Influence of Universal Health Coverage on Health Outcomes

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Influence of Universal Health Coverage on Health Outcomes

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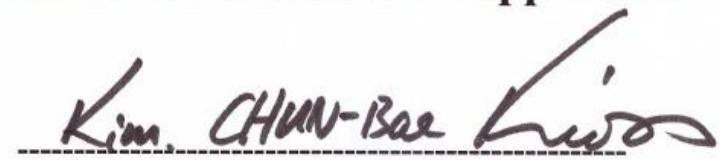
This certifies that the Doctoral Dissertation of Chhabi Lal Ranabhat is approved.



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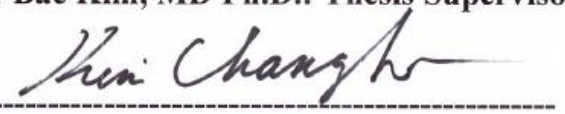

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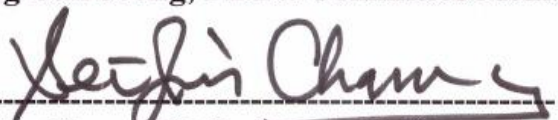

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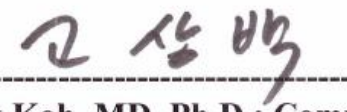

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ABBREVIATIONS

AMOS: Analysis of moment structure

AMR: Adult mortality rate

CGE: Combine gross enrollment

CRSS: Costa Rica social security

CUPC: Contracting unit for primary care

DPT: Diphtheria Pertussis Tetanus

GDP: Gross domestic product

GHE: Government health expenditure

HALE: Healthy life expectancy

HCP: Health card program

HSI: Health system index

ICD: International classification of disease

ICHD: International conference on health for development

IMF: International monetary fund

IMR: Infant mortality rate

IRB: Institutional review board

LE: Life expectancy

MAP: Medical aid program

NHI: National health insurance

OPP: Out-of-Pocket

SDG: Sustainable development goal

SHS: Social health security

SPSS: Statistical package in social science

SSDH: Society of social determinants of health

THE: Total health expenditure

TRT: Thai Rac Thai

UHC: Universal health coverage

UK: United Kingdom

UNDP: United Nations Development Project

VIF: Variation inflation factors

WHO: World Health Organization

ABSTRACT

Influence of Universal Health Coverage on Health Outcomes

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Directed by Professor Chun-Bae Kim

There is a huge global disparity of health outcomes across countries as well as within each country. There are many responsible factors for the large gap and those factors are not only on the demand side (social biological and behavioral) but also on the supply side (the policy level). Millions of people are impoverished due to catastrophically insufficient health expenditure; there is poor access to health care and unfair distribution of and contribution to health resources. An appropriate health financing policy to achieve universal health coverage (UHC) could be the mile stone to mitigate inequalities and it is priority of World Health Organization (WHO) and a health goal in the sustainable development goals (SDGs). The aim of this study was to explore the influence of universal health coverage on health system index, healthy life years, adult mortality and infant mortality rate in the case of UN members states during the period of 2010- 2013.

This is a multi-country analysis and data was adopted from different organizations. A database was created from data from the World Bank, United

Nations Development Project (UNDP) education report, WHO country reports on youth tobacco prevalence and adult alcohol consumption per year. Moreover, health system index and universal health coverage status was adopted from Stuckler et.al and Tandan et.al, political stability, state religion status and 2 major economic country groups (G20) were adopted, and also the conflict and government state fragile report 2012, Robert J. study 'which country has state religion' and Wikipedia using record linkage theory. The study hypothesis was formulated updating the Aron-Dine RAND theory of health insurance, PY Crémieux 1999, Fevzi Akinci 2014 and Vacillis Kontil 2014. The independent variables were composed of social determinants of health, disease prevention, health behavior and health financing and the dependent variables were health system index, health life years with adult and infant mortality rate. Descriptive statistics, linear regression, sub-group analysis, case studies and pathway analysis through structural equation modeling was performed using SPSS and AMOS when appropriate. For the normality, consistency and collinearity scatter plot diagram, Cronbach's alpha and variation inflation factors (VIF) were cross checked.

Data for a total of 194 countries were available from multiple resources. The predictors; Social determinants of health (GDP growth, population growth, education enrollment), Disease prevention (vaccine and sanitation coverage), Health behavior (youth tobacco use and adult alcohol consumption per year), Health financing policies (universal health care, out-of-pocket payment, total health expenditure and government health expenditure) variables were associated with long term health outcomes (Health system index, healthy life years, adult and infant mortality rate).In direct association, health care financing policy i.e. Universal Health Coverage (UHC) had great influences on health outcomes (Health system index ~0.39, Healthy life years 0.40, Adult mortality ~ -0.40 and Infant mortality ~ -0.39) in the hierarchical linear regression. Likewise, child vaccination (DPT-3), sanitation coverage and population growth rate had less influence than UHC. In the pathway analysis, with UHC as the intermediate outcome, the influence power was higher than direct association ($\beta>0.41$, $p<0.001$). In sub group analysis, the health system index and

healthy life expectancy was significantly higher and adult and infant mortality rate was significantly lower in countries those that had already achieved UHC. There was significance different in terms of mean health outcomes in economic, World Bank regions state of political stability group but the gap was lower than the UHC category. Case studies from Germany, South Korea, Thailand and Costa-Rica revealed that those health outcomes were increased after the extension of UHC.

Universal health care is a comprehensive health policy and more than 2/3 countries in the world need to achieve it. Our results concluded that final health goals could be achieved easily after the achievement of universal health coverage. Developing countries like Nepal would achieve the health goal earlier after the UHC and need to implement with details plan considering their context.

Key words: Health care financing, Policy, Health insurance, Universal health coverage, Multi-country analysis

I. INTRODUCTION

1. Background

Health policy is the heart of the health system and responsible for health goal achievement as well as health disparities[1]. Health inequality is also related to policy and it is the major threat in the 21st century[2]. Policies consists of the decisions, plans, and actions that are essential to achieve specific health care goals within a society[3]. In other words, there could be systemic inequality which results in huge gap between two groups and it is the outcome of that unfair health policy[4]. More precisely, the inequality of health care is directly linked with health financing policy, resource allocation and mobilization because it clearly shows the extent to which the health program is a national priority. Moreover, it refers to a health care system which provides health care and financial protection, improved access to health services to improve health outcomes[5]. Since 1961, Japan's national health policy has provided all types of health services considering the needs, individual purchasing power and state responsibility[6]. Likewise, United Kingdom (UK), Germany, Sweden, Ireland, Denmark, have more than 10% health expenditure as a percentage of Gross Domestic Product (GDP) and private health expenditure is less than 20% and have achieved universal health care[7]. In states that does not provide a health policy financial guarantee; which includes most of Asian and African countries there are poor health outcomes. More than 2/3rd private health expenditure and less than 5% government health expenditure would be responsible of health inequalities[8]. Those countries that have a risk pooling health care financing policy have better health status than who that have not and health disparities would reduce after the achievement of universal health coverage but it is great challenge to achieve globally[5].

2. Rationale

There is a visible gap in different indicators globally as well as locally. The GDP of the central Africa has been 182 times less than Qatar[9]. The composite index of development, the human development index, shows the intensity of the gap. The statistics show that Norway is 0.955 whereas Niger is limited to 0.304[10]. Life expectancy at birth, ranges from 49 years in Swaziland to 84 years in Japan[11]. When the health system ranking is dissected, France is leading (0.994) and Myanmar is the last (0.138)[12].In Afghanistan, 460 mothers die due to pregnancy related causes per one hundred thousand live births but in Estonia, only 1 mother is at risk of dying per one hundred thousand live births[13]. There is a large variation in adult mortality rates and a specific example is Lesotho which has high mortality rate (0.56) and San Marino which has the lowest mortality rate (0.05),which is 10 times higher than San Marino[14]. The risk of a child dying before completing the first year of life was highest in the WHO African Region (55 per 1,000 live births), over five times higher than that in the WHO European Region (10 per 1,000 live births)[15].Inequality is not limited to between countries. It is more serious inside countries. There is a 20-years gap in life expectancy between the most and least advantaged populations in the USA[16]. The under-5 mortality rate ranges from 18 to 98 per 1000 live births in Kerala and Uttar Pradesh respectively in India[17]. Ranking overall composite human development index of Nepal, there is huge gap between Kathmandu (0.913) and Mugu (0.325) district[18] as well as there is massive inequality in health service coverage too. Ranking the overall composite human development index in Nepal there is high inequality between Kathmandu (0.913) and Mugu (0.325) districts[18] and similar situation on health service coverage. The malnutrition rate of children is 15% and 2.3% and the proportion of dehydration due to diarrhea is 3% and 0.26% between national average and the remote (Mugu) district of Nepal[19].

Beyond health inequalities, approximately 44 million households worldwide, or more than 150 million individuals, face catastrophic health-care expenditures; of these, about 25 million households containing more than 100 million people are pushed into poverty by these costs[20]. A recent study showed that more than 50% of heart disease patient households in China, India and Tanzania engaged in catastrophic health spending (≥ 40% of non-food expenditures) due to out-of-pocket payments (OPP) for health care, and many were turning to distress financing (borrowing, sale of assets) to cover these costs[21]. In Ukraine,14.4% of the population lives below the national poverty line, it is likely that the effect of OPP for the treatment of diseases is very high[22]. High OPP for health care in the former Soviet Union countries have been reported[23-27] but they were not properly addressed by effective health care financing policy till now. In the south of Nepal, direct costs of hospital-based treatment for Leishmaniasis are catastrophic since they consume 17% of annual household income and that expenditure causes more than 20% of Leshmania affected households to fall below the poverty line[28]. Moreover, public health programs have low coverage in disadvantaged communities, private health expenditure (out-of-pocket) is more than 2/3 and even for the treatment of abdominal pain only, people should pay about $8 per person per year in Nepal[29].

Poor access to health services is another barrier for better health status. Access has four dimensions: availability, geographic accessibility, affordability and acceptability[30]. More indirect cost, waiting time to take service, quality of medical service, availability of service provider etc.[31, 32]are the main issues in accessibility of health service and those things also need to be solved by health care financing policies to bridge the gap.

3. Overview previous research

The previous research has explored the social determinants of health inequality; early childhood, social stratification, unemployment, labor market, health

behavior, health care utilization but authors did not focus on the policy gap[33]. There are mixed results on the role of economic growth rate and health outcomes. Economic growth improves health status in developing countries but it does not apply in developed countries[34]. Size of the population is another factor for health status and it was already proved that population growth rate influence the healthy environment and food security[35]. Another most important component education significantly affects on health promotions[36] and there are many examples that level and quality of education not only improves health but also quality of life. To achieve better health status, wealth related inequality and maternal and child vaccine coverage have an important role and poor coverage threats for better health outcomes[37]. Apart from the traditional variables (income, asset, education etc.) there is a significant role of sanitation, infrastructure and coverage in better health outcomes[38]. For better health outcomes, healthy behavior is important because the quantity and pattern of alcohol drinking is increasing male and female adult mortality[39]. Crémieux 1999 concluded that there was a relationship between health care expenditure with health behavior, morbidity and health service coverage in Canada[40]. The mortality rate in Europe was about 20 per thousand increasing due to smoking in adults[41]. Previously related studies have been explored in literature review section (Page: 7).

Health status has different predictors and some factors are behavioral and some are socio-economic. Beyond that, some policy related factors are equally important. Among them health financing policy, particularly the status of universal health coverage, is equally important.

The quality of services and health status was better for those who were registered in health insurance based on the RAND health insurance experiment[42] which is the fundamental principle of health care financing policy. After the achievement of universal health coverage in Japan, health care utilization rate and health of the poor and the elderly has increased[43]. Pre-payment health insurance; one

component of the universal health coverage examined that it protects the catastrophic health expenditure and impoverishment which was the result from 89 countries[20]. A recent article by Fevzi Akinci concluded that increases in government health expenditure reduced infant, under 5 and maternal mortality in 19 countries of the middle east and north Africa[44]. There is an enormous volume of research on the efficacy and effectiveness of health care, but surprisingly only few of them are useful to reduce the inequality, promote health status and helpful to increase access[45]. Previous health policy research had some limitation in exploring the situation between different dynamics of predictors and health outcomes because of the following reasons.

1) Variables related to social determinants of health (economic and population growth and education) disease prevention (child vaccine coverage, sanitation condition), situation related life style(smoking and drinking) and health policy (achievement of universal health coverage)were major predictors for health outcomes in separate studies but not in a single study.
2) Those studies were largely focused on some communities, single countries and small groups of countries not all United Nations (UN)member states.
3) Usually, health outcomes were traditional like life expectancy, infant mortality rate (IMR), services access etc. but not overall public health system like health system index and human productive period status like healthy life years and adult mortality.
4) The data set were from single organizations, or sampling of some countries rather than one or more organizations at the same time.
5) A UN sustainable development goal (SDG) highly focused on sustainable health financing through Universal Health Coverage (health goal (3) target-8) has been agreed upon, and research on its implications is lacking.

6) WHO has emphasized the need for research based on the above facts and focused on catching the way forward for universal health coverage adoption in health care financing policy and systems since the 90th plenary meeting about a decade ago[46] and there is still a lack of related research.

Such study results would guide the formulation of health care financing policies and encourage achieving universal health coverage in all countries, particularly in developing countries. This study will address those issues and encourage other researchers to adopt this research model.

4. Particular application of the study

Our study findings will be helpful to those countries that have not adopted appropriate health care financing policies and are struggling for universal health coverage like Nepal. After a full decade of civil war, now Nepal is in political transition. There is a lack of a consistent system in every sector because the previous policy and the structures are not well functioning. The people have high expectations but resources are limited. There is a gross inequality between rich and minority groups, urban and rural[47]. The GDP per capita purchasing power (PPP) is $1,025 ($320-1,730) and the out-of-pocket payment (OPP) is more than 2/3rd[48]. The health care financing approach is not uniform and a large portion of people depend on out of pocket health expenditure[49]. It means that this study is more important to those transitional countries like Nepal so that they can apply an appropriate health financing policy with the principle of fare contribution and distribution of resource to achieve universal health coverage in a short period of time.

