査読論文

Education, Well-being, and Healthier Practices in Bangladesh

Ileas Mia Mohammad *, INABA Kazuo **

Abstract

This study investigates the impacts of educational attainment on well-being with the Bangladesh Household Income and Expenditure data for 2010. The dichotomous response variable indicating the presence and absence of chronic diseases is treated as well-being. For the estimation, logistic regression model is used to assess well-being, pre and postnatal consultation, safe childbirth, access to hygienic latrine and safe drinking water in relation to education.

The estimated results show that the women with secondary and higher secondary education reap better health outcome of education and men's educational attainment does not have statistically significant association with their well-being. Women's education is positively and significantly associated with healthier practices like giving save childbirth, household having access to hygienic latrine and pre and postnatal consultation. As for the access to safe source of drinking water, educational attainment does not seem to play any role.

This study is important in designing policies related to human resources and achieving sustainable development goals in Bangladesh.

Keywords

Educational attainment, Well-being, safe childbirth and hygienic latrine

* Correspondence to: Ileas Mia Mohammad
Ph.D. Student, Graduate School of Economics, Ritsumeikan University, Japan and Senior Assistant Secretary, Ministry of Public Administration, Government of People's Republic of Bangladesh.
E-mail: gr0116ih@ed.ritsumei.ac.jp

** Correspondence to: INABA Kazuo
Professor, Faculty of Economics, Ritsumeikan University
1-1-1 Nojihigashi, Kusatsu, Shiga 525-8577, Japan
E-mail: inabak@ec.ritsumei.ac.jp

1. Introduction

Human capital stock in Bangladesh like other South Asian countries is low. Human Development Indices and Indicators: 2018 Statistical Update for Bangladesh by UNDP reported that the expected years of schooling is 14.4 years in Bangladesh with a mean of 5.8 years. In South Asian, Middle East and North African countries, about 60 percent of the work force has primary and secondary education. whereas, in East Asian and Pacific countries, more than 70 percent of the work force has education beyond secondary education (Ribound, Savchenko, & Tan, 2007). The health-related indicators are not satisfactory either in Bangladesh. The report by UNDP also pointed that the maternal mortality ratio in Bangladesh is 176 and the adolescent birth rate is 83.5 per 1000 women of age 15–19 years and under five mortality rates is 53 in 1,000 in 2010. About 54 percent of the preschool-age children is stunned which is the highest in the world, 56 percent are underweight, and 17 percent are wasted (FAO, Nutrition country profile; Bangladesh, 2010). Lim et. al. (2018) constructed functional health status linked to economic productivity from seven diseases and impairments like wasting, stunting, anaemia, cognitive impairment, vision loss, hearing loss and prevalence of three infectious diseases which includes HIV/AIDS, tuberculosis, malaria, diarrhea, and other neglected tropical and infectious diseases. They have combined health outcomes into a single measure and for these diseases and impairments, used country specific prevalence rates to evaluate functional health status and on this measure, Bangladesh scored 40% out possible 100. In respect of human capital investment among 195 countries, Bangladesh ranks 161st (Lim et al., 2018). If investment in education has beneficial health outcomes and healthier livelihood practices, then investment in health and education could complement each other in Bangladesh.

Bangladesh has made a remarkable achievement in universal primary education. At the primary level, enrolment rate is about 98 percent of all school-aged children (World Bank, 2018) and more girls study in secondary school than the boys, and the overall literacy rate has increased. On such context, this paper investigates whether education brings about beneficial outcomes to health and healthier practices of the people. So, this paper seek answer to the following questions;

(1) Does health benefits could be reaped from education and which educational attainment results in people's well-being? And

(2) Does education affect peoples' healthier practices?

Health is an important element of human capital and the most important economic asset of a nation. Heathier people have higher life expectancy and they save more and invest more (for their children's health and education), which results in capital accumulation and growth.

Both health and education make an individual more productive and there is mutual relationship between them. Higher education leads to better health and healthier lifestyle, but healthier people achieve higher educational attainment through their efficiency and more investment of time and effort in education. Genetical endowments, government initiative to educate, and neighborhood effect could also determine both health and education. In this paper we consider the role of educational attainment resulting in health and healthier practices. A few papers investigated health and well-being in Bangladesh, and we have not come across any that examined health in relation to education. While the other previous studies use data from their own survey to study health and well-being, this paper used the data from Household Income and Expenditure Survey (HIES). This analysis will contribute to the existing literature on Bangladesh with its finding and policy implication. This paper used dichotomous response variable of success and failure and estimated the response of the interest variable with logistic regression. The estimated results show that the women with secondary and higher secondary education are more likely to enjoy well-being and this relation is statistically significant. Men's educational attainment have insignificant relation to their well-being. Healthier practices like having safe childbirth, use of hygienic latrine, prenatal and postnatal consultation have significant favorable relation with women's educational attainment.

The organization of the study is as follows. Section 2 discusses a literature review, section 3 shows the data and methodological framework, followed by the estimated results and a discussion is offered in Section 4. Section 5 is the conclusion.

