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Does Structural Social Capital Enhance Health Status? An Empirical Analysis of 60 Countries

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Abstract

Structural social capital (SSC) is the extent to which people take part in social networks. Higher degree of social networks among people improve health of individuals, as social networks lower health care utilization, support self-management behaviour and become strong predictors of health. Social participation offers both material as well as moral support to individuals and makes it possible to fight against worries that reduces stress and emergence of chronic diseases. This study analyses the health consequences of social capital using the data of 60 countries over the period 1980-2014. We have used social participation as a proxy of SSC. The empirical studies largely focus on three measures of health outcomes that is physical health, mental health and social well-being of individuals separately while we are using these three measures of health in this analysis. Higher degree of social participation gives longevity, lowers mortality rate, improves mental health and enhances well-being. We conclude that social participation reduces distress and mental illness mainly in individuals and acts like a buffer. We also find that social participation in high income countries has beneficial impact on health status as extensive participation in social involvements is linked with a low incidence of health problems. This further reinforces the need for programs to facilitate individuals to improve their health that not only target the policies fostering economic activities but also improve policies which have beneficial impact in increasing social capital.

Keywords: Infant Mortality, Social Capital, Wellbeing, Life Expectancy, Social Participation

JEL Classification: H7, H51, H70, Z13, I30

1. Introduction

Social participation consequences of health appeared as important pathways for improvements in health (Poortinga, 2006). To lessen the distress in people, participation in different organizations acts as a buffer that benefits community health (Rietschlin, 1998). Social capital (SC) refers to all elements of community

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social relationships that are highly linked with improved health of individuals. The intensity of social connections and relationships of people improves health outcomes in various ways that can mitigate health care utilization, and boost self-management behaviours (Umberson and Montez, 2010). Social connectedness forms healthy environment of individuals, families and communities. The value of these associations and relationships boosts healthy behaviour and prevent unhealthy attitude for instance drug use, crime and alcoholism.

Social connectedness and support system enhance health management policies along with physical environments and everyday encounters. The theory of social determinants (factors) of health is encircled by the notion of social and inter community networks and connections. Recently, the terminology “social capital” is defined as "a resource accessed through social networks". SC has gained much importance and become profound concept across different disciplines of social sciences. Poor network relationships and support produce destructive effects on physical health and increase mental distress. There is an emerging interest on the importance of places and people for health. This debate has evolved by the discussion on SC and health by different scholars such as Coleman (1988) and Kawachi and Berkman (2000).

Community SC establishes trust-based association that strengthen the value of these relations among families and societies. This is an important ingredient which shapes healthy families and societies. The notion of SC is multifaceted, several researchers have used diverse terms loosely to enlighten this concept. Such as, social connections (Holt-Lunstad et al., 2017), social ties and relationships (Umberson and Montez, 2010), social integration and social networks (Mellor et al., 2008). The term SC can also be measured as structural component (social participation).

The participation in different social activities can be defined as structural form of SC (SSC). Avison et al. (2007) use the SSC as "the extent to which an individual participates in a broad range of social roles and relationships and the commitment of a member to stay in the group and interact with other members". During last few decades literature has evolved around social determinants of health. In this regard, SC has gained much attention as a prominent determinant of health. So, health promotion theory and practices shifted towards community development and empowerment instead of targeting individual behavioural changes (Robertson, 1999).

Putnam et al. (1993) took the first step to introduce SC as determining factor of health. In this regard, Kawachi et al. (1997) analysed empirically the association

of SC, income inequalities and mortality have confirmed the argument of Putnam that decreased investment in SC leads to increased mortality. SC offers both material as well as moral support and provides shield against worries of life. This ultimately reduces the incidence and intensity of chronic illness and stress in their daily life (Poder and He, 2010).

This study uses different constructs of health for a better understanding to establish the idea whether structural social capital (social participation) affects health outcomes similarly or differently. To get a better snapshot of the health of individuals and their associations with social participation, this study uses four dependent variables: life expectancy, infant mortality, smoking and happiness. This study uses panel data analysis for 60 countries spanning over 1980-2014. To our knowledge, this is the only study which used four measures of health in a single study with an empirical analysis on panel dataset. Although different studies have used suicide as a proxy of mental health, but we are using smoking as a determinant of health due to two reasons. Firstly, data on suicide is very limited. Secondly, smoking is identified as the most important preventable cause of premature death in advanced countries (CDC, 1989) and now it is an emerging issue as a key public health concern in different countries. Literature also proves with psychological observation that people smoke more to manage with anxiety induced by socioeconomic environments (Hanibuchi et al., 2016).

The main aim of current study is to find the relationship between health and SC by using the definition of WHO (1948) constitution that health is a "state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity". We use life expectancy and infant mortality as indicators of physical health, whereas mental health is measured through smoking and happiness is used as a proxy of social well-being. To capture the SC, we used social participation as an indicator of SC. The variable of SSC (social participation) is constructed by making Principle Component Analysis (PCA)[2] of membership in eight organizations using questions of World Values Survey (2014) that include either you are active or inactive member of an organization. Due to causality between SC and health (Xue et al., 2016) endogeneity problem exists in our study. To tackle the endogeneity, we use telephone, internet and mobile subscription as instruments of SC.

The study is organized as: Section II presents literature review, Section III emphasizes theoretical underpinnings. Section IV designs data analysis over view.

[2] Author's own calculation of index.

Empirical investigation is conferred in Section V along with sensitivity analysis (robustness). Finally, Section VI offers concluding remarks.

2. Literature Review

In sociological literature, social capital is a multi-definitional notion, which originated from Bourdieu, Coleman and Putnam. In this context, Bourdieu (1986) outlines SC as "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition". Whereas Putnam et al. (1993) define social capital in elaborative form as "features of social organization, such as social participation, trust, norms, and networks that can improve the efficiency of society by facilitating coordinated actions".