Our research explored the relation between different indicators like socioeconomic, demographic, health behaviors and health financing variables to final health outcomes. In health care financing policy we focused on two aspect of those variables which are distribution of health financing by public and private way and

contribution of resource by prepayment health insurance and it must be achieved by >90% by the country which has been defined as universal health coverage. This study aims to explore the determinants of 4 health outcomes (Health system index, healthy life years, adult mortality rate and infant mortality rate) and determine the component more responsible in contemporary situation. Moreover, it will provide the fundamental guideline to develop financial risk coverage model in health sector which will be role model of other developing countries also.

5. Objectives of the study

General objective: To observe whether the countries better achievement with universal health coverage has good health outcomes. The specific objectives are:

1) To find out the direct and intermediate (pathway) influences of Universal Health Coverage (UHC) with long term health outcomes (Health system index, healthy life years, adult mortality rate and infant mortality rate).

2) To find out the magnitude of association between predictors and health outcomes related to objective (1)

3) To explore and compare the overall health status between some countries who achieved universal health coverage**.**

4) Implicate the results for strengthening health care system of Nepal.

6. Research questions

1) Does universal health coverage affect health outcomes (directly, through pathway or both)?
2) What is the magnitude of association with universal health coverage to estimate direct or indirect health outcomes?

7. Hypothesis

7.1 Null hypothesis

There is no significant difference between the health outcomes of those countries that adopted universal health coverage and those who did not.

7.2 Alternative hypothesis

There should be significant difference with health outcomes of those countries that achieved universal health coverage and who did not.

7.3 Other sub hypothesis of study

1) Achievement of universal health coverage countries have better health system index than those group of countries who are not achieved.
2) Healthy life year is significantly high to those countries who have achieved universal health coverage.
3) Adult mortality rate is inversely proportional with achievement of universal health care.
4) The IMR is significantly lower with achievement of universal health care and child vaccine coverage.
5) The strength of influences would be significance difference for health outcome putting the UHC as intermediate outcome or pathway.

II. REVIEW OF RELATED LITERATURES

A policy is a statement of intent, and is implemented as a procedure or protocol and it deliberate system of principles to guide decisions and achieve rational outcomes. There are intended and unintended impacts of policy and to form an agenda setting a program, there must be an evaluation process to guide policy[50]. World Health Organization (WHO) defines the health policy as decisions, plans, and actions that are undertaken to achieve specific health goals within a society[51]. An explicit health policy can achieve several things: it defines a vision for the future which in turn helps to establish targets and points of reference for the short and medium term. It outlines priorities and the expected roles of different groups; and it builds consensus and informs people.

Health policy is courses of action (and inaction) that affect the sets of institutions, organizations, services and funding arrangements of the health system. It includes policy formation in the public sector (by government) as well as policies in the private sector. Because health is influenced by many determinants outside the health sector, health policy analysts are also interested in the actions and intended actions of organizations external to the health system which has an impact on health for example, the food, tobacco or pharmaceutical industries[3].

Commonly, health policies are understood as the formal, written documents, rules and guidelines that present policy-makers' decisions about what actions are deemed legitimate and necessary to strengthen the health system and improve health[52]. Health policy in the form of laws, regulations, and guidelines, has a profound effect on health status[53]. As with any decision-making process in public health practice, formulation of health policies is complex and depends on a variety of scientific, economic, social, and political forces[54].

In summary, health policy sets a vision assessing the current situation from setting agendas to evaluate the program in its cycle composed of guiding principles (constitution to guideline) to promote the health status of the nation and the entire world. Ultimately it is a roadmap where the current health status is and where we want to go by setting some sort of health goal and outcomes.

1. Association of health outcomes with multiple domains

1.1 Political philosophy, stability and health outcomes

The importance of philosophical perspective as an influential factor in health and health care out-comes is well established. Along with the unprecedented growth in the quality of health and health care services in the post-war years, there has been witnessing the onset of a major paradigm shift towards a more holistic, philosophically flexible approach to health care[55]. In ideological politics, there are different perspectives on how to operate the health system and policy and health outcomes are also fluctuated by political activities.

The social democratic parties in Scandinavian countries in Sweden, Norway, Denmark, Finland, as well as the social democratic party in Austria have historically been committed to redistributive social policies (the average Gini coefficient in this group over the last 10 years of the study period was0·225)[56-58]. Studies concluded that universal health coverage provided social benefits to all citizens (the average public social expenditure in this group was 30% of gross domestic product (GDP), and the average public health care expenditure over the last 10 years of the study period was 7·2% of GDP)[59].However politics shaped by conservative and traditional Christianity in Italy, Netherland, Germany, Belgium and France had been less committed to redistributive policies than the social democrats, and the average Gini coefficient within this group was 0·306. The countries adopting liberalism, UK, USA, Canada and Ireland, have little distribution of resources (Gini 0.372) and the countries with prior dictatorships, Spain and Portugal (Gini 0.423) had very few distribution of

expenditure in social sector. As a result the infant mortality rate and life expectancy was better in democratic socialism than others. Due to individualism and extreme privatization, capitalist countries neglected the social welfare and there is poor social cohesion. Countries with high liberalism undermines the social welfare and average social cohesion but socialistic countries have promoted the social welfare and very good social cohesion and health status has been better in socialism[60]. The health indicators are better in socialistic countries than capitalist, neoliberal and autocratic countries in world health report 2014[61].By philosophy, left and egalitarian political traditions on population health are the most salutary, consistent and substantial, liberal democracies are better in health outcomes. Welfare regime studies, primarily conducted among wealthy countries found that social democratic regimes tend to fare best with absolute health outcomes yet consistent in terms of relative health inequalities[62]. Not only the political ideology, political stability influences different inequalities including health outcomes[63].

1.2 Social determinants of health

The social determinants of health are the conditions in which people are born, grown, lived, and conducted their livelihood. These circumstances are shaped by the distribution of money, power and resources at global, national and local levels. The social determinants of health are mostly responsible for health inequities - the unfair and avoidable differences in health status within and between countries[64]. In Canada, the social determinants have wide and specific concept and consists of economic status, education, demographic factors, culture and social capital[65].

Many previous studies have explored that health status basically morbidity and mortality status has been improved in North America, Western Europe and some developing countries by improving social determinants of health[66-69]. Furthermore there is not only relation between economic effect to the health but also reciprocal relationship on longitudinal study using structural modeling equation in 2003[70]. In economic status, there are specific factors like individual income, household income,

occupation, communities and countries economic growth rate and wealth status. Health of the elder people was significantly better than those people who had more wealth but for the adult, the health status was significantly better who had higher education[71]. More specifically for the adult, national wealth, income inequality and access to education were the structural factors for better health[72]. Education is another important factor for health because it is individual power for each subject. Now education has also been more specialized and literacy is the basic education. In this line poor literacy was associated with disease (chronic obstructive pulmonary disease) severity, helplessness and health related quality of life[73]. Now, the literacy has been almost achieved all over the countries and people have a formal education at least the secondary level. The health and the happiness was better in those people who have more than secondary education[74].

In the three decades since 1950,population growth was strongly associated with health, environment and food security and they influence infant mortality, maternal mortality, child mortality, access to health care[75, 76] but after starting the 21st century the previous paradigm has been shift. David Bloom, David Canning and Sevilla, Jaypee 2003 published one book named as Demographic Dividend. In this chapter 1 they described the pessimist, optimist and naturalistic effects of population growth on economy and other areas[77]. There is a strong prediction that the population growth will be end 21st century and there will be scarcity of human capital which has multiple effects on hospital and service sector[78]. So, normal population growth has less impact on health outcomes.

The Commission of Social Determinants Of Health (CSDH); set by World Health Organization (WHO) had set up the conceptual framework on social determinants of health[79] (Figure 1). It is more complex and divided the 2 major components to influence health status. One is structural determinants and another is intermediary or pathway which is health system and policy. It further highlights that socio-economic

position determines the social class and it creates fundamental gaps on education, occupation, demography, access to resources. Another is, state health system or policy that would reduce the gap between rich and poor. The health outcomes and well beings will not be universal coverage if there is problem in structural or intermediary or both.

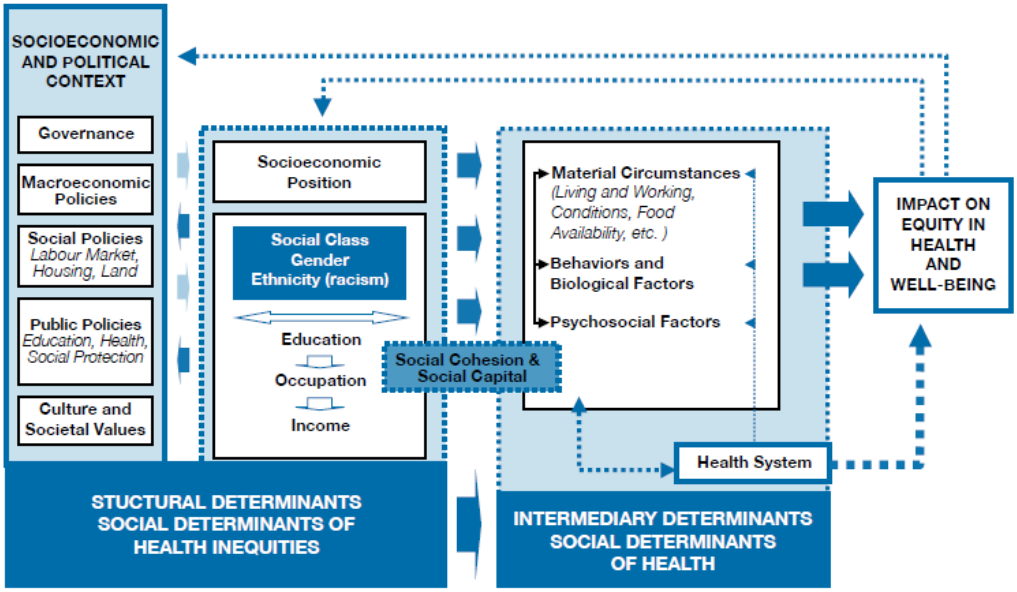


Figure 1: Conceptual framework on social determinants of health

1.3 Life style and health outcomes

Life style is one of the most important factors for health. There are many factors related to health and it is not similar even in one family. Among them food, drinking, physical fitness, stress coping, sleeping and different forms of substance use habits directly affect health. In an overwhelming way, behavior has multiple levels of influences, often including intrapersonal (biological, psychological), interpersonal (social, cultural), organizational, community, physical environmental, and policy[80]. The people who have better life style have perceived more healthy than who had not in elderly Koreans[81]. Nowadays the lifestyle without physical exercise, limited

movement which is known as sedentary life is risk for diseases and disabilities. The morbidity and mortality is significantly higher in those people who have sedentary life style[82-84]. Since long time there are many research and discussion that tobacco use and drinking alcohol are main cause of death.

The amount of alcohol (26) binge and frequency (16) and more per week had higher mortality than occasional drink, a cohort study conducted in Vietnam[85]. Another study in Sweden explored that heavy drinkers and former drinkers had risk for death and co-morbidity in comparison with moderate drinkers[86]. Studies examining the relation between alcohol consumption and all-cause mortality have identified J-shaped associations, which suggest that low alcohol consumption may confer some degree of protection[87]. It is possible that the J-shaped association between alcohol consumption and all-cause mortality may be in part a product of a similarly protective relation between alcohol and vascular diseases[88, 89]. It means that there are mix result about the drinking alcohol to the risk of morbidity and mortality and it more depends upon the amount of alcohol products and concentration.

It is already proved that smoking is one of the major risk factors for multiple chronic diseases, such as cardiovascular diseases[90-92] and cancer, as well as for mortality and leading causes of death. More specifically smoking remains a strong risk factor for premature mortality even at older age[93]. The reports of the Surgeon General have alerted the nation to the health risk of smoking, and have explored that effects of secondhand smoke are substantial and rapid, explaining the relatively large risks that have been reported in different epidemiological studies[94].

1.4 Disease prevention and health outcomes

Associated with social determinants of health, there are basic components for the healthy life and well-being. However, they are inter-related each other. Daily food security, housing, water and sanitation, protection of individual by the clothes, protective measures during the risk jobs, etc. are some examples. Those are not only

the basic components of life but also preventive approach from diseases and injuries. Especially for some infectious and communicable disease, the preventive approaches are more effectives and less cost. After the formation of disease, it needs the appropriate treatment which is less effective more costly.

Improved sanitation reduced significant proportion of some diseases and the median reduction 26% for diarrhea and 78% for guinea worm. The median reduction in general diarrhea mortality was 65% and in child mortality 55%. It is the report from 144 studies during the 1990 decades[95]. As a result, there are not reported diarrheal disease epidemic due to the success intervention of water and sanitation. Improved sanitation were the major determinants of child morbidity and mortality in India and as a results, the adulthood of those children have been risk and vulnerable for other diseases[96, 97].Studies from some Asian and African countries concluded that water, sanitation, and hygiene interventions, as well as their combination, are effective at reducing diarrheal illness[98]. After increasing water and hygiene access to 1/4th population, under-5 mortality was reduced 1.66 and 1.14 IMR per thousand death and odds ratio was protective (0.52) for maternal mortality ratio too, result from 193 countries in 2010[99].

Vaccines have been a part of the human fight against disease for more than 200 years since Edward Jenner starting a smallpox vaccine in one unaffected child[100]. The worldwide vaccination campaign eradicated smallpox and polio immunization has globally eliminated poliomyelitis. Childhood vaccination has substantially reduced the morbidity and mortality from infectious diseases in much of the developed world. Among them, Diphtheria, Pertussis Tetanus (DPT) is the most essential vaccine to reduce the infant and child mortality and to gain the life-long immunity however there are many other vaccines in different countries and continents and some of them have been used commercially too[101]. As a result, child vaccine coverage is taken as an indicator of child survival, functioning as high public health priority program of

government[102]. Not only the DPT, other vaccines are also recognized as one of the most cost-effective public health interventions with the potential to significant impact the unacceptable childhood deaths in the world. Furthermore, with the renewed emphasis on universal health coverage, immunization has covered the way forward and continues to provide an enabling platform for other child and maternal health services in International Conference on Health for Development (ICHD) in 2007[103]. Except DPT vaccine, Pneumococcal[104], Measles[105], Rota virus[106] have been reducing 8 million, half million and 0.75 million related child death per year globally.

