mongolia, suicide mortality rate is the highest in Republic of Korea and road traffic mortality rate is the highest in Japan. Probability of dying from any CVD, cancer, diabetes, CRD between age 30 and exact age 70 of Mongolia is the highest in the region and that is almost 5 times higher than Republic of Korea, 4 times higher than Japan, 2.5 times higher than China and higher than Russian federation.

Graph 23. Age-standardized mortality attributed to household, ambient air pollution and unsafe WASH services, per 100000 population



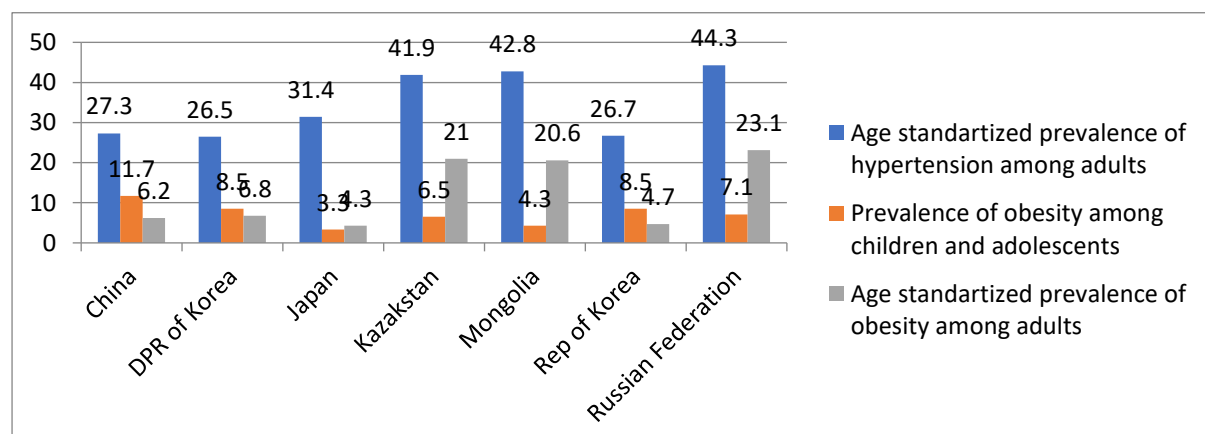
Age standardized mortality attributed to household, ambient air pollution and unsafe WASH services per 100000 population is the highest in Mongolia.

Graph 24. Comparison of Prevalence of stunting, wasting and overweight in children under five (%) in selected countries, 2020



Prevalence of stunting and overweigh in children under five are the highest in Mongolia, prevalence of wasting in children under five is the highest in China. Republic of Korea has the lowest prevalence of stunting and wasting in children under five while Japan has the lowest prevalence of overweigh in children under five.

Graph 25. Comparison of age standardized prevalence of hypertension among adults aged 30-79 years, prevalence obesity among children and adolescents (5-19 years) and among adults (18 + years) (%) in the selected countries, 2016



Age standardized prevalence of hypertension among adults aged 30-79 years and prevalence of obesity among children and adolescents are the highest in Russian Federation and Mongolia while age standardized prevalence of obesity among adults is the highest in China.

DISCUSSION

This comparative analysis of social determinants of health in the countries of Northeast Asian Region showed that the countries with very high and high HDI have advantages in some indicators, but main determinants of health in these countries are economic indicators such as GDP per capita and poverty. The most disadvantaged indicators of health determinants in these countries are air pollution, climate change and other environmental related indicators. Above mentioned social and environmental indicators have impacts on health of the population in the countries of Northeast Asian Region.

CONCLUSION

1. The most indicators of social determinants of health in Northeast Asian Countries are comparatively acceptable and reasonable because of they are belonged to very high and high human development indexed countries, but there are big differences in GDP per capita and poverty related indicators between the countries. Income shares of the countries show that all countries have inequality in income distribution of the population. These inequalities in social determinants of health within the region impact to health indicators of the population of a particular country.
2. Environmental determinants of health in the countries in Northeast Asian Region are critical for all countries and likely to continue to worsen. Planetary pressures- adjusted Human Development Index and Carbon Dioxide Emissions Index are the highest in Mongolia and Air quality and Climate change indices in all countries have been worsened from 2020 to 2022. Regional policy reform and urgent action are needed for environmental determinants of health
3. The indicators of health are different for the countries. The differences are in life expectancy and healthy life expectancy; health and universal health coverage index, probability of dying from any of CVD, cancer, diabetes between age 30 and exact age 70 years, age-standardized mortality attributed to household, ambient air pollution and unsafe WASH services, per 100000 population, prevalence of stunting, wasting and overweight in children under five, and prevalence of hypertension among adults aged 30-79 years, prevalence obesity among children and adolescents

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8.. Data availability

Data was available for the study from global open access sources. The limitations of the study are twofold. The first limitation is geographical because this study includes only the countries of Northeast Asian countries. Otherwise, if more countries of other regions were included in this study the findings and results could be different and the richest. The second limitation is data limitation. Data of North Korea, which is the country belongs to this region was missed. That may lead some misinterpretation of the study findings.

9] Conflict of interest

The authors declare that there is **no conflict of interest**.

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