Despite disagreements on how one can define SC, it is an intermingling of norms, participation trust and support that enables cooperation among people (Veenstra, 2005; Poortinga, 2006). SC has separated into cognitive measures that include value systems, ethics, religious beliefs, trust and social cohesion and structural components which measure concentration of social relations, social participation and networks. Several studies measure structural component of SC by accessing different structural aspects that is social participation, civic engagement, social connections and social participation (Bolin et al., 2003; Veenstra, 2005).

SSC is "the degree to which one participates in social networks". It refers to participation in organizational activities through which one can establish social ties and neighbourhood association. Social participation, community involvement, community participation, social engagement and civic engagement (Jang et al, 2014), all are identified as various types of SSC, both formal as well as informal. In the same manner, social participation is the best indicator to measure the essence of SSC (Ichida et al., 2009; Morrow-Howell, 2014).

How does structural aspect of SC affect health outcome? There are various channels that draft the connections between health and SC glowingly in the context of social links and social participation. Involvement in different organizations enable easy access to facilities and resources that have direct health effects for instance, job opportunities reduce stress and provide high-grade health service. Various studies explain direct positive association between SSC and health (Xue et al., 2016). Whereas few studies find no relationship between SSC and health (Snelgrove et al., 2009).

Norms of cooperation ensure benefits through informal insurance and enable individuals to respond to negative health surprises in a better way

(Fukuyama, 2001). In this context, Miller et al. (2006) assert that social involvement in various organizations benefit health in three ways. Firstly, participation offers some direct positive material benefits. Secondly, community involvement develops an entree to social networks, relations and connections. Thirdly, these organizations may endorse health-care externalities to the whole society.

Social networks and participation have two-fold effects; positive as well as negative. On the positive side, network relations may enhance healthy lifestyles, for instance, smoking cessions and participation in healthy physical activities, provide information to gain medical facilities and health-related monetary support directly. Conversely, involvement or participation might confine health attitude and boost unhealthy behaviour (Kumar et al., 2012). In general, social participation has beneficial effect on health but in a limited case, it has detrimental effect on health. According to Putnam (2000), socially isolated people can be involved in health-damaging behaviours converse to those who are engaged in social and community activities since social networks may reinforce healthy norms and behaviours.

Even though there is a huge strand of literature on social participation and health outcomes, yet to our limited knowledge, no study finds its impact on physical health, mental health and wellbeing together. This study contributes to existing literature on SSC in a number of ways: first we are using three indicators of health that captures subjective (happiness) and objective (life expectancy, infant mortality and smoking) measures of health. Mostly previous literature takes only subjective or objective measures of health status. Second, this study uses longitudinal data from 1980-2014 for 60 countries. Third, we use internal and external instruments to control endogeneity. Fourthly, we also checked whether findings are robust to other determinants of health.

3. Methodology

Grossman (1972) asserts that health is produced by individuals depending upon their attitude, medical care and the constraints they face (related to finance, time, and output endowments). Grossman (1972) production function specifies relation between inputs and outputs. Where inputs to health comprise of economic, political, social and environmental factors (Fayissa and Gutema, 2008). While health as an output depends upon these inputs. The model is represented as follows:

$$\mathrm{H} = \mathrm{f}\,(\text{inputs to health}) \ldots \ldots (1)$$

In the above equation, inputs to health are various economic factors, for instance, GDP, education and health expenditures. Environmental factors include

urbanization, whereas social factors cover improved water and sanitation, and immunization. Here, longevity, infant mortality, smoking and happiness are used as health indicators that are generally used in literature (Majeed and Ajaz, 2018). Several studies find the relative impact of income, level of employment and education on health status primarily for mortality and longevity (Stronks et al., 1997). Apart from the factors discussed above, SC as a determining factor of health is also becoming a matter of increasing attention, after Putnam et al. (1993) publication.

How does SC affect health? Various studies elucidate several pathways to describe the channel. For instance, Kawachi et al. (1997), suggest three ways to describe this channel. Firstly, the social networks offer easy access to information and education that are directly linked with health facilities. Secondly, SC may impact health policies through collective actions to establish improved health-care delivery systems thereby increasing access to services. Finally, the support systems associated with SC may act as a source of self-esteem and mutual respect.

Bolin et al. (2003) further extend the Grossman health production by building a theoretical model. This model illustrates that household invests in health and SC instantaneously, so they get direct benefits in the form of utility gains from social networks and indirect benefit in the form of household resources. The model derives a household utility function of consumption commodities, health and SC. So, health is also a function of SC.

$$\text{Health} = \text{f}(\text{SP}, \text{X}) \dots\dots\dots\dots (2)$$

In the light of methodological framework, we are formulating an econometric model.

$$Health_{it} = \alpha_{it} + \alpha_1 Social\ Participation_{it} + \alpha_2 X_{it} + u_{it} \dots\dots\dots\dots (i)$$

Health status is measured using three indicators described above. Whereas, social participation is captured through the membership in eight organizations by constructing the PCA. Social participation index is based on the number of questions asked from the respondents about their participation in different social organizations. PCA is used to construct the indices based upon linear combination of uncorrelated component of variables. On the other hand, health is also a function of vector 'X' that includes real GDP, urbanization, improved water, improved sanitation, age dependency and immunisation.

Random effects model (REM) is used based on Hausman test. The REM is economical in degree of freedom and has fewer parameters to estimate. REM is to express ignorance through error term. Error component model assumes that

intercept of a single cross-sectional unit is randomly drawn from a large population sample with constant mean value of intercept. The intercept of each country is taken as the deviation from mean. Thus equations (i) can be written as follows:

$$H_{it} = \alpha_{it} + \alpha_1 SP_{it} + \alpha_2 X_{it} + e_{it} + \varepsilon_i \qquad \text{(ii)}$$

Where $\boldsymbol{\varepsilon_i}$ represents cross sectional error component and $\boldsymbol{e_{it}}$ combines cross sectional and time series error component. The error term ε_i reflects individual differences in the intercept of each country.

4. Data

Panel data analysis is used to investigate the association among social participation, health status and wellbeing covering 60 countries during 1980 to 2014 (see Table A in Appendix for list of countries). To analyse this relationship, we follow the definition of World Health Organization (WHO) on health. According to WHO (1948) constitution, "health is a 'state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity". Data is taken from (i) World Development Indicators (2015) for life expectancy, infant mortality and smoking (ii) World Values Survey (2014) for happiness and social participation. Table B in appendix provides summary of the variables, definitions and data sources.