1.5 Health policy and health outcomes

In previous chapters there is more discussion on different categories of predictors with health outcomes and in epidemiological theory, person will sick or die if there is continuous interaction between agent host and environment[107] and if we break the agent, host and environment relationship we could be healthy. Health and sickness is not only determined by that epidemiological triad but availability of health service, policy adopted by the country and effective management of resources also. In other words, health outcomes are equally determined by delivery or supply side. Collectively, health is determined by adopted health policy because if there are consistent and practical policies, the health status and outcome would be improved.

Health policy is guiding principles but it is very wide term like ‘sky has no limits’ because those guiding principles must be adopted by program, country, and specific problem and can be presented in multiple ways. Health policy can be divided in 5 forms namely laws, rules and regulations, operational decisions, judicial decisions and macro policies in specific areas[108].

Before 2000 there was not comprehensive international policy to reduce the poverty alleviation including health issues. After Millennium Development Goal(MDG), global prevalence of extreme poverty ($1.25/day) has been declined from 43.1 to 22.2% in 2008 and now it is reducing more quickly[109]. Likewise other

MDG target (Health, population, environment, disease control etc.) are going to be fulfilled because of this policy. WHO Framework Convention on Tobacco Control adopting MPOWER package is significantly reducing the proportion of tobacco related death globally[110]. Three best alcohol policies; increasing the price, limit the availability and ban on advertisements have reduced the alcohol related death and disorder in Europe[111]. When Finland applied the comprehensive nutrition policy in 1992, the utilization of saturated fat was decreased by 90% and mortality due to cardiovascular diseases and ischemic heart disease has been decreased by 80% and life expectancy was increased by 10 years[112]. After the adoption of total sanitation policy in South East Asia particularly in India, the sanitation coverage was 72% in 3 years period and most of the communicable disease has been controlled[113]. Access to contraceptive and abortion policy in Europe, teenage pregnancy, unsafe abortion, preterm birth is falling and chance of outdoor job has been increased and this policy has been adopted in India, Nepal, China and other countries[114]. Likewise extending program on immunization by Rotavirus vaccine, there was substantial decreasing of related death in Indian and some African countries[115]. After the vaccination, children get lifelong immunity and adult mortality rate is also reducing.

Policies related to health financing have also significant impact in health outcomes because it has two perspectives. One is distribution of resource to needy people and area by principle of equity. Usually, people from the marginalized group, remote area, uneducated have poor access to health service, increase poverty. Poor and unemployment people, women, children and ageing population need more medical and other service. As a result the health service and state welfare service are more necessary and government should allocate more resource to those groups. Another, it is not possible to provide all health service by state to the people completely without contribution by them because health is more individual concern. So, prepayment contribution for medical service is necessary by the people in different health insurance modality because after getting severe illness, household

purchasing power may not sufficient for complete care and person or family fall to poverty trap easily. In other words, who had mandatory (by law) health insurance and or tax based health financing and more than10% government health expenditure in health, would have low infant mortality rate, high life expectancy low adult mortality and average length of stay in hospital is short[7]. If there is a provision of effective health financing policy, it will assure the universal health care by law and fulfill the target of prepayment health insurance and ultimately improves the health outcomes and health system.

University of Wisconsin, department of population health sciences has provided the framework of health determinants and health outcomes (Figure 2). Between those predictors and outcomes health policies play the significant role to determine health status[116].

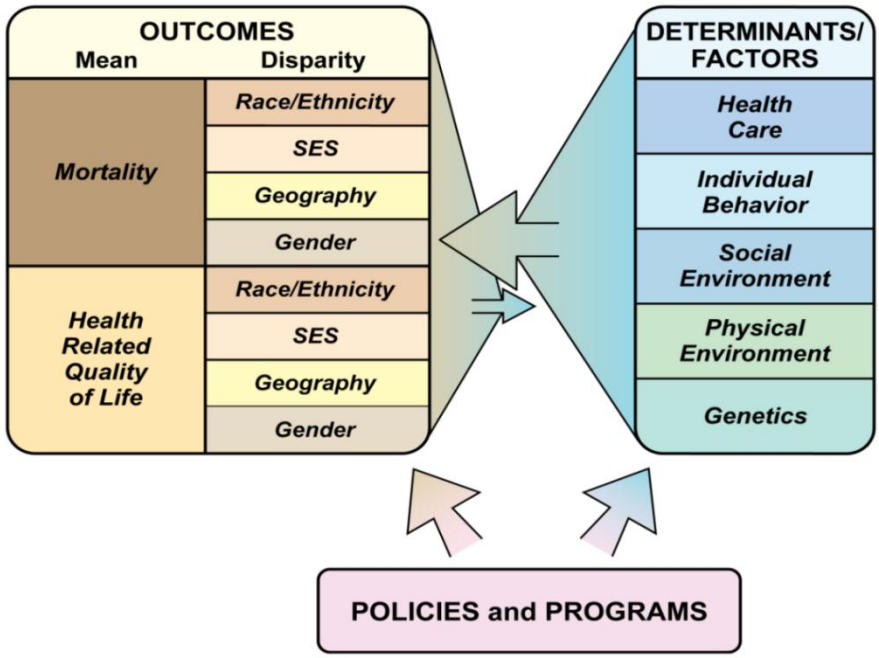


Figure 2: Bridging the health determinants and health outcomes by health policies

2. Health related laws

Health related laws, act and constitutional provisional contract can be categorized as hard policies because these are mandatory and every people should adopt this policy and if they cannot adopt it is treated as violation of law. Law is an important public health tool that plays a critical role in reducing illness and unusual death. Public health law examines the authority of the government at various jurisdictional levels to improve the health of the general population within societal limits and norms[117]. Law clearly defines the right and responsibility of every citizen to consume of health service provided by states. There might be varieties of laws related to health that are solely developed for health system as well as other laws that would be complementary to promote health. As examples, road and safety laws, food security laws, food quality monitoring laws etc. are crosscutting laws and health promotion act, quarantine laws, laws related to prevent the diseases, health insurance laws, tobacco control laws, blood transfusion laws, organ transplant laws, waste disposal acts, drug supply acts etc. are direct health related laws .There are many health related acts in different countries and those countries that have federalism, there are state laws also. As an examples, public health promotion law Korea-1995, Health Promotion and Nutrition in School Act Scotland-2007, Health Protection and Promotion Act-1990 Canada, Malaysian Health Promotion Board Act-2006, Thai Health Promotion and Foundation Act-2001, Public Health Act Federal State of British Columbia 2008- Canada etc.

The acts and laws related to the health care financing policy are also very common. Germany has the world's oldest national social health insurance system[118], with origins dating back to Otto Von Bismarck's Sickness Insurance Law of 1883[119]. Likewise most of the Scandinavian and European countries have mandatory health insurances by Act[120]. Japan amended health insurance law 1922[121]. Thailand passed the bill of National Health Security Act 2002 and achieved the universal health coverage after 10 years (2012)[122]. Lastly Turkey has amended the Health Insurance

and Universal Health Law 2008 and it almost achieved the Universal Health Coverage[123]. Similar trend can be observed in Korea. Because after the amended of National Health Insurance Act, Korea easily achieved the Universal Health Coverage (UHC)[124]. Lack of the hard policy (law) United State, Russia, India, China Brazil, and many countries may not achieve the universal health coverage.

3. Impact of universal health coverage

There are many factors for the development, prosperity and stability for any country. There is already established principles that economic development either growth rate or per-capita income may radically improve the health status. But it is not absolute true because the countries who have captured the whole economy like China India, the United State and Brazil could not achieve sustainable economic status in comparison with those countries who applied the Universal health care (Table 1).

Table 1: Comparison of per capita income in 1955 and 2008 with universal health coverage

Countries group	Countries (Achieved year UHC)	Per capita income in $ (1955)	Per capita in $ (2008)	Growth proportion (times)
Achieved UHC	Japan (1938)	2,771	22,816	8.23
	Sweden (1955)	7,478	24,409	3.26
	Canada (1965)	8,725	25,267	2.89
	Finland (1972)	5,197	24,344	4.70
	Denmark (1973)	7,395	24,621	3.32
	South Korea (1989)	1,169	19,614	16.77
	Singapore (1993)	2,358	28,107	11.91
	Israel (1995)	3,701	17,937	4.84
	Thailand (2001)	945	8,750	9.25
	Costa-Rica (2010)	2,460	8,032	3.26
	Average	*4,219.9*	*20,389.7*	*4.83*
Not achieved UHC	Brazil	1,926	6,429	3.33
	China	5,77	6,725	11.65
	India	676	2,975	4.40
	Russia	6,582	9,111	1.38
	United States	10,897	31,178	2.86
	Average	*4,131.6*	*11,283.6*	*2.73*

Source: Data from Groningen Growth and Development Centre[125]

It clearly shows that countries that achieved UHC have 2 times economic strength who have not achieved it. However those countries have powerful than other countries.

Health status is determined by many factors and health outcome is achieved after long period. Likewise, health status is examined by many health related outcomes indicators. Previously the determinants of health status were explored by socioeconomic, health behavior, disease prevention but the policy review in relation

to health outcomes are very few and not explored with multiple angle. In other words, in past decades there was sufficiently discussed and reviewed about different predictors but rarely, slowly and insufficiently about adopted health policies. In this line, it is more useful to study overall factors that determinants of health status in one equation.

III. RESEARCH METHODS

1. Study design

This is a multi-country ecological study of all UN member countries. The data based study is ecological study design. It compares clusters of countries, country characteristics etc. usually grouped based on their geographical location or temporal associations[126, 127]. Ecological studies assign one exposure level for each distinct group and can provide a rough estimation of prevalence of disease within a population. Ecological studies are generally retrospective[128]. Our study is composed of different sources of data variation in location, time, group and retrospective in nature. The data sources are different around the time of 2012. Result from the study has been shown in one observation as cross-sectional pattern.

To verify the statistical results, some selected case studies have been performed. The case studies comprised of short history situation of health status before and after achieving UHC and impact of amended act or related laws.

2. Previous study models

Previously, study had been performed by similar type of dependent and independent variables as below (Table 2).

Table 2: Previous study model with our study

Model name	Dependent variables	Independent variables	Equation
Arone-Dine RAND health experiment [129]	Health outcome (Health expenditure, health care utilization rate)	Age, gender, location, intervention/Insurance (Yes/no), time	$y_{it} = \lambda_p + \tau_t + \alpha_{im} + \varepsilon$
P. Y Cremieux 1999 [40]	Infant mortality and life expectancy	Location, health economics variables, life style and socio-demographic variables and Nutritional variables	$Y = \beta_1 x_1 + \beta_2 x_2 \ldots. \beta_n x_n + \alpha$
Fevzi Akinci 2014[44]	Infant mortality, maternal mortality and <5 mortality	Government health expenditure in health, out of pocket expenditure, population with safe drinking water, Birth attendance by skill personnel and adult literacy	$Y = \beta_1 x_1 + \beta_2 x_2 \ldots. \beta_n x_n + \alpha$
Vacillis Kontil 2014[130]	Adult mortality	Tobacco use, harmful alcohol, salt intake, obesity, raised blood pressure, raised blood glucose	Population impact fraction by year

3. Theory conceptualization

The research concept is based on Aron-Dine RAND theory of health insurance. This theory explores that there is better health status of financially protected persons than those who have no protection. RAND health experiment on insurance is the gold standard experiment by sharing treatment cost[129]. This theory explores more about use of health service, quality of service and health status between 2 groups. It summarized that the disease prevalence and health status was better in insured person/family than who had no insurance[42] which is prerequisites of universal health coverage (UHC). Up to this time, such experiment is more important for universal health coverage and to apply employer health insurance[129]. Research by PY Crémieux 1999[40], Fevzi

Akinci 2014[44] and Kontis, Vasilis 2014[130]were the relevant models to make advance in our study (Figure 3).

Updating those all studies and models, we have conceptualized the model to be fit as below:

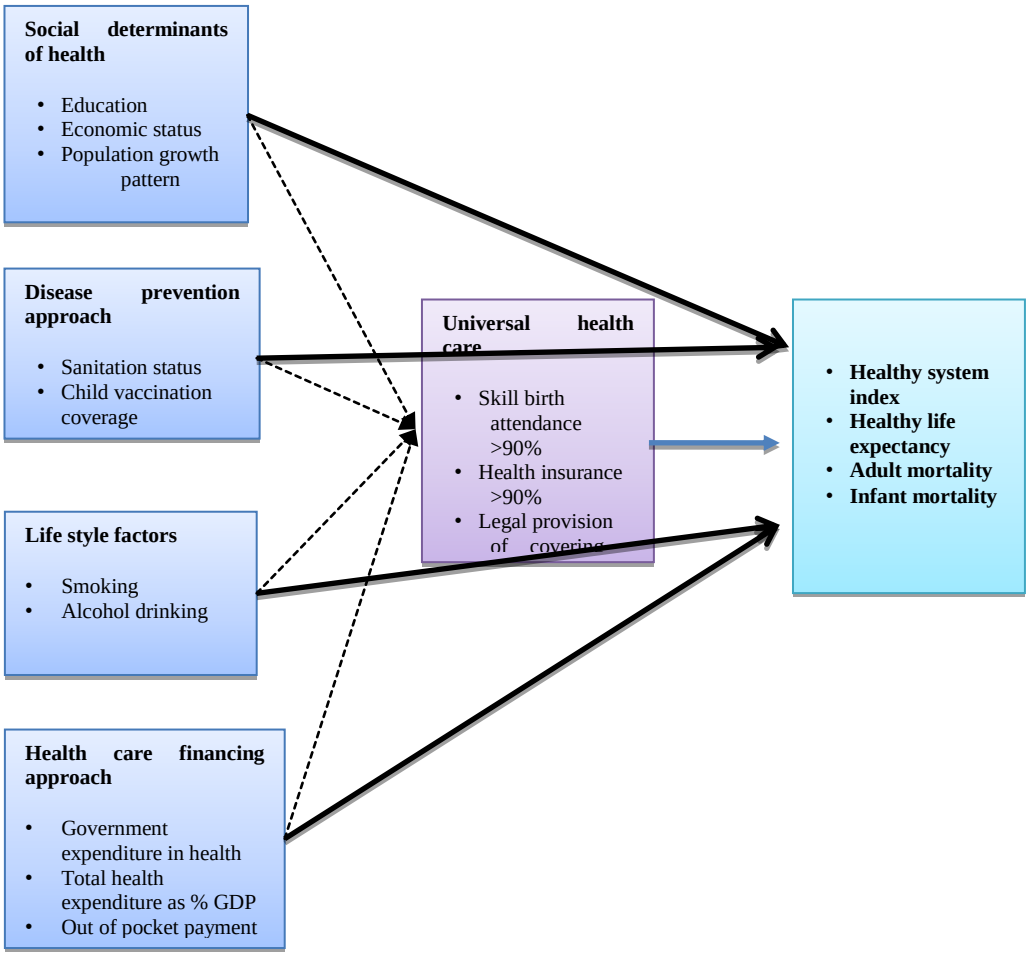


Figure 3: Theoretical conceptualization of study model

4. Data adoption models

Data was created based on Record Linkage theory applied by Halbert L Dunn in 1946[131]. The objectives of this model were to preserve the records, verify them and create the new statistics. Furthermore, this model was advanced by Douglas P. Jutte 2011 as Administrative record linkage as a tool for public health research[132]. This method is used widely for example saving the individual data and used for the research, unite the different sources of data and conduct research and compare the same entity across different data sources.

5. Data sources

We made the data base from Combine Gross Enrollment (CGE) in all age: Human Development Report: education 2013[133], World Bank data base on health 2012[134], WHO health report 2014[61], Health system ranking index 2002 by Tandon A. et.al[12], Conflict government and state fragility report 2011 by Global Economy 2013 [135], "Which country have state religion" by Barro et.al 2005[136], World Bank: categories of country by region and members of G20 countries by Wikipedia web page[137] as below (Table 3).

Table 3: Formation of new complete data set from different sources

Data sources	Reference
World Bank health data	World Bank: Data Catalogue
Category of countries adopted and achieved universal health care	Stuckler D, Feigl AB, Basu S, McKee M. The political economy of universal health coverage; 2010[143]
Health system index	Tandan et.al 2001[12]
Education: combine gross enrollment of all age	Human development report 2013: education [133]
Categories of countries with different religion	Barro RJ, McCleary RM. Which countries have state religions? : National Bureau of Economic Research; 2004[136]
Categories of countries with different economic level	Members of G20 countries by Wikipedia web page; 2014[137]
Categories of countries with different geographical location	World Bank Economy categories: updated
Categories of countries based on political stability	The Global Economy. Political Stability Index; 2013[135]

6. Data management

As mention above, data base was established based on record linkage theory. The data was prepared in Microsoft Excel by country for all 193 UN members from different sources. Data and outliers were cross checked and missing data from some countries had excluded during analysis. After verification, the DB was exported into SPSS.

7. Data analysis model

7.1 General statistical analysis

In first stage, data was analyzed in three stages as general to specific so that result could be observed in chronological order.

1) The descriptive results were presented in mean and standard deviation as global average.
2) In second phase raw correlation coefficient was computed.
3) In third step, multi-variant analysis was performed by statistical package in social science (SPSS-20) in two ways.
    a. The hierarchical regression model was used among all types of independent variables and dependent variables

    In equation direct influence= $\beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \alpha$ …… (i)

    i.e. Health outcomes (Y= Y_1, Y_2, Y_3 and Y_4)

    (Health system index, Healthy life years, Adult mortality rate and Infant mortality rate in 2012) = "β_1 Social determinants of health + β_2 disease prevention + β_3 Health behavior + β_4 Health financing"

    b. Beyond the hierarchical regression, sub-group comparison was performed with different groups to compare UHC and similar other groups t by mean comparison

There were 2 groups regarding universal health coverage (achieved-yes and not achieved-no) but some other groups would necessary to compare with it to be responsible for the health outcomes. The group of G-20 and none, group of political stability (Stable, average, unstable and very unstable), countries with religion (No religion, and country with religion) were the other subgroup to compare with achieving and non-achieving universal health coverage.

7.2 Path analysis

In second stage, pathway analysis was performed using structural equation modeling (SEM) with universal health coverage to the health outcomes (HSI, Healthy life years, adult mortality and infant mortality).

Path analysis is a straightforward extension of multiple regressions. Its aim is to provide estimates of the magnitude and significance of hypothesized causal connections between sets of variables. This is best explained by considering a path diagram and it is special case of structures equation modeling (SEM) and assumes that variables are measured with negligible error. SEM is often visualized by graphical path diagram through special software like Analysis of moment structure (AMOS). Direct and pathway effect was compared to see the magnitude of association.

In equation, the variable composition pathway equation can be expressed as: Predictors → Pathway → Outcomes (SEM Figure-4)

I.e. β value × independent variables (V_1, V_2, V_3 …….$V_{n)}$ → Pathway; p (UHC) → outcomes; health system index, healthy life expectancy, adult mortality and infant mortality…… (ii)

The variables composition had been presented on conceptual framework (Figure 4).

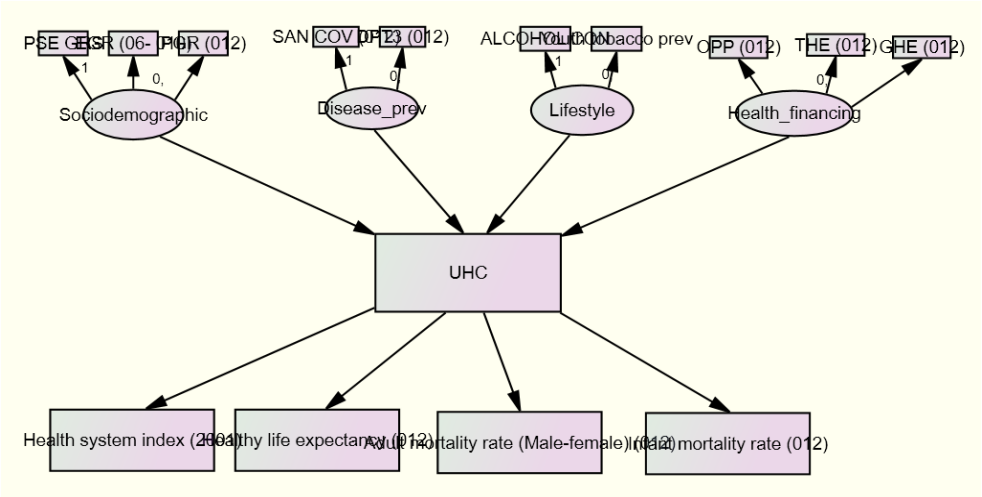


Figure 4: Structure equation model putting UHC in path

PSE: Primary school enrollment, EGR: Economic growth rate, PGR: Population growth rate, SANCOV: Sanitation coverage, DPT: Diphtheria Pertusis Tetanus, OPP: out-of-pocket payment, THE: Total health expenditure GHE: Government health expenditure

8. Operational definition of variables

8.1 Independent variables

8.1.1 Variable related to social determinants of health

GDP growth rate is a measure of gross domestic product growth from one period to another (2006 to 2010) in percentage terms. This measure does not adjust for inflation; it is expressed in nominal terms. In practice, it is a measure of the rate of change that a nation's gross domestic product goes through from one year to another. It was calculated from average gross domestic product (GDP) growth rate (2008-2012) by World Bank because 1 year GDP growth rate is unstable to compare to impact level health outcomes.

Population growth rate (PGR) is the increase in a country's population during a period of time, usually one year, expressed as a percentage of the population at the start of that period. It reflects the number of births and deaths during the period and the number of people migrating from a country.

Combine gross enrollment (CGE) of all age is the number of students enrolled in primary, secondary and tertiary levels of education, regardless of age, as a percentage of the population of theoretical school age for the three levels (Human development report 2013: education).

8.1.2 Disease prevention variables

Access to improved sanitation facilities refers to the percentage of the population using improved sanitation facilities. Improved sanitation facilities are likely to ensure hygienic separation of human excreta from human contact. They include flush/pour flush (to piped sewer system, septic tank, and pit latrine), ventilated improved pit (VIP) latrine, pit latrine with slab, and composting toilet.

Child immunization measures the percentage of children ages 12-23 months who received vaccinations before 12 months or at any time before the survey. A

child is considered adequately immunized against Diphtheria, Pertussis (or whooping cough), and Tetanus (DPT) after receiving three doses of vaccine health behavioral variables.

8.1.3 Variable related to health behavior

Prevalence of youth tobacco use: It was derived from WHO health statistics 2014. The prevalence of using all forms of tobacco by youth based on global youth tobacco survey (GYTS).

Alcohol consumptions per year in liter: It was also derived from WHO world health statistics report 2014 based on each country per year per adult in liter 2012.

8.1.4 Health financing variables

There are two types of health care financing variables; one is *distribution of resources* from individual and nation those are total health expenditure as % of GDP, government expenditure in health as % and individual out-of-pocket payment estimated as % in 2012. Another is *contribution of resources* in the form of social health insurance, tax or privately and those countries already achieved Universal Health Care (UHC) 2010 by countries as 'Yes' and 'No'.

Health expenditure as % of GDP: Total health expenditure is the sum of public and private health expenditure. It covers the provision of health services (preventive and curative), family planning activities, nutrition activities, and emergency aid designated for health but does not include provision of water and sanitation[138]. In 2013, the global average of health expenditure in health was 9.1% by global health observatory data[61].

Public/government expenditure on health: It is the proportion of the annual government budget allocated in health sector in percentage. Country specific governments have allocated 2-24% in health sector from their annual budget ceiling. The global average of government health expenditure was 15.2%.

Government expenditure on health as a share of total government expenditure reflects the priority of health in the national agenda[139]. Indeed in 2001, the Abuja Declaration endorsed that at least 15% of total government expenditure should be allocated to health[140]. According to world health report 2010 reveled that wealthy countries utilized more than 10% of government expenditure in health[141].

Out of pocket payment: Out of pocket expenditure is any direct outlay by households, including gratuities and in-kind payments, to health practitioners and suppliers of pharmaceuticals, therapeutic appliances, and other goods and services whose primary intent is to contribute to the restoration or enhancement of the health status of individuals or population groups. It is a part of private health expenditure. Increasing the OPP is the main challenge in health inequality and catastrophic health expenditure. The global average of OPP was 23%[142]in 2009.

Achievement of universal health care (UHC): The application of the universal health coverage has many concepts and definitions. The WHO paper on 'Political economy of universal health coverage' had made criteria that more than 90% of the population must achieve skilled birth attendance (SBA) and insurance coverage and mandatory legal provision for universal health insurance[143] (page no.15). These completing criteria have 58 countries and declared the already achieved Universal Health Coverage (UHC).

8.2 Dependent variables

Infant mortality rate: Simple it is the total death of infant (<1 year) among 1000 live birth but it signify many situations of the countries. This reflects the apparent association between the causes of infant mortality and other factors that are likely to influence the health status of whole populations such as their economic development, general living conditions, social well-being, rates of illness, and the quality of the environment[144].

Adult mortality rate: Like IMR adult mortality rate is also the mortality rate of adult among productive age group (15-60 years). In other words, it is the probability of dying between 15-60 years of age per thousand populations. It means that higher AMR signifies the long term effects on family income, parenthood, family vulnerability in different aspects and falling into poverty trap. Not only this, it is the loss of investment of country and society without sufficient output for nation and society.

Healthy life expectancy: HALE measures the number of remaining years that a person of a certain age is expected to live without disability and it is actually a disability-free life expectancy[145]. Healthy life expectancy (HALE) provides a summary of overall health conditions for a population, which is in turn an integral part of development. Daniel Sullivan developed a method to account for both mortality and morbidity in a single index capturing the expected years of survival free of disability [146],productive capacity index[147] and established the concept of healthy life expectancy[148]. So, a healthy life year provides a more complete picture of the impact of morbidity and mortality on populations, than simple life expectancy alone and one of its structural indicators for yearly monitoring of outcomes related to health-care and retirement policies[149, 150]. The availability of health expectancy indicators dividing life expectancy into life spent in different states of health is useful to health authorities in the field of public health and health policies provided that these indicators allow comparisons over time and between geographic areas and between socio-economic groups in society[151].

Health system index: It is a composite index in order to assess overall efficiency, the first step was to combine the individual attainments on all five goals of the health system into a single number those are disability adjusted life years (DALE) 25%, health inequality 25%, responsiveness level 12.5%, responsiveness

distribution 12.5% and fair financing 25% based on the goal of health system[12]. In other words, it reflects the policy impact of overall health status.

9. Characteristics of variables

All of the above variables are numerical variables except universal health care. UHC is combined of 3 indicators: legal obligation of UHC, skill birth attendance rate and health insurance coverage. So we applied the UHC as yes =1 and no =0 category. After making consistent variables, we performed the linear regression models.

10. Validity and reliability

There are very few questions about the validity and reliability of Word Bank, WHO and UN data that was used in this study. Sources of data were also available from their online web pages. After data entry, we cross checked more than two rounds and assured of the quality. Likewise, the normality of the data was verified by the observation of scatter plot diagram and consistency of data was checked by Cronbach's alpha in appropriate variables. We checked multicollinearity also because being a comprehensive definition of UHC, available variables might show multicollinearity effect as variance inflation factors (VIF) values >3. Due to the high fluctuation nature of data in GDP growth rate, the outliers had been removed and ran the equation. For the reliability, the result had been checked by winsorizing method also.

11. Ethical approval

For the research, the first approval was taken from institutional review board (IRB) of Yonsei University, Wonju College of Medicine, South Korea with this research concept. Other ethical approval was not necessary because they are all open access data in web page and published articles.

IV. RESULTS

We made a new data set from different resources and such data were country base data. Beyond the group analysis all dependent and independent variables were numerical. This is global data of all countries who are the members of United Nations. During the data analysis, all variables of all countries were not available because some data was missing and analysis was done among available countries.

The results have been divided into two parts. This is mixed study which is defined as result from numeric data, categorical or cluster data and another is selected case studies.

1. Results from numeric data

1.1. Descriptive findings

The average global status is varying in different sector. The GDP growth is 3.16%, population growth was less than 2%, around 1/3of the population have only secondary or higher education, more than 2/3rdof the population achieved basic sanitation coverage, and smoking and adult alcohol consumption status is around 1/3rd of the population. More interestingly, adult mortality rate (178/1000) is 7 times higher than infant mortality rate (26/1000 live birth) and only 1/3rd (32.08%) countries achieved universal health coverage (Table 4).