In this study, life expectancy at birth and infant mortality are used as outcome variables. Life expectancy refers to "life expectancy at birth, total (years)" and infant mortality is measured by "mortality rate, infant (per 1,000 live births)". Smoking, third focused dependent variable of our study, is used as a proxy of mental health. People who face mental illness are likely to smoke more as compared to those with no mental illness (Hanibuchi et al., 2016). Smoking is identified as the most important preventable source of premature death in advanced countries (CDC, 1989)[3] and now it is an emerging issue as a key threat to public health in many countries. Happiness, a proxy of well-being, is another dependent/outcome variable. The question asked: "Taking all things together, would you say you are: 1 'very happy', 2 'rather happy', 3 'not very happy and 4 'not at all happy'". We construct an index of happiness with the help of PCA by using all four categories of happiness in our analysis.

As an independent variable we use social participation as a proxy variable of SC. We compile an index with the help of component analysis to measure social

[3] US Department of Health and Human Services. (1989). Reducing the health consequences of smoking. 25 years of progress. A report of the Surgeon General, 140-161.

participation. Social participation index includes individual participation in eight different organizations. This counts the membership in church/religious organization, membership of voluntary organisations: sport or recreation, membership of art, music, educational, membership of professional organization, membership of political party, membership of labour unions, membership of charitable/ humanitarian organization and membership of environmental organization.

Additionally, several control variables are also used such as: real GDP (Economic growth). Recent analysis uses log of "GDP per capita at constant US$" to linearize the relationship between health and income as the effect of income on health is typically nonlinear. We then take the lag of GDP after taking its log, as increase in income does not have direct effect on health and wellbeing at the current period. So, the effect of income on both is dynamic in nature. Similarly, improved water and improved sanitation, share of the total population living in urban areas and age dependency ratio are also included in the analysis.

Younsi and Chakroun (2016) stated that there is strong reverse-causality between SC and health. People energetically participate in social activities with improved health. Whereas, individual with deprived health may see their health declining faster due to the missing beneficial outcome of SC. To tackle the potential endogeneity, we use internal as well as external instruments. In this study, endogeneity originates from SC. Schultz et al. (2008) assert that causality could run in either direction that health can affect SC. Both health and SC are two types of human capital that are influenced by various other factors, so impact on one may also have effect on other. Thus, it has been tough to regulate both causality and direction of causality.

SC is instrumented by several appropriate internal (initial values) as well as external instruments. External instruments are telephone, internet and mobile subscription. Mobile phone subscription and broadband connections (ICT) help people to integrate with others in everyday life with others without limitations of geography. Mellor et al. (2008) outline that internet and mobile directly affect society in various ways. The internet saves time and spatial restrictions, thus gives the opportunity for isolated people to expand their social networks. Yang et al. (2011) argue that no technological advancement occurs without affecting individuals and societies in some way or the other. So, ICT is transforming not only our lives but also our relationships. The study also points out that our relationships are foundation of SC and ICT is also transforming and maintaining SC.

4.1. Data Analysis

Table 1 gives summary statistics. The summary analysis depicts that on average life expectancy of population is 67 years. Whereas, the data on infant mortality shows that on average 41 children per 1,000 live births in a given year die before reaching their first birthday. Smoking data reveals that 40 percent of individuals have daily, non-daily or occasional tobacco consumption habit. Whereas, for happiness we have constructed an index by using PCA of all four categories of happiness: 1 ‘very happy’, 2 ‘rather happy’, 3 ‘not very happy and 4 ‘not at all happy’". The value of happiness in summary statistics depicts the index value.

Table1: Summary Statistics

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
Dependent Variables					
Life Expectancy	207	67.05	9.04	40.17	81.50
Infant Mortality	197	40.95	32.18	3.70	137.61
Smoking	213	3.96	3.91	4.78	15.97
Happiness	94	27.79	14.70	3.10	64.50
Independent Variable					
Social Participation	64	3.55E-09	1.00	-1.40	3.53
Control Variables					
Log Real GDP	206	3.53	2.37	-1.56	22.92
Urbanization	211	3.88	0.52	2.27	4.61
Immunization	196	78.48	15.01	31.37	99.00
Improved Water	205	83.97	17.83	13.20	100.00
Age Dependency	198	56.59	21.65	23.36	100.30
Improved Sanitation	204	68.83	28.52	6.65	100.00

Descriptive analysis exhibits that different proxies of health (life expectancy and infant mortality) vary across countries. Such as, on average maximum prevalence of life expectancy in San Marino is 81.49 and minimum is in Sierra Leone, that is 40.17. Similarly, on average maximum score of infant mortality is 137.61 in Sierra Leone and comparatively minimum is 3.7 in Iceland. There is variation in level of happiness across countries as it is believed that people of high-income countries are happier than people of low-income nations. The people of Uzbekistan are the happiest with the value 64.5 contrary to the belief about the people of developed nations to be happier while Albanians are less happy with value 3.1. Similarly, people of Ethiopia smoke less (4.78) as compared to Kiribati (15.97) where people have more habit of smoking. According to WHO statisitcs, Kiribati has highest male smokers in the world.

With respect to GDP per capita, Qatar displays the best results with highest level of GDP while Ethiopia lags with the lowest GDP. Malaysia, Sint Maarten, Gibraltar, Monaco, Bermuda and Singapore are most urbanized. Chad has maximum immunization while Hungary shows low immunization figures. People of Uganda have high age dependency while Italians show less age dependency. The nations including Australia, American Samoa, Canada, Finland, United Kingdom, France Italy and United States have improved water quality due to the use of advanced development in water purifying technologies for water and sanitation amenities.

4.2 Graphical Analysis

Graphical analysis depicts that social participation is positively linked with life expectancy (Sirven and Debrand, 2008) while inversely related to infant mortality (Yang et al., 2009). Similarly smoking, a proxy of mental health, increases with increased social participation (Cohen and Wills, 1985) while well-being decreases with this form of SC (Mehl et al., 2010).