Table 4: Results of descriptive analysis

Variables	Number of countries	Mean± Std. Deviation
GDP growth rate by country % (2008-2012)	185	3.16±3.17
Population growth rate by country % -2012	192	1.41±1.33
Combine gross enrollment in all age % among total population	194	95.80±31.08
Sanitation coverage by country % - 2012	188	70.59± 23.79
Child vaccine coverage (DPT 3) by country % -2012	190	89.23±13.05
Adult alcohol consumption /year in liter by country in - 2010	194	5.72± 4.30
Prevalence of youth tobacco use by country % -2011	132	38.25± 18.21
Total health expenditure as % of GDP - 2012	183	6.80± 2.94
Out of pocket payment (OPP)% among total expenditure-2012	185	32.08± 18.97
Government expenditure in health % -2012	186	11.63± 4.90
Health system index by country -2002	182	0.643± 0.221
Healthy life expectancy by country in -2012	179	61.34± 8.40
Adult mortality rate (AMR) by country in/1000 population –2012	179	178.56±103.72
Infant mortality rate (IMR) by country /1000 living birth -2012	188	26.22±24.46
Application of universal health care - Yes (2010)	57	32.47%

Multicollinearity: UHC, education and GDP growth and other variables <1.8, Cronbach's alpha: 0.701

1.2 Validity, reliability and consistency results

Table 5 shows the internal quality of data and its power for generalization. The data was acceptable normal distribution, collinear effect was 1.2 -2.4, consistency was relatively small but acceptable and descriptive power (R^2) and critical ratio were acceptable.

Table 5: Result of internal quality of data

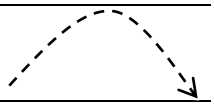
Independent variables	Dependent variables	Test results
GDP growth rate, Combine gross enrollment of all age of education, population growth rate, Sanitation coverage, Vaccine coverage, Youth tobacco prevalence, Alcohol consumption per year, universal health care, Out-of-pocket payment, Total health expenditure, Government health expenditure	Health system index, Healthy life years, Adult mortality and Infant mortality	
Normality	Scatter plots	Normal distribution 
Co-linearity	Variation inflation factors (VIF)	1.2-2.4 (Acceptable <3)
Consistency	Cronbach's alpha	0.62-0.73 (Acceptable >0.60)
Descriptive power	R^2 and Adjusted R^2 in full model regression	R^2: 0.53-0.70 Adjusted R^2: 0.49-0.69
Critical ratio (CR)	Pathway analysis	>2.4 (Acceptable:>1.96)

Table6 shows the correlation between available variables using Pearson correlation coefficient. Economic growth, population growth rate, education, vaccine and sanitation coverage rate, smoking and alcohol rate, total expenditure in health, out of pocket expenditure government expenditure in health and those groups who achieved universal health coverage are related to health system index, healthy life expectancy, adult mortality rate and infant mortality rate.

Table 6: Correlation matrix between all variables

S.N.	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	GDP growth rate	1														
2	Population growth rate	.449**	1													
3	Combine gross enrollment all age	-.039	-.222**	1												
4	Sanitation coverage	.187*	-.280**	.146*	1											
5	Vaccine coverage (DPT)	.120	-.342**	.160*	.393**	1										
6	Adult alcohol consumption/year/ liter	-.322**	-.427**	-.185**	.124	-.202**	1									
7	Prevalence of youth tobacco use	-.377**	-.560**	.045	-.252**	-.275**	.493**	1								
8	Universal health care	.341**	-.287**	.254**	.416**	.495**	-.402**	-.359**	1							
9	OPP expenditure among total expenditure	.080	.132	-.031	-.161*	-.269**	-.200**	-.223*	-.269**	1						
10	Total health expenditure as % of GDP	-.223**	-.319**	.180*	.047	.200**	.361**	.240**	-.173*	-.283**	1					
11	Government expenditure in health%	.162*	-.268**	.155*	.087	.104	.152	-.171	.221**	-.413**	.378**	1				
12	Health system ranking	.452**	-.364**	.246**	.440**	**.509****	-.211*	-.288**	**.588****	-.268**	.092	.216**	1			
13	Healthy life years	.363**	-.477**	.283**	**.560****	**.564****	-.326**	-.416**	**.599****	-.337**	.160*	.285**	**.855****	1		
14	Adult mortality rate	-.478**	-.371**	-.241**	**-.523****	**-.509****	-.158*	-.352**	**-.529****	.247**	-.108	.210**	**-.818****	**-.939****	1	
15	IMR	-.364**	**.509****	-.282**	**-.545****	**-.586****	-.330**	-.311**	**-.539****	.341**	-.132	-.228**	**-.815****	**-.928****	**.843****	1

GDP: Gross domestic product, DPT: Diphtheria pertussis tetanus, OPP: Out –of-pocket payment, IMR: Infant mortality rate

1.3 Regression Analysis

1.3.1 Linear regression model between predictors and health system index

Linear regression model was followed between social determinants of health, disease prevention, health behavior and health financing policy variables with health outcomes inserting the variables in different hierarchy. Table 7 explores that GDP growth rate; DPT 3 vaccination coverage and achieved universal health coverage were predictors of health system Index. Among them, achieved universal health coverage would increase the health system index by 0.391.

Table 7: Linear regression model between predictors and health system index

Independent variables	**Dependent variable (Health system index)**							
	Std coff.	P value	Std coff.	P value	Std coff.	P value	Std coff.	P value
(Constant)	0.707	<0.001	-0.022	0.829	-0.160	0.257	0.153	0.377
Social determinants of health								
GDP growth rate %	.385	.000	.329	.000	.294	.001	.215	.019
Population growth rate %	-.115	.139	-.004	.957	-.044	.654	-.088	.355
Combine gross enrollment of education in all age %	.192	.005	.138	.025	.112	.122	-.072	.312
Achieving universal health care (Yes-reference)	**.294**	**.000**	**.445**	**.000**	**.529**	**.000**	**.391**	**.000**
Disease prevention								
Sanitation coverage %			.197	.003	-.210	.011	.093	.254
DPT-3 vaccine coverage %			.341	.000	.337	.000	.299	.000
Health behavior								
Adult alcohol consumption per year per liter					.035	.679	-.038	.665
Prevalence of youth smoking %					-.023	.796	-.062	.467
Health financing								
Percent of OPP on health among total expenditure							0.160	.072
Total health expenditure as percent of GDP							-.020	.802
Government expenditure in health%							.108	.215
R^2		0.26		0.43		0.45		0.53
Adjusted R^2		0.25		0.42		0.41		0.49
p- value		<0.001		<0.001		<0.001		<0.001

1.3.2 Linear regression model between predictors and healthy life expectancy

Healthy life years were determined by population growth rate, sanitation and child vaccine coverage (DPT 3), achieved UHC and out of pocket expenditure ($p<0.05$). As previous predictors, achieved UHC increases healthy life years by 0.401 (highest) than other variables (Table 8).

Table 8: Linear regression model between predictors and healthy life years

Independent variables	**Dependent variable (Healthy life expectancy)**							
	Std coff.	P value	Std coff.	P value	Std coff.	P value	Std coff.	P value
(Constant)	64.2	<0.001	36.5	<0.001	36.0	<0.001	45.4	<0.001
Social determinants of health								
GDP growth rate %	.206	.005	.183	.003	.171	.019	.100	.143
Population growth rate %	-.331	.000	-.155	.016	-.161	.058	-.218	.006
Combine gross enrollment of education in all age %	.197	.003	.135	.015	.103	.100	.063	.276
Achieving universal health care(Yes - reference)	**.320**	**.000**	**.439**	**.000**	**.519**	**.000**	**.401**	**.000**
Disease prevention								
Sanitation coverage in %			.334	.000	.324	.000	.237	.001
DPT-3 vaccine coverage in %			.320	.000	.305	.000	.232	.001
Health behavior								
Adult alcohol consumption per year per liter					.090	.225	-.016	.823
Prevalence of youth smoking (2011) in %					.021	.785	-.029	.677
Health financing policy								
Percent of OPP on health among total expenditure							-.189	.045
Total health expenditure as percent of GDP in 2012							.059	.417
Government expenditure in health%							.050	.485
R^2	0.28		0.53		0.58			0.68
Adjusted R^2	0.27		0.52		0.56			0.64
p-value	<0.001		<0.001		<0.001			<0.001

1.3.3 Linear regression model between predictors and adult mortality rate

Table 9 shows the association between different categories of variables and adult mortality rate 2012. The population growth rate, DPT 3 vaccine coverage and achieved UHC were the significantly influencing ($p<0.05$) for adult mortality rate. In linear regression, UHC would decrease AMR by 0.403 (standardized beta) than other determinants.

Table 9: Linear regression model between predictors and adult mortality rate

Independent variables	**Dependent variable (Adult mortality rate)**							
	Std coff.	P value	Std coff.	P value	Std coff.	P value	Std coff.	P value
(Constant)	153.45	<0.001	483.30	<0.001	447.32	<0.001	356.55	0.001
Social determinants of health								
GDP growth rate %	.158	.046	.133	.048	-.148	.868	-.059	.464
Population growth rate %	.251	.002	.083	.249	.185	.551	.248	.009
Combine gross enrollment of education in all age %	-.171	.018	.-107	.086	-.060	.635	-.014	.837
Achieving universal health care (Yes - reference)	**-.236**	**.002**	**-.326**	**.000**	**-.440**	**.000**	**-.403**	**.000**
Disease prevention								
Sanitation coverage %			-.339	.000	-.301	.000	-.201	.013
DPT-3 vaccine coverage %			-.299	.000	-.291	.225	-.224	.004
Health behavior								
Adult alcohol consumption per year per liter					.133	.081	.259	.004
Prevalence of youth smoking %					-.059	.430	-.003	.974
Health financing policy								
Percent of OPP on health among total expenditure							-.060	.452
Total health expenditure as percent of GDP							-.012	.892
Government expenditure in Health%							-.028	.743
R^2	0.17		0.41		0.44			0.54
Adjusted R^2	0.16		0.39		0.41			0.49
p-value	<0.001		<0.001		<0.001			<0.001

1.3.4 Linear regression model between predictors and infant mortality rate

Infant mortality has been influenced by different factors. Population growth rate, sanitation and child vaccine coverage, achieved UHC and out of pocket expenditure, were the determinants of IMR (Table 10). Being infant death, DPT 3 vaccine would reduce IMR by 0.395 (standardized beta) than others but among health policy UHC and out of pocket expenditures both are strong predictors of IMR.

Table 10: Linear regression model between predictors and infant mortality rate

Independent variables	**Dependent variable (Infant mortality rate)**							
	Std coff.	P value	Std coff.	P value	Std coff.	P value	Std coff.	P value
(Constant)	17.16	.000	99.05	0.000	110.68	0.000	73.67	<0.000
Social determinants of health								
GDP growth rate %	.196	.006	.179	.002	.134	.050	.083	.204
Population growth rate %	.365	.000	.186	.003	.185	.023	.250	.001
Combine gross enrollment of education in all age %	-.190	.004	-.125	.021	-.100	.094	-.097	.080
Achieving universal health care (Yes - reference)	-.277	0.004	-.366	<.000	-.414	.000	**-.304**	.006
Disease prevention								
Sanitation coverage in %			-.311	<.000	-.281	.000	-.218	<.001
DPT 3 vaccine coverage in %			-.337	.006	-.373	.000	**-.395**	<.000
Health behavior								
Adult alcohol consumption per year per liter (2010)					-.128	.067	-.066	.348
Prevalence of youth smoking %					-.002	.979	.050	.456
Health financing policy								
Percent of OPP on health among total expenditure							**.216**	.001
Total health expenditure as percent of GDP							.134	.054
Government expenditure in health%							.030	.667
R^2	0.30		0.55		0.62			0.70
Adjusted R^2	0.29		0.54		0.59			0.67
p-value	<0.001		<0.001		<0.001			<0.001

After the calculation of regression analysis it shows that adopting the universal health coverage have strong impact on major health outcomes. Among them it has positive impact on health system index (standardized beta~0.391), healthy life years (standardized beta~0.401) and significantly reduce adult mortality rate (standardized beta ~403). Such policy has great impact to reduce the infant mortality also (standardized beta~0.304) (Table 7-Table 10). More importantly, after achieving the universal health coverage more impact to increase healthy life expectancy and to decrease adult mortality rate.

2. Result from categorical data

Previously, the study explored the association between numeric and numeric variables and further description to show the association between different sub groups. It is not possible to find the country wise data of all countries in relation to health policy and health outcomes. Table 6 shows the clear pictures between different group and health system index. The health system index is significantly higher between achieving universal health coverage and G-20 countries than who did not achieve UHC and non G-20 groups. Table 11 shows country with universal health care, economic (G-20) and with political stability have significantly higher health system index in comparison with no UHC, non G-20 and political instable countries. There is no significant difference of HSI in religious category of countries.

Table 11: Sub-group comparison with health system index

Independent Variables	Country groups	No. of countries	Mean and SD	P value
Application of universal health care	Yes	56	0.820±.137	<0.001
	No	126	0.552±.201	
Economic classification	G-20	19	0.759± .187	0.009
	Non G-20	163	0.620± .221	
Religion	No state religion	96	0.649 ± .224	0.345
	State with religion	98	0.619 ± .214	
Political stability	Stable	33	0.757±.183	<0.001
	Average	50	0.719±.218	
	Unstable	62	0.558±.204	
	Very unstable	27	0.513±.192	

Healthy life expectancy is significantly low in those countries with no UHC, non G-20 countries political unstable countries in comparison with UHC, G-20 and political stable countries (Table 12). Among all groups, the HALE has highest (10 years) gap among UHC and non UHC category.

Table 12: Sub-group comparison with healthy life expectancy

Independent Variables	Country groups	No. of countries	Mean and SD	P value
Application of universal health care	Yes	54	68.78±4.11	<0.001
	No	125	58.12±7.72	
Economic classification	G-20	18	66.89±6.23	0.003
	Non G-20	161	60.71±8.40	
Religion	No state religion	95	62.12±8.19	0.199
	State with religion	86	60.52±8.52	
Political stability	Stable	32	65.56±7.58	<0.001
	Average	49	64.53±7.51	
	Unstable	64	59.00±7.57	
	Very unstable	26	56.27±8.34	

Table 13 reveals that adult mortality rate is significantly lower in achieved UHC, G-20 and political stable countries and the gap is highest in UHC category as previous result above.