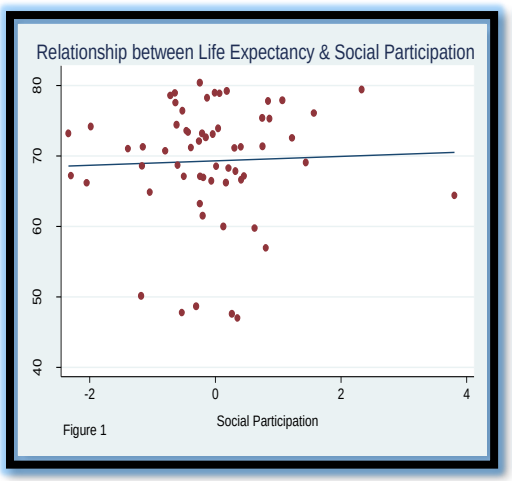

Figure 1

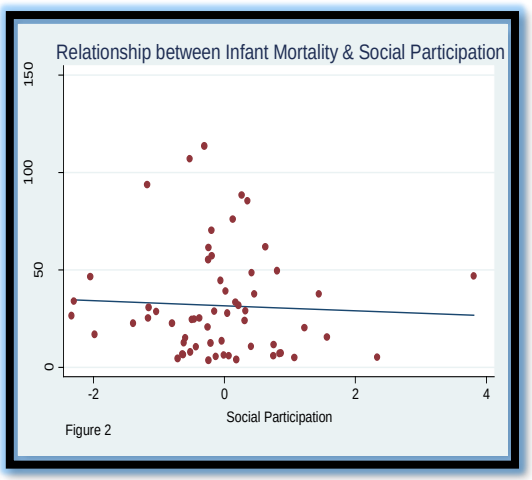

Figure 2

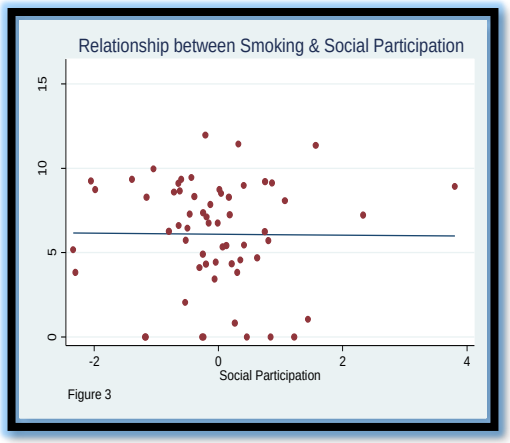

Figure 3

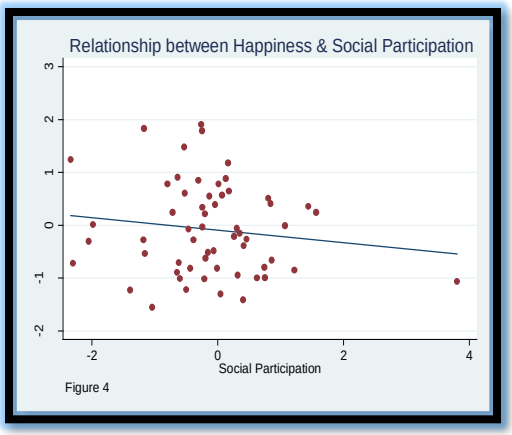

Figure 4

5. Empirical Results

In this section, panel data estimation technique is used to find the effect of SSC on health and wellbeing of individuals. The diagnostic tests, presented at the end of each table, demonstrate that model is appropriately specified, there is no multicollinearity (VIF) and functional form (hat sq p-value) of our model is also correct. Whereas, there is issue of heteroscedasticity (P >chi2) in our data, so we have used robust command to remove this issue.

We are using different health status proxies in panel data estimation by adding control variable one by one in our model. Panel data gives more sample variability and degree of freedom with the ability to capture complex human behavior. Hsiao (2007) argues that panel data offers accurate predictions about outcome variables (health status) by pooling data. Keeping in view these points we are incorporating panel data analysis to check the validity of our results. We are using different health status proxies in estimation.

Table 2 shows pooled OLS results of life expectancy and social participation. We are adding dependent and independent variable in first column. Where social participation shows positive but significant relationship with life expectancy. In second column we then add log of real GDP which shows negative and insignificant association with life expectancy. Real GDP is showing mixed signs after adding all control variable in each column. Income fulfils the intake of nutrition, more access to higher quality of goods and services, improved living standard and medical care facilities which have positive effect on health outcomes (Babones, 2008).

Urbanization is our next variable which is positively and significantly connected with life expectancy. As in urban vicinities, medical clinics are more cost-effective and easily available which have beneficial impact on health. Further, we add immunization as next control variable which has positive effect on life expectancy. Effective and high rate of immunization reduces the chances of infant mortality and improves life expectancy as risks of infectious diseases decrease (Mondal et al., 2009). In the same way, when we include improved water in our model, it has positive and statistically significant consequence on life expectancy.

Table 2: Panel Data Results of Health and Social Participation

Variables	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Social	0.58**	1.04***	0.48*	0.72***	0.26*	0.30*	0.37**
Participation	(0.296)	(0.304)	(0.257)	(0.272)	(0.189)	(0.184)	(0.189)
Log Real		-0.01	0.03	-0.08	-0.04	-0.01	-0.01
GDP t-1		(0.106)	(0.093)	(0.079)	(0.050)	(0.046)	(0.047)
Urbanization			7.33***	6.09***	2.78***	2.47***	2.05***
			(0.730)	(0.718)	(0.417)	(0.356)	(0.363)
Immunization				0.18***	0.01	0.03***	0.03***
				(0.031)	(0.013)	(0.013)	(0.013)
Improved					0.48***	0.34***	0.30***
Water					(0.033)	(0.037)	(0.045)
Age						-0.13***	-0.12***
Dependency						(0.015)	(0.015)
Improved							0.04***
Sanitation							(0.014)
Observations	379	340	340	323	322	322	312
R-squared	0.005	0.019	0.273	0.413	0.800	0.836	0.842
				Diagnostic Tests			
hat sq p-value	0.153	0.145	0.001	0.604	0.000	0.272	0.510
Mean VIF	1.00	1.00	1.02	1.08	1.31	1.87	2.53
P >chi2	0.813	0.365	0.940	0.000	0.000	0.000	0.000

Note: Robust standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1. Constants not reported

Age dependency is negative and significant. In the same manner, improved sanitation has significant positive relation with life expectancy. Improved sanitation is must for better health status, as unavailability of clean water blowouts the diseases and costs the heath and lowers quality of life that reduces longevity (Cingolani et al., 2015). This model explains that social participation is positively and significantly linked with life expectancy after adding all control variables. Our results express that social participation influences health outcomes positively (Sirven and Debrand, 2008).