Table 13: Sub-group comparison with adult mortality rate

Independent variables	Country groups	No. of countries	Mean and SD	P value
Application of universal health care	Yes	54	98.81±54.07	<0.001
	No	125	213.01±101.12	
Economic classification	G-20	18	127.97±87.01	0.029
	Non G-20	161	184.21±104.13	
Religion	No state religion	98	160.40±104.94	0.388
	State with religion	95	173.97±112.87	
Political stability	Stable	32	129.64±87.78	<0.001
	Average	49	143.84±100.80	
	Unstable	64	207.32±95.97	
	Very unstable	26	229.67±103.44	

Infant mortality rate is sensitive indicator of health outcomes and overall health system. IMR is significantly less in UHC applied, G-20, and politically stables countries. After the UHC category, the gap of IMR is in political stability group (Table 14).

Table 14: Sub-group comparison with infant mortality rate

Independent variables	Country groups	No. of countries	Mean and SD	P value
Application of universal care	Yes	56	6.80±6.40	<0.001
	No	132	34.46±24.64	
Economic classification	G-20	19	11.89±11.23	0.007
	Non G-20	169	27.83±25.03	
Religion	No state religion	94	25.51±26.38	0.001
	State with religion	94	26.94±25.47	0.689
Political stability	Stable	32	15.75±20.56	0.001
	Average	50	17.02±17.49	
	Unstable	68	30.66±24.03	
	Very unstable	26	44.31±28.46	

3. Result of path analysis

In previous analysis, we calculated the direct association among predictors and outcomes in hierarchical regression model. After regression analysis it was found that UHC was the most influencing factor among all predictors. The following pathway diagram shows the result putting the universal health coverage as intermediate outcome (pathway) to effect the outcomes; health system index (0.54), healthy life expectancy (0.57), adult mortality rate (-0.43) and infant mortality rate (-0.50) (Figure 5).

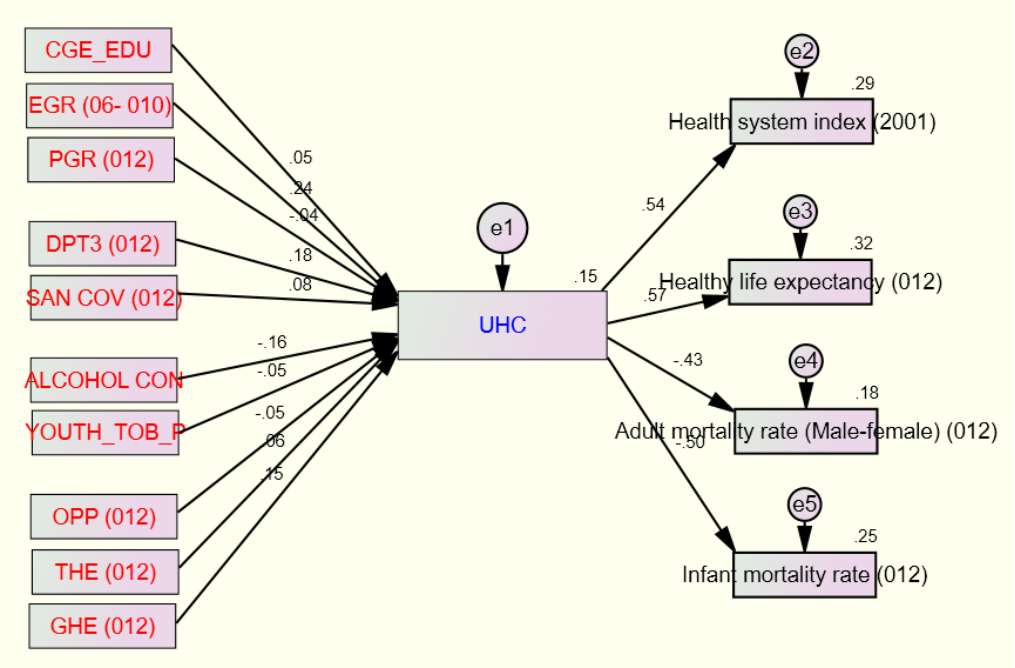


Figure 5: Effect of universal health coverage setting in pathway

4. Comparison of standardized beta in direct and pathway association

Tables 7-Table 10 showed that UHC influenced to health system index, healthy life expectancy, adult and infant mortality rate by 0.391, 0.401, -0.403 and -0.304 respectively after adjusting all other variables. The result was observed after hierarchical linear regression as direct effect or predictor to outcome (x→y). Being a most influencing factor, UHC was fit as pathway using SEM, the effect of UHC to outcome was higher than direct effect (HIS~0.15, HALE~0.17, AMR~0.03 and IMR~0.11). So, the putting UHC as mediator or pathway health system index and healthy life expectancy would increase and adult mortality and infant mortality rate reduced with high value than direct association as we performed regression analysis (x→y). So, to get the high score outcomes it is necessary to achieve UHC first.

5. Case studies

Above results précised that universal health coverage could be the major predictor for vital health outcomes. This situation has been proved by different sub-groups comparison, regression analysis and pathway analysis. Moreover, here are some case studies by some countries that have achieved UHC in different time period and their health indicators.

5.1 Republic of Korea

The achievement of Universal Health Coverage in South Korea, in 1989, within 12 years of the launch of National Health Insurance (NHI) scheme in 1977, represented an historical, landmark record in global health systems. Through the compulsory NHI scheme, Korea has improved the accessibility of medical care and reduced the burden of medical costs for the population.

In the beginning, some politicians perceived the adoption of the health insurance system as being burdensome, given the poor economic status of Korea in

the 1960s and the 1970s, when per-capita national income was a meager 1000 US dollars[152]. This case study of Korea's universal health coverage describes the historical, political, and economic aspects associated with its progress toward overall health status. It addressed the challenges and health needs that the government had undertaken and outlines them in three periods of health system development: the introductory period (1963–1977), the coverage expansion period (1977–1989), and the institutionalization and development period (1990–present).

In introductory period first Korea amended a law 'Medical Insurance Act 1963', as a part of a plan for a series of 5-year Economic Development Plans. In July 1977, health insurance societies were first established for industrial workers and companies with more than 500 employees. Under the five-year economic development plans, rapid economic expansion was an important factor in the introduction of mandatory health insurance and 1979 the health insurance program had been expanded and poor people were involved by Medical Aid Program (MAP)[153]. The economy of Korea benefited from high annual growth rates of approximately 12% in the late 1980s. The booming economy substantially improved both the ability of the self-employed to pay for social insurance and the fiscal capacity of the government to provide health insurance subsidies for the self-employed. In January 1988, self-employed populations in rural areas were included under this system, followed by the inclusion of the urban self-employed sector in July 1989. As a result, by 1989, Korea had achieved universal health insurance coverage, in which the majority of population groups were enrolled under the NHI scheme[153]. After this full implementation, the health outcomes like expectancy (81 years), IMR (3/1,000 live birth), healthy life expectancy (73 years), health system index are top 20 ranking globally.

5.2 Thailand

Thailand has achieved universal health coverage scheme since 2002 through the implementation of the Universal Coverage Scheme (UCS) for 47 million of the population. Among them, private sector employees covered by the Social Health Insurance Scheme and government employees and dependents covered by the Civil Servant Medical Benefit Scheme[154]. Before 1990, the health status of Thailand was poor, economic growth and per capita income was low and unstable, high prevalence of HIV infection and other communicable disease, creating inequalities among regions and population subsets. To overcome this problem Health Card Program (HCP), a voluntary prepaid rural health insurance scheme initiated by Ministry of Public Health (MOPH) in Thailand in 1983, has been implemented in all provinces but did not success as their expectation and realized for universal health coverage[155]. January 2001 the election victory of the Thai Rak Thai (TRT) Party, on a populist program that included low-cost health care, opened the way for change. The 30 Baht Scheme extended the insured population from about twenty-five million (40 percent of the population) in 2001 to above fifty-nine million (95.5 percent) in 2004[156]. The 2002 'National Health Security Act' took account of this legislation and made provision for local purchasing agencies, which contained representatives from both health institutions and local governments. After the formation of Contracting Units for Primary Care (CUPC), as an autonomous body in local level it was very easy to collect premium and channelize.

The coverage and package of reproductive health service was significantly higher after the implementation of UHC in 2004[157]. UHC-mitigated health impoverishment was also found at the sub-national level. Impoverishment in the poorest rural Northeast dropped from 3.4% in 1996 to 2.3-2.4% in 2002-04 and 0.8-1.3% in 2006-09[158]. UHC increases individuals' likelihood of having an annual check-up, especially among women. Regarding health care consumption, UHC

increased hospital admissions by over 2% and increases outpatient visits by 13%[159].World health statistics 2014 state that out of pocket expenditure was decreased by 21% in 2011 in comparison with 2001, life expectancy increased by 6 years in comparison with1990, IMR reduced 19 to 11 per thousand live birth in 2012 in comparison with 2001[61].

5.3 Germany

Germany has the world's oldest national social health insurance system, with origins dating back to Ottovon Bismarck's social legislation, which included the 'Health Insurance Bill of 1883, Accident Insurance Bill of 1884, and Old Age and Disability Insurance Bill of 1889[160]. Bismarck stressed the importance of three key principles; solidarity- the government is responsible to ensure access by those who are in need, subsidiary- policies are implemented with poor, no political and administrative influence, and corporatism- the government representative bodies in health care professions deems feasible procedures[161]. Mandatory health insurance originally applied only to low-income workers and certain government employees, but has gradually expanded to cover the great majority of the population[162]. Approximately 92% of the population is covered by a 'Statutory Health Insurance' plan, which provides a standardized level of coverage through any one of approximately 1,100 public or private sickness funds. Standard insurance is funded by a combination of employee contributions, employer contributions and government subsidies on a scale determined by income level. Higher income workers sometimes choose to pay a tax and out of the standard plan in favor of 'private' insurance. The old age premiums are not linked to income level but instead to health status[120].

Being a better health policy of German the health indicators are in good trends. IMR was 4.3/1000 live birth, MMR was 3.7/100000 live birth and the disease prevalence of non-communicable had been reduced by 1/3rd in 2001 in comparison to 1991[163] and current situation, the morbidity and mortality are improved as IMR 3/1000 live birth

and healthy life expectancy 71 years[61]. The health system index by WHO research team ranked the Germany was in 22nd position all over the world[12]. Due to the effective health system and policy there was great impact in economic development of Germany. Because since past century, there was continuous linear economic growth[125] and many sociopolitical obstacles did not significantly affect.

5.4 Costa-Rica

Costa–Rica is one successful countries among all low and middle income group that provides universal health care to its citizens and permanent residents[164]. The Costa Rican Social Security (CCSS) institute made a push towards universal health coverage, replacing the previous system which only encompassed the working population. In 1970, 47% of the total population was insured; today that figure is 89%.The 'General Health Law of 1973' placed all health treatment services, including all health care areas and hospitals, under the control of the national social security program. In the next decade public health service coverage extended to reach 78% of the population in 1982. In that time, only 80% of the population is insured either through the compulsory or voluntary system, or as pensioners or their dependents. Of the remaining 20%, 10% are insured through state subsidies, given that this population group is under the poverty line. The other 10% can request public services when necessary and pay for them directly[164]. By this point, all those employed, regardless of their socioeconomic status, received health care[165]. After this in 1996, they needed to improve service and reduce the costs by strengthening the PHC system. Health spending had risen to almost 10% of gross domestic product (GDP) but without a corresponding rise in the volume and quality of services[165, 166].

There was visible impact of UHC in Costa-Rica with the sunrise of 21st century. The attention to health has brought this middle-wealth country's health indicators in line with those of Organization of Economic Cooperation and Development (OECD) countries[167]. In 2001 the average life expectancy at birth in

Costa Rica was 76.6 years and 97% of births were attended by skilled professionals, 89% of the pregnant women were given prenatal care, and 93% of children under 1 year had health insurance[168]. From 1990 to 2000 life expectancy increased by 0.8 years, the fertility rate dropped, and the population grew due to an influx of Nicaraguan immigrants. Up to 2015, Costa-Rica, life expectancy at birth was 77 years, healthy life expectancy- 69 years, IMR 9/1000 live birth male and female adult mortality rate/1000 population was 133 and 65 respectively[61]. The leading causes of death were cardiovascular disease and neoplasms, which is comparable to many OECD countries[169]. Spending on health care has increased steadily over recent years, and in 2000 it composed 9% of the national GDP and according to world health statistics report 2014 Costa-Rica increased continuously and in 2014 it reached in 10%.

From the case studies of these countries it can be confirmed that there should be clear vision to improve of health by policy, supporting legal provision, political support and enough expenditure on health by state. As a result there will be breakthrough not only health but also economic development.

6. Verification of hypothesis

After the analysis of the results the null hypothesis of the study cannot be accepted and alternative hypothesis and sub hypothesis have been accepted as below

6.1 Alternative hypothesis

There is a significant influence of universal health care on health outcomes (directly, pathway and case studies).

6.2 Other Sub-hypothesis of study

1) The health system index is significantly high who achieved the universal health care that those did not.
2) Healthy life years is significantly high to those countries who have achieved universal health coverage
3) Adult mortality rate is inversely proportional with achievement of universal health coverage
4) IMR is significantly lower with achievement of universal health coverage along with child vaccine (DPT 3) coverage.

V. DISCUSSION

This is a study of all UN members countries of using open access data and the data base was set up different source like World Bank, WHO and other published articles applying administrative record linkage approach. There are clearly defined variables as predictors and outcomes. The outcomes variables have been selected in such a way that they can represent all aspects of health outcomes. In other words such outcomes represents with multiple dimension. Health system index represented overall governing mechanism in health; healthy life year characterized economically productive life of people. Adult mortality rate is important because adult period is responsible to give maximum output in human life in comparison with children and old. In case of infant mortality rate, it is the reflection of access of overall health service of that country because infant death is related to condition of pregnant period, effort of delivery service and post natal period to set a baby. So this is the significant study in health system and policy sector nationally and globally.