Table 3 depicts the pooled OLS results of social participation and infant mortality, in column 1 the estimated regression results of dependent and independent variables direct that social participation is inversely linked to infant mortality. The coefficient of social participation indicates that one unit rise in social participation saves the life of 1747 infants annually. This shows that improved social participation of mothers lessens the intensity of infant mortality (Yang et al., 2009). It implies that social participation provides easy access to information, helps to educate mothers about health care facilities that assists them to take decisions related to health during their pregnancy.

Table 3: Panel Data Results of Infant Mortality and Social Participation

Variables	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Social	-1.75*	-2.81***	-2.87***	-2.12***	-0.83*	-0.96**	-1.08***
Participation	(0.919)	(0.990)	(1.014)	(0.757)	(0.430)	(0.418)	(0.416)
Log Real		-0.14	-0.12	0.21	0.05	-0.02	-0.03
GDP t-1		(0.372)	(0.374)	(0.262)	(0.133)	(0.115)	(0.112)
Urbanization			-0.36	-17.2***	-7.09***	-6.13***	-3.74***
			(0.698)	(2.393)	(1.317)	(1.118)	(0.979)
Immunization				-0.76***	-0.19***	-0.11**	-0.10**
				(0.115)	(0.046)	(0.050)	(0.047)
Improved					-1.46***	-1.02***	-0.80***
Water					(0.111)	(0.140)	(0.183)
Age						0.41***	0.33***
Dependency						(0.048)	(0.047)
Improved							-0.23***
Sanitation							(0.060)
Observations	385	346	346	329	328	328	318
R-squared	0.005	0.014	0.015	0.486	0.828	0.862	0.876
				Diagnostic Tests			
hat sq p-value	0.764	0.952	0.001	0.675	0.001	0.038	0.295
Mean VIF	1.00	1.00	1.02	1.08	1.30	1.87	2.53
P >chi2	0.320	0.172	0.000	0.000	0.000	0.000	0.000

Note: Robust standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1. Constants not reported

Urbanization decreases infant mortality rate, as, in urban areas medical facilities are easily accessed and clinics are more cost-effective, which have positive effect on both mother and children health (Bandyopadhya and Green, 2013). Likewise, negative relationship of immunization and health status depicts that Mondal et al. (2009) are right in their argument that complete vaccinations to new-borns decreases infant mortality. Similarly, there is negative relation between infant mortality and improved water and improved sanitation portraying that clean

water safeguards infants from harmful infectious diseases. Conversely, age dependency is positively and significantly associated with infant mortality.

In case of mental health, analysis depicted in Table 4 shows that social participation has negative impact on smoking of individuals. This implies that increased participation in different organization facilitate productive activities and provide strong social environment (deter unhealthy behaviour) which reduces smoking and incidence of tensions that helps to improve and maintain mental health. Individuals who are less educated and lived below poverty line are at higher risk of smoking. Another reason might be the presence of social support that leads to lowering psychological illness and mental distress (Cohen and Wills, 1985).

Table 4: Panel Data Results of Health (Smoking) and Social Participation

Variables	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Social	-0.80	-0.87	-0.77	-0.80	-0.70	-0.63	-0.38
Participation	(0.674)	(0.709)	(0.697)	(0.699)	(0.711)	(0.706)	(0.768)
Log Real GDP		0.39**	0.37**	0.35**	0.34**	0.34**	0.35**
t-1		(0.180)	(0.175)	(0.175)	(0.174)	(0.169)	(0.173)
Urbanization			0.59*	0.59*	0.68**	0.62*	0.45
			(0.317)	(0.318)	(0.323)	(0.327)	(0.337)
Immunization				0.09**	0.15***	0.15***	0.14***
				(0.041)	(0.053)	(0.053)	(0.054)
Improved Water					-0.08	-0.23**	-0.11
					(0.062)	(0.107)	(0.128)
Age						-0.16*	-0.19**
Dependency						(0.093)	(0.098)
Improved							-0.08
Sanitation							(0.064)
Observations	385	346	346	346	345	345	335
R-squared	0.002	0.006	0.155	0.241	0.293	0.386	0.475
			Diagnostic Tests				
hat sq p-value	0.769	0.363	0.294	0.259	0.394	0.248	0.128
Mean VIF	1.00	1.00	1.01	1.01	1.38	1.85	2.49
P >chi2	0.405	0.028	0.013	0.002	0.002	0.001	0.001

Note: Robust standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1. Constants not reported

Log of real GDP shows that as income grows, the incidence of smoking also grows. In most developed countries, the incidence of smoking is inversely related to income (Hanibuchi et al., 2016). On the contrary, a positive connection between income and tobacco use is found in low income countries (Barik et al, 2016). In the same manner, urbanization has positive and significant effect on smoking, in urban areas the incidence of smoking prevalence is higher as compared to rural areas. All other control variables show identical pattern as in longevity and mortality.

Findings of Table 5 show that SSC is inversely and significantly linked with happiness. It depends on the form of connection (Mehl et al., 2010) as participation in organizational activities reduce the family connections which negatively affects one's happiness level. Similarly, organizational participation may satisfy some people but does not enhance happiness. In the similar manner, improved water, improved sanitation and age dependency have positive impact on happiness level and individual's well-being, while immunisation has negative and significant effect on well-being.

Table 5: Panel Data Results of Well-Being and Social Participation

Variables	1	2	3	4	5	6	7
Social	-0.13**	-0.20***	-0.20***	-0.18***	-0.18***	-0.19***	-0.20***
Participation	(0.066)	(0.067)	(0.066)	(0.070)	(0.070)	(0.068)	(0.075)
Log Real		-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
GDP t-1		(0.015)	(0.015)	(0.014)	(0.014)	(0.014)	(0.014)
Urbanization			0.06**	0.05*	0.05	0.05*	0.05
			(0.031)	(0.030)	(0.032)	(0.033)	(0.035)
Immunization				-0.01***	-0.02***	-0.02***	-0.02***
				(0.003)	(0.007)	(0.006)	(0.006)
Improved					0.00	0.01*	0.01
Water					(0.007)	(0.009)	(0.009)
Age						0.01*	0.01*
Dependency						(0.006)	(0.007)
Improved							0.04
Sanitation							(0.004)
Observations	255	229	229	229	229	229	223
R-squared	0.015	0.042	0.068	0.131	0.353	0.444	0.482
Diagnostic Tests							
Hatsq p-value	0.247	0.659	0.514	0.329	0.339	0.805	0.845
Mean VIF	1.00	1.00	1.02	1.02	1.49	1.99	2.48
P >chi2	0.0005	0.0011	0.9001	0.6196	0.7646	0.9272	0.9000

Note: Robust standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1. Constants not reported

To remove endogeneity, we use 2SLS approach. The results of 2SLS regression (Table 6) specify that SSC is positively (directly) and significantly connected to life expectancy and happiness, whereas inversely (negatively) and significantly related with infant mortality and smoking. Here we used initial value and telephone, internet and mobile subscription as an instrument of social participation. Over Id results suggest validity of instruments for social participation. This depicts that individual residents' perceptions of trust on others and community participation reduces the stress level which ultimately leads to better health outcome

Table 6: Two Stage Least Squares Panel Data Results

Variables	Life Expectancy	Infant Mortality	Smoking	Happiness
Social Participation	1.71**	-1.51*	-12.05*	0.55***
	(0.819)	(0.834)	(6.228)	(0.211)
Log Real GDP t-1	0.04	0.27**	0.02	0.00***
	(0.088)	(0.111)	(0.000)	(0.000)
Urbanization	2.67***	-6.72***	-1.19	0.63***
	(0.453)	(1.103)	(2.391)	(0.128)
Immunization	-0.01	-0.32***	0.25**	-0.03**
	(0.039)	(0.064)	(0.101)	(0.013)
Improved Water	0.39***	-1.66***	-0.14	-0.00
	(0.049)	(0.073)	(0.198)	(0.011)
Age Dependency	-0.14***	0.57***	-0.12	0.02
	(0.022)	(0.072)	(0.111)	(0.020)
Improved Sanitation	0.04	0.41***	-0.14*	0.04***
	(0.027)	(0.070)	(0.084)	(0.011)
Observations	162	127	247	75
R-squared	0.853	0.974	0.587	0.139
		Over Id Test		
Test Score Chi sq.	(p=0.4065)	(p=0.8129)	(p=0.2342)	(p=0.8758)
		Endogeneity Test		
Durbin	(p=0.0062)	(p=0.0656)	(p=0.0469)	(p=0.0249)
Wu-Hausman	(p=0.0089)	(p=0.0780)	(p=0.0499)	(p=0.0261)

Note: Robust standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1. Constants not reported

Real income is significantly and directly linked with life expectancy and happiness while income has negative relation with infant mortality. Urbanisation is positively linked with infant mortality and negatively related with smoking. Immunisation and improved water improves life expectancy while reduces infant mortality. Literature justified that clean and safe water guards infants from many infectious and harmful diseases, similarly immunization lowers infant mortality. Results of 2SLS are consistent with pooled OLS findings. Next, we perform Hausman test to check either fixed or random effect is appropriate in our model. Results of Table 7 suggest that random effect is more appropriate regardless of health proxies used in our model. All variables have expected signs and significance which is similar to our baseline results.

Table 7: Random Effects Results

Variables	Life Expectancy	Infant Mortality	Smoking	Happiness
Social Participation	0.69***	-3.17***	-0.32	-0.35***
	(0.211)	(0.616)	(0.838)	(0.093)
Log Real GDP t-1	0.04	0.04	0.01	0.07
	(0.012)	(0.037)	(0.216)	(0.008)
Urbanization	1.11***	-0.56	0.53	-0.23***
	(0.360)	(1.058)	(0.422)	(0.045)
Immunization	0.00	-0.04**	0.15*	-0.01**
	(0.006)	(0.019)	(0.082)	(0.005)
Improved Water	0.15***	-2.03***	-0.12	0.10***
	(0.022)	(0.066)	(0.148)	(0.012)
Age Dependency	-0.14***	0.37***	-0.19**	0.01*
	(0.014)	(0.040)	(0.092)	(0.009)
Improved Sanitation	0.13***	0.28***	-0.08	-0.05***
	(0.014)	(0.042)	(0.065)	(0.007)
Observations	313	319	336	225
	Hausman Test			
Chi (2)	4.63	4.88	6.50	6.28
P-value > Chi (2)	0.4625	0.4312	0.4827	0.4987
Outcome	YES	YES	YES	YES

Note: Robust standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1. Constants not reported

Table 8 portrays the results of development level in case of health and SSC. We have taken the dummy variable for developed and developing nations of the world. Our base category is developing nations which represents intercept of our model. Where "0" is taken for developing and "1" for developed nations. The analysis shows that all proxies of physical health in slope dummy (social participation*development level) show consistent and significant relation with social participation. While for mental health, our results reveal that in case of developed nations social gatherings have detrimental effect on smoking behaviour of people. Conversely, social participation has beneficial effect on happiness in case of developing nations. According to UN Report (2010) the developing economies get benefits from social participation as their income level is low, have high social and economic vulnerability and lack of available human resources. So, they enjoy their life by participating in social activities.