1. Influences UHC on overall health status

There are different and diverse types of research on this area. In our knowledge there has not been established the hypothesis on universal health care and health outcome either directly or indirectly. Many commentators, including WHO, have advocated progress towards universal health coverage on the grounds that it leads to improvements in population health[170, 171]. A review study by Rodrigo Moreno-Serra in 2012 concluded that broader health coverage generally leads to better access to necessary care and improved population health, particularly for poor people[172] however such study pointed out that there are insufficient data and appropriate methods to conclude the findings. Similarly, another review by Rodrigo Moreno-Serra 2011states that high reliance on out of pocket payment in health financing is associated with an increased risk of households being affected by financial catastrophe, being pushed into poverty and citizens who cannot afford to use health

services they have poor health status[173]. Escobar, Maria-Luisa, Charles C. Griffin, and R. Paul Shaw published one book entitled on "Impact of health insurance in low and middle income countries- 2011" revealed that risk pooling mechanisms will increase access to care by enhancing the availability and affordability of basic health care and thereby improve health[174]. Previously, there was no same way of measurement but well-functioning health systems improve population health, provide social protection, respond to legitimate expectations of citizens, and contribute to economic growth. In Latin America, universal health coverage was responsible to reform the health system; a recent review by Rifat Atun and other 14 scholars[175]. Likewise, universal health care improves the health system and well function health system accelerates the universal health coverage as boundary effect each other's[176-181]. Qualitative, quantitative and policy summarization in Turkey concluded that Universal health coverage is not only enhance the health system but enhance the equity also[182]. Those almost studies are cross countries comparison and conclusions are similar to our findings.

2. Influences on healthy life expectancy

Healthy life year has special character because this is an indicator of productive life and an attractive indicator for monitoring health. Global average healthy life years in 2010 was 59.0 years [145] and now slightly increased 61.3 years(Table 2). Our results revealed that, universal health coverage is major predictors of healthy life expectancies and child vaccination and sanitation coverage are following predictors. In previous literatures, there are not fully matching studies but some proxy results are available. As our findings, out-of-pocket payment is negatively associated with healthy life expectancy; a study done by E. Baldacci, M. T. Guin-Siu and L. de Mello from International Monetary Fund (IMF) in 2003[183].A study by Carol Jagger et.al gross domestic product was positively associated with healthy life years in 25 European countries[184]. Such study reveals that the economic situation more

specifically materials deprivation is negatively associated with healthy life years[184] but there are no consistent results. A longitudinal study from 1987 to 2008 dataset, covering 140 countries and 2360 country year observation showed that economic growth improve the health status in developing countries but it does not apply in developed countries[34]. It means that economic growth may not necessarily increase the healthy life years. As our findings in bivariate analysis (Table 3), smoking was the predictor of the less healthy life years which was the result from Luigi Ferrucci1et al. published in American Journal of Epidemiology[185]. Those previous researches follow our result.

3. Influences on adult mortality

Regarding the adult mortality, alcohol consumption was highly responsible along with universal health coverage. The data from 1998 to 2008 in 200,000 Russian adult found that Vodka drinking was main responsible factor for adult death[186]. Before 2000, the major cause of adult death was also alcohol drinking in Russia[187-189]. Alcohol kills the people by direct and indirect way because excessive consumption can directly kills the people and on the other hand it can create casualty and risk for many cardiovascular and liver diseases. Alcohol use is a necessary causes for adult mortality, with more than 30 International Classification of Diseases (ICD-10) and sufficient causes for more than 200 ICD-10 according WHO ICD classification[190, 191] and alcohol is the eighth leading cause of mortality globally. In 2004 alcohol was responsible for 2.3 million deaths, representing 3.8% of all deaths[191]. Before one decade in US it showed that alcohol consumption has been estimated to be responsible for 64,000 deaths for all ages and almost death were adult[192].

4. Influences on infant mortality

It has been already proved that infant mortality rate (IMR) is the sensitive indicators of public health[193] and such indicators is principally focused on health

priorities, strategies and policy[194]. More specifically IMR remains an important indicator of health for whole populations, reflecting the intuition that structural factors affecting the health of entire populations have an impact on the mortality rate of infants[144]. Global health observatory 2012 by WHO provided the data progress toward universal health coverage that it is reducing the infant mortality rate and increasing the life expectancy[195]. Beyond the UHC, population growth rate and child vaccination (DPT III) were the major predictors of IMR in our study. A regular follow up study in India revealed that overall socio-demographic factors were associated with IMR in rural India[196] and similar conclusion can be drawn from our study also. California Pertussis epidemic 2010 and 2014 concluded that more epidemic and death were in that community's children who had not covers all DPT vaccines[197, 198].'History of human life span and mortality' by G Acsadi and J. Nem[199] and 'Demographic transition theory' by Thompson Warrant[200] determined that population growth was mainly responsible for increasing infant mortality. Our results also revealed that, UHC was also significant with IMR too. Those literatures supported the major trend of our study.

5. Influence as intermediate outcome (Mediator/Pathway)

Putting the UHC as intermediate outcome (pathway), health system index, and healthy life expectancy would increase by 0.54 and 0.57 and reduce adult and infant mortality rate by 0.43 and 0.50 which is greater values than direct influences. There are no similar studies for exact comparison. However, we can see the status of life expectancies before and after achievement of UHC in some countries. Salomon compared life expectancy (LE) and healthy life expectancy (HALE)between 1990 and 2010[145].He showed life expectancy and healthy life expectancy trends increased faster for countries with UHC. For example, United States has not achieved the UHC and life expectancy and healthy life expectancy in 1990 was 72 and 63 years. After 20 years (2010), it had reached 76 and 66 years. This was an increase of about 3 years.

But UK achieved in 1950 decade, the increase was 5 years (LE 73- 79 and HALE 63-67). Likewise, Brazil and China increased LE and HALE about 4.5 years but South Korea and Ireland increased by more than 6 years in same time line. We can see the fact of life expectancy of those countries before and after one decade of achieving UHC[201]. For example, Finland declared UHC in 1972. In the 10 years prior, LE increased by 3 years (68-70) but after UHC it increased by 5 years (70-74). Similar trends were observed in Slovenia, South Korea, Iceland, Switzerland, Israel and elsewhere. In Thailand, LE had increased by 4 years (71-74) after the implementation of UHC in 2002, compared to only 2 years (70-71) in the decade prior. China, Brazil, US achieved strong economic growth, but life expectancy has not kept pace with those countries that achieved UHC. So, UHC can increase life expectancy in two ways. Firstly, disease mortality is reduced by minimizing risk factors through effective public health programs[202, 203] and secondly, poverty is not a barrier to get treatment[204, 205]after illness and survival is high.

Likewise, Assuming the UHC as intermediate outcome (pathway), economic growth and vaccination affects positively but alcohol consumption, youth smoking affects negatively. Economic status positively influences the universal health care and increase life expectancy with more speed in South Korea[124]. If smoking and alcohol related deaths were eliminated by effective policy and there is access to care without financial burden, adult life expectancy would increase on average by 2.4 years in men (0.1 in Uzbekistan to 4.8 years in Hungary) and 1 year in women (0.1 in Kyrgyzstan to 2.9 years in the USA)[206].A similar conclusion was reached by the pathway analysis in our result.

6. Sub-group comparison

Table 11–Table 14 showed that the health status was significantly better on those countries where there is universal health care than other groups; economic, region and political stability. It showed that implication of universal health care is more

important than economic status, religion and political situation. We already discussed that the health status is better in Scandinavian countries than US, China, Brazil and India however they have more than half economic weight. Due to the achievement of UHC, the Scandinavian health status is better. Japan, Israel and Greece political system is unstable but health indicators showed good result there.

The major health outcomes were compared using more than 30 studies in the literatures with this study which is very important and advance but categorically this findings highlighted as major component is health policy; the universal health care as a major part of health care financing policy. Among all 4 vital health outcomes, achieving of UHC is the main predictor after adjustment. The concept of UHC is very abstract and it can be defined as means, collective program, policy and end also and there is no operational definition in preventive, promotive, curative and palliative care[207]. However, it was already defined that the countries that legislative provision of UHC, coverage of ≥90% skill birth attendance and prepayment health insurance as achieved universal health coverage and it might be relative and will change the definition by time. In this study, achievement of UHC has been used as vital health financing policy variables and used as an intermediate outcome (pathway) responsible for reducing IMR AMR and promote health system and healthy life years. So it is different research than previous because putting as UHC (Yes/No) as independent variables using global data. There are no exact comparisons previously with UHC and health outcomes but it is a 'concept' comparison by multiple ways with vital health outcomes. In this study the UHC has been used as narrow concept *as* mandatory health insurance financed through pre-payment echoed in major recent reviews of 65 empirical studies on UHC progress[208-210]. The global move towards UHC by ensuring affordable access to essential health benefits is urgent and long overdue. However, the ultimate challenge for policy makers is not merely to improve clinical services, but to 'achieve equitable health outcome improvements' through genuine integration

of individual and population-level health promotion and preventative efforts with curative services[211]. With this recent innovative research modality, the UHC was link with major health outcomes in this study and it will establish the new concept of research in the sustain development goal (SDG).

7. Philosophical foundation of universal health coverage

Universal health coverage is comprehensive approach by its scope but it has been studies as health care financing policy. Previously health policy used to be formulated some specific political ideology like socialism, capitalism, religious dogmatism but now a days it has been defined as common philosophy as social welfarism. Because health is universally accepted a fundamental human right and any citizen of countries even though they have different political system and ideology. First global symposium on health system research formulated basic principle, framework and theory of UHC[212] and conceptual development was shaped by economists; thus, the concept is grounded in the logic of achieving a fair distribution of scarce financial resources in order to respond to differential health needs[213-217]. Parallel way, the understanding and definitions on societal goals regarding equity, as well as the social dimensions and influences of the process of equitable access has been included from the fields of sociology, philosophy, bioethics, public health and human rights[218-223].

VI. CONCLUSION AND RECOMMENDATIONS

This is comprehensive research and there should be more careful to draw the conclusion. Up to now, there was common understanding for inequality in health that was social determinants of health and researchers and policy makers pointed out to people not themselves and their duty; the policy. Another, most of the countries are seeking for economic development without guarantee of health which is rarely possible. Because the countries which are stable and prosperous, they fix the principle with fare contribution of resource (health insurance) and distribution of resources (Government expenditure of health) by law then economic growth developed continuously and consistently. In particular, the vital health outcome namely health system index, healthy life expectancy, adult and infant mortality rate were mostly affected by universal health coverage (UHC). UHC is very comprehensive, abstract and some sort of philosophical concept but more specifically, it is full coverage of prepayment non-profit health insurance. With diverse health variables, this study found that universal health care is most powerful predictor on health system, healthy life expectancy and to reduce the infant and adult mortality rate.

This is the multi-country study result and provides the direction for future policy makers, interest groups and researchers. The goal of the research and policy implication would be reduce inequality and reduce impoverish by health catastrophe. Here are some recommendations:

1. For policy makers

1) There should be specific and measurable target indicators on UHC as its definition according to type of health service like preventive, promotive and rehabilitative
2) The list of countries with universal health coverage should be update because according to the definition it has been defined legal obligation of

UHC, ≥90% pre-payment health insurance and skill birth attendance (SBA). These are relative target indicator and better to redefine the term UHC as legislative provision of special health program rather than target.

3) After the Millennium Development Goal, there is starting of sustainable development goal (SDG) and in SDG goal 3.8 is related to universal health coverage (achieve universal health coverage), including financial risk protection, access to quality essential health care services, and access to safe, effective, quality, and affordable essential medicines and vaccines for all)[224] but there are no measurable indicators.
4) Universal health coverage had been targeted on achievement on prepayment health insurance and it has not been defined the modality because private health insurance may be difficult to afford and would be more harmful than having no insurance. So it should be non-profitable, government stewardship and guaranteed by some Act.
5) Health financing policy has been mostly targeted for health insurance and it's modality but less discussion on distribution of government resources. So, it should be equally emphasized.
6) As health outcome, there are some traditional health indicators like IMR, life expectancy that cannot represent overall health status and there should be created some health system outcomes, healthy life years and adult mortality situation also because previous indicators have some limitation.

2. For researchers

1) There has been limited research about UHC as independent variables and it needs to make relation with other health outcomes too.
2) For the health policy research there should be separate methodology because quantitative analysis and systematic reviews may not be sufficient.

3) Health related laws are hard policies and such researches are very rare and not accessible to study and cite. It can be a major area of research.

3. Contribution to the academic field

This is policy research on a most relevant area, universal health coverage because since some decades, the need of UHC has been highlighted more. There were not sufficient studies to explore the importance of UHC link with long term health goal with data, case study and policy analysis. This study itself is good contribution in health policy research and it emphasize to adopt the UHC as intermediate comprehensive health goal and long term health goal could be achieved easily after UHC. It has highlighted that UHC impact in health system index, healthy life expectancy and adult mortality because those health goals have been ignored in current research. Further policy research can be performed by joint methods. For the policy makers, it is a milestone to explore the importance of UHC, challenges and ways to implementation in developing country. Sustainable development goal is 15 years goal and upto 2030, such study content, method and result are important. In SDG health goal, policy research is the important means of implication and this research definitely contributes to policy makers and interest group also.

4. Limitation of the study

1) This is a multi-country analysis based on ecological cross-sectional study and the data around the time of 2012 and from UN members. Variables in both sides, dependent and independent variables were missing of some countries.
2) As coverage, all the countries data have been used but statistically, the sample size may not sufficient. Generalization should be done with caution and even more risk because of different context of specific countries.
3) The index on health system was conducted in 2002 and after this there is no update. It needs to adopt this index until replace by another research /version. So, the situation around 2003 and 2015/16 may not contextual.
4) The variables used universal health coverage (UHC) was used as dummy variables because there are no consistent definitions and target and program on it. The countries who have achieved the UHC after 2010 and some special states like Hong-Kong, Taiwan and other small islands have not included because they are not UN members.