Table 8: Health and Social Participation (Development Level)

Variables	Life Expectancy	Infant Mortality	Smoking	Happiness
Social Participation	0.12	-1.13	-0.43	0.13*
	(0.286)	(0.751)	(0.963)	(0.093)
Social	0.49*	-0.09*	0.13	-0.20
Particip*Development	(0.337)	(0.886)	(1.615)	(0.166)
Log Real GDP t-1	-0.02	-0.03	0.35**	-0.01
	(0.046)	(0.112)	(0.174)	(0.014)
Urbanization	2.03***	-3.74***	0.45*	0.06*
	(0.353)	(0.987)	(0.342)	(0.034)
Immunization	-0.03***	-0.10**	0.14***	-0.02**
	(0.013)	(0.048)	(0.056)	(0.006)
Improved Water	0.30***	-0.80***	-0.11	0.01*
	(0.045)	(0.183)	(0.129)	(0.009)
Age Dependency	-0.11***	0.34***	-0.19**	0.01*
	(0.015)	(0.047)	(0.098)	(0.007)
Improved Sanitation	0.04***	-0.23***	-0.08*	0.01
	(0.014)	(0.061)	(0.064)	(0.004)
Observations	312	318	335	223
R-squared	0.842	0.876	0.048	0.147

Note: Robust standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1. Constants not reported

These results infer that social participation has promising effect on physical health in developed nations rather than developing ones. The impact of SSC on health has been widely debated in developed countries. As social engagement enables individual to participate, feel attached with others, feel obligated and fulfilled, these all contributes to improved health (Takagi et al., 2013). In developed countries, social networks are strong as compared to developing ones.

Developed countries also have high intensity of accessibility and awareness of organizational activities and take part in multiple social roles. By using these platforms, one can get benefit in terms of health and health-related issues and have social pressure in to care about one's health. Existing literature in developed countries supports social engagement theory and explains that substantial participation in social events is linked with a low incidence of health problems. Numerous studies highlighted that social participation in high income countries has beneficial impact on health status including morbidity, mortality and wellbeing as well (Bourassa et al., 2017).

5.1. Sensitivity Analysis

For robustness, we perform sensitivity analysis by using other determinants of health one by one in Two Stage Least Squares of panel data analysis. We added physicians, trade openness, health expenditures and population growth in sensitivity analysis. Public health expenditures guarantee improved health facilities that directly impact health performance. Life expectancy is sensitive to physicians and population growth while insensitive to trade openness and health expenditures. Physicians help in improving health of individuals. Infant mortality is sensitive to trade openness, health expenditures and population growth. However, smoking is sensitive to inclusion of trade openness and population growth, while happiness is sensitive to the inclusion of physicians and population growth. Overall results of sensitivity analysis suggest that findings are robust to addition of other determining factors of health. (see Table C in Appendix).

6. Conclusion and Policy Recommendation

The theory related to social determinant of health is encircled by the notion of social and inter community relations, networks and connections. Participation in different organizations enable easy access to facilities and resources that have direct health effects, for instance job opportunities reduce stress and provide high-grade health service. We attempt to add in the prevailing literature on health outcomes and wellbeing in relation to social participation by employing the diverse dimensions of health status using panel data estimation technique. The main contribution of this study is that, it segregates health status into three extents, that is: physical and mental health along with wellbeing of individuals. The study used Grossman (1972) health production function.

The results confirm our prior theoretical expectation that SSC is the most important predictor of individual's health and well-being. In all the cases, social participation has significant positive impact on health outcomes. Further, we find that social participation has more powerful effect in case of mental health. Policies should be aimed to improve social participation to reduce incidence of smoking as organizational activities provides healthy social environment. The control variables also have significant impact on health. When we control economic growth, improved water, improved sanitation, age dependency and child immunisation have favourable effect on health status, whereas urbanisation has adverse effect on health status. When we group countries into developed and developing, results suggest that social participation has beneficial effect on health status subject to developed countries only. As social engagement enables individual to participate, feel attached with others, feel obligated and fulfilled, these all contributes to improved health.

This study is confined to low sample size due to less data available in case of social participation and in some cases, data set of health indicators also, especially in case of happiness where we find the data of 99 countries only from World Values Survey (2014). Secondly, the present study only takes one proxy of structural social capital (social participation), further research can also focus on the other proxies of SSC which also have potential impact on health of people and their social well-being. This study reflects the analysis of global social participation and health along with developed and developing groups of countries, so there is need to determine regional level effects to find the sensitivity of the current analysis.

We detect that social participation is an influential determinant of health as suggested by various studies (Xue et al., 2016). In this context, policies should be aimed to build friendly and productive environment in social organizations. As healthy social environment in these organizations promote healthy activities, which boosts improved health outcomes. Strategies should also be made for developing economies to give awareness to people in order to participate in social organizational activities to boost their physical health, improve their mental conditions and to enhance their well-being.

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Appendix

Table A: Countries included in the Study

Countries	Countries	Countries	Countries
Albania	El Salvador	Macedonia	Slovenia
Armenia	Estonia	Mali	South Africa
Australia	Faeroe Islands	Mexico	Spain
Azerbaijan	France	Moldova	Sweden
Bangladesh	Georgia	Morocco	Switzerland
Bosnia	Germany	Netherlands	Thailand
Brunei Darussalam	Ghana	New Zealand	Trinidad & Tobago
Burkina Faso	Hungary	Nigeria	Turkey
Burundi	India	Norway	Ukraine
Chile	Indonesia	Peru	United Kingdom
China	Iran	Philippines	United States
Colombia	Italy	Poland	Uruguay
Comoros	Japan	Romania	Venezuela
Czech Republic	Jordan	Rwanda	Vietnam
Dominican Republic	Lithuania	Serbia	Zambia

Table B: Summary of Variables, Definition & Data Sources

Variables	Definition of Variables	Construction	Data Sources
Outcome Variables			
Life Expectancy	"Life expectancy at birth indicates the number of years a new born infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life".	Life expectancy at birth, total (years)	World Bank (2015)
Infant Mortality	"Infant mortality rate is the number of infants dying before reaching one year of age, per 1,000 live births in a given year".	Per 1000 live births	World Bank (2015)
Smoking	"Prevalence of smoking, female is the percentage of women ages 15 and over who smoke any form of tobacco, including cigarettes, cigars, pipes or any other smoked tobacco products. Data include daily and non-daily or occasional smoking".	% of adults	World Bank (2015)
Happiness	The respondents are asked, "Taking all things together, would you say you are: very happy, quite happy, not very happy, and not at all happy".	1 (very happy) to 4 (not at all happy)	World Values Survey (2014)
Focused Variables			
Social Participation	The respondents are asked: "Could you tell me whether you are an active member, an inactive member or not a member of that type of organization"	Index	World Values Survey (2014)
Control Variables			
Real GDP per Capita	GDP is the "sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products".	Log	World Bank (2015)
Urbanization	People living in urban vicinity	Percentage	World Bank (2015)
Immunization, measles	Child immunization measures the percentage of children ages 12-23 months who received vaccinations before 12 months or at any time before the survey.	% of children ages 12-23 months	World Bank (2015)
Improved Water	Access to an improved water source refers to "the percentage of the population using an improved drinking water source. The improved drinking water source includes piped water on premises (piped household water connection located inside the user's dwelling, plot or yard), and other improved drinking water sources (public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs, and rainwater collection)".	Per 1000 people	World Bank (2015)
Age dependency ratio	Age dependency ratio is the ratio of dependents--people younger than 15 or older than 64--to the working-age population--those ages 15-64. Data are shown as the proportion of dependents per 100 working-age population.	Per 100 working-age population.	World Bank (2015)
Improved Sanitation	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, pit latrine), ventilated improved pit (VIP) latrine, pit latrine with slab, and composting toilet.	% of population with access	World Bank (2015)

Table C: Results of Sensitivity Analysis

Variables	Life Expectancy	Life Expectancy	Life Expectancy	Life Expectancy	Infant Mortality	Infant Mortality	Infant Mortality	Infant Mortality	Smoking	Smoking	Smoking	Smoking	Happiness	Happiness	Happiness	Happiness
Social Participation	1.23	1.93**	2.70*	0.36	-1.76*	-0.79	-1.32	0.63	-20.49**	-8.12	-11.46*	-11.76*	0.43*	0.03	0.74***	0.19
	(1.587)	(0.869)	(1.865)	(0.594)	(1.052)	(0.768)	(0.821)	(0.820)	(10.297)	(6.466)	(8.020)	(6.444)	(0.286)	(1.360)	(0.231)	(0.180)
Log Real GDP	-0.01	0.05	0.06	-0.01	0.23*	0.20**	0.26**	0.22***	0.01	0.01	0.01	0.02	0.00***	0.00*	0.00***	0.00*
	(0.090)	(0.092)	(0.087)	(0.080)	(0.133)	(0.104)	(0.125)	(0.088)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Urbanization	3.42***	2.90***	3.37***	2.22***	-11.82**	-6.90***	-6.50***	-6.95***	-0.72	-0.82	-2.12	-1.37	0.72***	0.52	0.65***	0.25
	(0.736)	(0.476)	(0.660)	(0.444)	(2.457)	(0.880)	(1.201)	(0.917)	(1.895)	(2.642)	(2.629)	(2.510)	(0.216)	(0.380)	(0.127)	(0.154)
Immunization	-0.07	-0.00	-0.02	-0.01	-0.33***	-0.30***	-0.32***	-0.34***	0.19	0.27**	0.24**	0.25**	-0.05***	-0.01	-0.03**	-0.02*
	(0.055)	(0.044)	(0.051)	(0.031)	(0.094)	(0.059)	(0.067)	(0.059)	(0.172)	(0.109)	(0.113)	(0.101)	(0.019)	(0.040)	(0.013)	(0.012)
Improved Water	0.38***	0.41***	0.40***	0.32***	-1.57***	-1.66***	-1.67***	-1.62***	-0.11	-0.25	-0.19	-0.15	-0.31	-0.02	0.01	-0.64
	(0.058)	(0.054)	(0.066)	(0.041)	(0.174)	(0.064)	(0.084)	(0.067)	(0.373)	(0.223)	(0.230)	(0.198)	(0.019)	(0.054)	(0.019)	(0.010)
Age Dependency	-0.13***	-0.12***	-0.13***	-0.25***	0.57***	0.61***	0.56***	0.70***	0.09	-0.19*	-0.15	-0.14	-0.08	0.05	0.04*	0.25
	(0.035)	(0.023)	(0.024)	(0.037)	(0.084)	(0.064)	(0.074)	(0.057)	(0.238)	(0.111)	(0.130)	(0.146)	(0.022)	(0.022)	(0.022)	(0.015)
Improved Sanitation	0.03	-0.01	0.00	0.02	0.41***	0.45***	0.40***	0.41***	-0.04	-0.07	-0.13	-0.14*	0.02	0.03**	0.05***	0.04***
	(0.037)	(0.034)	(0.042)	(0.022)	(0.115)	(0.065)	(0.077)	(0.064)	(0.143)	(0.099)	(0.098)	(0.084)	(0.016)	(0.014)	(0.011)	(0.010)
Physicians	-0.16				1.07*				3.09				0.07			
	(0.567)				(0.629)				(3.235)				(0.196)			
Trade Openness		0.01***				-0.04***				-0.01*				0.09***		
		(0.003)				(0.016)				(0.014)				(0.003)		
Health Expenditures			-0.42*				-0.07				0.08				-0.08*	
			(0.225)				(0.186)				(0.691)				(0.049)	
Population Growth				2.19***				-2.59***				0.55				0.76***
				(0.667)				(0.538)				(2.083)				(0.159)
Observations	83	160	161	161	72	126	111	127	128	219	218	247	87	148	154	167
R-squared	0.885	0.850	0.812	0.902	0.968	0.978	0.971	0.979	0.574	0.473	0.597	0.599	0.720	0.659	0.721	0.627

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Constants are unreported