VII. IMPLICATION OF STUDY TO ACHIEVE UNIVERSAL HEALTH COVERAGE IN NEPAL

Nepal is developing countries and there is large gap between urban and rural area. Life expectancy of Nepal is 68 years, infant mortality rate 41/1000 live birth and healthy life expectancy is 59 years. Particularly, health coverage is very poor in some marginalized group and mountain district of mid and far western region of Nepal. The health system in Nepal faces daunting challenges such as unequal distribution of health care services, poor infrastructures, inadequate supply of essential drugs, poorly regulated private providers, inadequate budget allocation for health, and poor retention of human resources in rural areas. Nepal has only 0.67 doctors and nurses per 1,000 populations, which is significantly less than the World Health Organization's recommendation (2.3)[225]. After restoration of democracy in 1991 and liberalization of the economy thereafter, private health facilities have emerged massively. Within only the last 8 years, nearly two-thirds of the country's total private hospitals have been established[226]. The private sector grew from a total share of 23% of all hospitals in 1995 to 78% in 2008. Similarly, private hospital beds are nearly doubled than that of public hospital beds and are unevenly distributed across the regions; that is, the central region – the most developed region. It has 76% of the total share, whereas the far western development region – the least developed region – has virtually no private hospitals[227]. In terms of total health expenditure, the private sector accounts for 70%, of which 81% comes from out-of-pocket payment[134]. Private pharmacies appear to provide the bulk of services covered through private providers. With regards to coverage of essential medicine, free public health service initiated by the public sector in 2007 covers only basic health services with 40 essential drugs; for other services, people have to pay out of their pockets and often rely on private health facilities. Out-of-pocket expenditure has remained the principal means of financing health care in Nepal.

Here are some steps to achieve UHC in Nepal and it is not yearly achievement program and for the full fledge achievement it may takes a decade.

1. Defining and articulating UHC

UHC has wide spread meaning and definition and it has been discussed early. The people and high profile person are also confused with the concept of 'Universal'. So it is necessary to define, understand adopt the UHC with 3 major components; legal mandatory of health insurance to entire population >90%, skill birth attendance and health insurance coverage >90%. Constitute of Nepal 2015 is clearly accepting health as fundamental human right[228]. Adjusting with current progress, challenges and opportunity, there is immediate necessary to prepare the bill discussing with stakeholders (Nepal Medical Council, Nursing Council, Health Professional Council, Private hospital owners, Civil Society, Trade Union Organizations, Public Health Experts, Lawyers and other Interest Groups working for poor and minorities etc).

1.1 Mandatory legal provision of health insurance

It is the most important components for universal health coverage. After mandatory provision every citizen must enroll in health insurance and there is guarantee for fair contribution during illness. Ultimately it assures universal coverage in health care nobody falls into poverty due to catastrophic health expenditure. Now, there is only a guideline approved by cabinet and after this specific act is necessary to define all legal aspects related to health insurance. After getting many suggestions, the Universal Health Insurance bill should be amended.

1.2 Achievement of 90% of skill birth attendance

It is the most important indicator to save mother and child. Previous data revealed that the trend is in positive direction. In 2014, the skill birth attendance was 45% and it increased in 50% in 2015[229]. It showed that it can be achieved near 90% within 5 years.

1.3 Health insurance status in Nepal

It is the main challenge for Nepal to achieve >90% pre payment health insurance with accessible, quality health services. Evaluation of Nepal's earlier community-based health insurance (CBHI) schemes by GIZ showed that CBHI introduced in Nepal since 1970s suffered from low enrollment and retention of members as well as from a pro-rich bias[49]. It suggested increasing population coverage, ensuring equitable protection to all poor and minorities, setting up efficient health care services and easy access of medical services with financial viability.

With a very clear understanding of the health care needs of the Nepalese people and available financial prospects, the overall scheme of Social Health Security (SHS) including the benefit package can be crafted to include coverage of major health services including non-communicable diseases. Also, engaging the private sector as service 'providers' for the health insurance scheme, as envisioned in the policy, needs clear regulations and fair pricing for all services to be covered by the insurance scheme to ensure quality and sustainability as well as to make participation attractive to private providers. Regulations should include such issues as accreditation mechanisms for private providers, specification of minimum benefits to be provided to those insured, pricing control and reimbursement mechanism, protection for poor and vulnerable groups in private care, and monitoring mechanisms.

In essence, the whole idea of insurance is to pool the risks of a large number of people and share the financing of adverse events that strike at random, through prepayment of a contribution, so that no or limited payment is required at point of care when needs arise. This results in a redistribution of resources from those who stay healthy to those who become sick. Low enrollment and retention puts the sustainability of the scheme at risk and reduces the services that can be included in the benefit package. Mandatory contributions to an SHS scheme is therefore preferable, but is a major challenge to implement in countries with a large informal

sector[230]. Voluntary enrollment further entails a risk that only those who need the service enroll, which also defeats the purpose of sharing risks. Careful design can to some extent reduce, but not eliminate this risk.

2. Fix the model of universal coverage of health insurance

There are 4 kinds of health care financing models and the countries who achieved universal health care have applied 3 models and got success however models that have been used according to the political system of the country. In the Beveridge model of Britain's National Health Service, health care is provided and financed by the government through tax payments, just like the police force or the public library. The Bismark model was used in Germany as a sickness fund and health service is the responsibility of the government but with the collaboration of fair contrition with the concept of social welfare. Another national health insurance model is a combination of these two models, that means some part from tax and some part from contribution[231]. But there is a single payer's system for private and public care providers. The out-of-pocket is the model where rich people can pay for high quality of service and the poor could not. It is the haphazard model for health equality. Nepal is adopting socialism in its constitution and Bismark model (contribution base) is better approach for a socialistic country.

3. Fix the standard and type of health service

Given the current economy, purchasing power and geographical constraints, there are great challenges to improve quality of all types of medical services for Nepal. There have been different experiments with health and medical services in Nepal. The user fee, community drug program, free health services are contradictory and confused the public and community. Primarily, the public health service including disease control program and first aid treatment should be free and clearly distinct from insured

medical services. Basic ambulatory service, drug cost inpatients care and laboratory services should be started primarily as medical service with a co-payment system.

4. Formation of organization structure

To implement universal health insurance, it is necessary to verify medical claims and reimbursements organization. The verifying body should consist of medical experts, market experts as well as lawyers. Being a federal country, such an institution is needed in each federal state and in the central government.

Governing body: One governing body should be formed as an independent corporation to manage all health insurance related activities. This body will make necessary policies, laws, guidelines and manuals. More importantly, such an organization reimburses the claims of medical expenditure through a recommendation body.

Recommendation body: There should be one independent body to recommend all claims having different level of experts like physicians, pharmacists, lawyers, civil society representatives and representatives of the government. Payment should be done after the recommendation of this board.

Formation and operation of consistent software: The consistent software will be distributed to all health care facilities and it will be updated once a year. All patients' records will be maintained under this software. No registration of the patients will be beyond this software.

5. Merging and upgrade of health care providers

There is an unequal distribution of health care organizations in Nepal. The sophisticated hospitals are in cities and capital but in remote areas there basic public health services are lacking. Same situation applies for human resources and drug

distribution. So, in cities, it is necessary to merge hospitals and upgrade hospitals in remote areas.

6. Capacity building

The existing health workforce is not able to perform the universal health insurance program. Because it is a new program, and there will be new challenges and problems. From the grass roots to central level all related health and administrative personnel must upgrade their knowledge and expertise for premium collection, verifying the poor, monitoring, supervision, technical issues. For the experts it is necessary to update the knowledge and skills with reference to successful countries as models.

7. Payment models

Payment is the main challenge to collect premiums in developing countries. There are many informal labor markets in remote areas and the banking system is poor. Now it has been estimated that more than 3 million people are outside the country for employment. Table 15 shows the stepwise implementation of health insurance and payment model.

Table 15: Insurance payment modality for Nepal

S. N	Steps	Insured person	Total number	Beneficiaries (total families) Family size: 5	Premium payment system	Time line
1	First	All government personnel	400,000	2,000,000	From salaries	1 Year
2	Second	All private and non-governmental org. personnel	500,000	2,500,000	Salary or by the company	1 year
3	Third	Person who are working abroad	40,00,000	20,000,000	From the remittance company or bank	2 years
4	Fourth	General family head who have cash income	500,000	2,500,000	From regular yearly as tax	2 years
5	Fifth	Ultra poor	400,000	2,000,000	Nominal by themselves remaining by government	2 years

8. Set up benefit package and premium

Benefit packages and premiums should be determined by the expert team within 1 month in the initiation of Ministry of Health and Population. The subsidy package will be formed according to risk, marginalized populations and the remote areas. To reduce selection bias and induced demand, a 10% copayment will be required.

9. Opportunities and challenges

Universal health care is not only a national but also a global health goal and there it was accorded a high priority in the sustainable development goals (goal 3: target 8). So, international funding and technical support is favorable to implementation. Likewise, the domestic environment is positive because the Constitution of Nepal has guaranteed health as a fundamental human right and it is easy to create appropriate legislative provisions. In spite of positive factors for UHC, there are challenges to implementation. Firstly, the professional organizations like NMC, HPC, private organizations, local pharmacy clinics, trade unions etc. may not co-operate with the

implementation of UHC because those organization and related persons benefit from large amount of out-of-pocket payments for medical services. The problem of political instability and a lack of commitment, will power and expertise regarding UHC cannot be discounted. Process oriented bureaucracy; poor governance and efficiency are secondary challenges for UHC implementation.

KOREAN ABSTRACT(초록)

건강의 형평성 문제는 국가간 그리고 국가내에서도 매우 크게 차이가 날 수 있다. 이러한 불형평성의 문제는 수요와 공급의 측면에서 여러 정책적인 이유가 존재한다. 수 백만명의 사람들이 감당하기 힘든 의료비, 취약한 의료접근성, 불공정한 의료자원의 분포로 인해 빈곤에 빠져들게 된다. 세계보건기구가 새로이 채택한 지속가능 발전을 위한 새로운 목표에 따르면 건강보험을 위한 적절한 재정정책이 위와 같은 문제를 완화시킬 수 있을 것이다. 이번 연구의 목적은 2010년부터 2013년까지 UN에 가입한 국가를 대상으로 건강보험이 보건시스템지표, 건강수명, 성인사망률, 영아사망률에 어떠한 영향을 주는지에 대한 탐색적 연구이다.

이번 연구는 생태학적 횡단면 연구이다. 이번 연구를 위해 교육분야는 세계은행, 유엔개발계획, 청소년 흡연과 성인의 알콜소비량은 세계보건기구의 자료를 통해 수집하였다. 더불어 보건시스템지표 및 건강보험 관련 자료는 Stuckler, 보건시스템의 순위는 Tandon, 지역별 분류는 Robert J. State, 경제수준에 따른 국가 분류는 위키디피아의 자료를 이용하였다. 이번 연구는 건강보험에 관한 RAND 이론을 보완하여 사용하였으며, 독립변수는 건강의 사회적 결정요소, 질병예방, 건강행태, 보건재정이며, 종속변수는 보건시스템지표, 건강수명, 성인사망률, 영아사망률이다. 기술분석, 선형회귀분석, 층화분석, 사례분석 및 경로분석을 실시하였으며 통계분석은 SPSS 와 AMOS 를 이용하였다. 정규분포, 일관성 등을 확인하기 위해 상관도표, 크론바흐 알파, 분산팽창계수 등을 체크하였다.

연구의 결과는 총 194 개국을 대상으로 분석하였으며 예측인자로서 건강의 사회적 결정요인(GDP 성장률, 인구성장률, 교육수준), 질병예방(예방접종, 위생), 건강행태(청소년흡연율, 성인의 알코올 소비량), 보건재정정책(건강보험유무, 본인부담비율, 보건계정)과 건강의 결과지표인 보건시스템지표, 건강수명, 성인사망률 및 영아사망률과 어떠한 연관성이 있는지 피어슨 상관분석을 실시하였다. 위계적 회귀분석 결과, 보건재정정책 요소가 전반적인 건강결과 (보건시스템지표: 0.39, 건강수명: 0.40, 성인사망률: -0.40, 영아사망률: -0.39)에 가장 큰 영향을 미치는 요소였으며, 예방접종(DPT), 위생, 인구성장률은 건강보험에 비해 영향력이 낮았다. 건강보험 유무를 매개효과로 하여 경로분석을 실시한 결과, 영향력은 앞서 연구한 회귀분석의 모형보다 더 높았다($\beta>0.41$, $p<0.001$).

건강보험은 통합적 건강정책의 일환으로 전세계 3 분의 2 이상의 국가에서 시행하고 있다. 건강보험의 적용은 건강수준을 향상시키는 가장 쉬우며 효과적인 방법이다

핵심단어: 건강보험, 건강보험 재원조달, 전국민의료보장제도, 다국가분석

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ANNEX

List of the countries of universal health coverage

1. Andorra
2. Antigua
3. Argentina
4. Armenia
5. Australia
6. Austria
7. Azerbaijan
8. Bahrain
9. Belarus
10. Belgium
11. Bosnia and Herzegovina
12. Botswana
13. Brunei Darussalam
14. Bulgaria
15. Canada
16. Chile
17. Costa Rica
18. Croatia
19. Cuba
20. Cyprus
21. Czech Republic
22. Denmark
23. Estonia
24. Finland
25. France
26. Germany
27. Greece
28. Hungary
29. Iceland
30. Ireland
31. Israel
32. Italy
33. Japan
34. Kuwait
35. Luxembourg
36. Moldova
37. Mongolia
38. Netherlands
39. New Zealand
40. Norway
41. Oman
42. Panama
43. Portugal
44. Romania
45. Singapore
46. Slovakia
47. Slovenia
48. South Korea
49. Spain
50. Sweden
51. Switzerland
52. Taiwan
53. Thailand
54. Tunisia
55. UAE
56. Ukraine
57. United Kingdom
58. Venezuela.

PUBLICATION LIST

Publication directly related dissertation

Ranabhat Chhabi, Kim Chun-Bae, Kim Chang-Soo,Jeong Hyoung-Sun, Koh Sang Baek, Chang Sei-Jin and Park Muyng-Bae“Multiple disparities of adult mortality in relation to social and health care aspect: result from different data sources” (Accepted from ActaBioethica, May, 2016)

Partially related to dissertation

Ranabhat, Chhabi, Kim Chun-Bae, Kim Chang-Soo, Park Myung-Bae and Freidoony Leila "Determinants of Body Mass Index and Intelligence Quotient of Elementary School Children in Mountain Area of Nepal: An Explorative Study." Children 3.1 (2016): 3.

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