2. Literature Review

Cutler and Lleras-Muney (2010) found that people with more education are less prone to morbidity from acute and chronic diseases like heart condition, stroke, hypertension, cholesterol, diabetes, asthma attacks, ulcers, etc., and are less likely to report poor health, anxiety and depression. According to them, behavior-related education gradient is largest at younger age and it wears off after 50–60 years. In India, Tilok (2007) found that education negatively influences infant mortality and is positively related to life expectancy.

Life expectancy for both male and female is positively influenced by education and secondary and higher secondary education reduces infant mortality and the coefficient is significant at 1% in rural areas of India (Tilak, 2007). However, this result in the case of urban area is insignificant. Education is associated with good health because of working and economic conditions, social-psychological resources and healthy lifestyle (Ross & Wu, 2006). Ross and Wu found that working and economic conditions are significantly better for college-educated people compared to those with high school degrees and income is higher for the college educated. According to Ross and Wu, college education, compared to a high school degree, leads to significantly higher levels of work fulfillment and one is more likely to exercise, less likely to smoke, and more likely to abstain from drinking or drink heavily. In their estimate, the education gradient in respect to self-reported health status of the people with college education is significantly better than that of people with high school degrees.

Prevalence of obesity and Type 2 diabetes has increased in almost every country. Liu et al. (2015) found that the genetic risk of HbA1c is smaller among people with more years of schooling and larger among people with less than a high school degree. People with more education enjoy better health because they have more health knowledge. One more year of schooling increases health knowledge index by 15% of a standard deviation (Johnston, Lordan, Shields, & Suziedelyte, 2015). In Australia, using differences in law regarding minimum school leaving age as a source of exogenous variation, Johnston et al. (2015) found that more education leads people to have improved diets and a tendency to engage in exercise, drink moderately and avoid smoking. Education improves not only health knowledge and engaged people in healthy behavior, but also has better health-causing effects. The estimated result by Gøtzsche and Jørgensen (2013) was that the life expectancy gain from yearly mammography screening opposed to not screening is about one month, and life expectancy gain is about 6 months between people with high low density lipoproteins (LDL) cholesterol as opposed to normal cholesterol (Clarke et al., 2009). On the contrary, life expectancy difference between people with less than high school degree and people with advance degree is 10–12 years (Montez & Hayward, 2014). However, health effect of education level is not uniform everywhere.

In European welfare countries, social transfer lowers health inequalities among people with primary education against the people with tertiary education (Dahl & van der Wel, 2013). In another study among 22 European countries, it was found that people with low education have reported high risk of poor self-rated health and functional limitations and

health effects of education are stronger at ages between 25–55 years relative to higher age groups (von dem Knesebeck, Verde, & Dragano, 2006). In Bangladesh, children in household with educated mother and other member resorted to healthier practices respecting breast-feeding and child feeding (Guldan et al., 1993). Women, poor and illiterate people are less compliant to health education intervention among older people in Bangladesh (Rana, Wahlin, Lundborg, & Kabir, 2009).

Matsuoka, Aiga, Rasmey, Rathavy, and Okitsu, (2010) found that in the case of utilization of maternal health services in Cambodia, lack of education and decision-making authority impedes woman having access to maternal health services. These barriers are common to all developing countries, and Bangladesh is no exception. *Gemmill et al. (2014)* collected cross-country data from 2003–2009 to investigate global causes of maternal deaths and found that 73% of all maternal deaths were caused by pregnancy and childbirth-related problems and global distribution of maternal deaths is mostly shared by sub-Saharan African and South Asian countries. These maternal deaths could have been averted if there were provision of and awareness to avail the prenatal and postnatal care and consultation and childbirth attended by skilled birth attendants. Prenatal care increases the use of pediatric health care and improves maternal health related to parenting practices and child health (Poma,1999, and E Reichman, Nancy & Corman, 2010). In developing countries, the childcare burden falls predominantly on women and mothers' health affects children's health through their ability to breastfeed and nourish the children (Bhalotra & Rawlings, 2011). Thus, the health of mothers improves the development prospects through intergenerational transmission of human capital. Health is a regular factor of production and have positive correlation with growth (Mankiw-Romer-Weil, 1992). Health determines growth through total factor productivity (TFP), and a 1% increase of malaria incidence reduces TFP by 0.41%, whereas malnutrition and lack of access to safe water reduces it to the range of 0.17% to 0.22 (Cole & Neumayer, 2006).

Literature on education affecting health outcomes in positive way is quite unanimous. Only contention in this regard is which level of educational attainment has the better health outcomes. Most literature on education and health relationship is centered to the developed countries. Literature that examined education-health relationship in developing countries are mostly from China and India. So, this paper will be a gap filler in literature on education-health relation in Bangladesh.

3. Data and Methodology

This chapter discusses the empirical model for estimating relation between education and well-being and healthier practices. The data for the analysis were taken from the Household Income and Expenditure Survey (HIES) for 2010. HIES is conducted by the Bangladesh Bureau of Statistics (BBS). The BBS surveyed 612 primary sampling unit (PSUs). A PSU is two or more contiguous enumeration areas (EAs). Each PSU consists of 200 households, and of these 200 households 20 are surveyed. The survey was completed within a year starting from 1st February 2010 and completed on 31st January 2011. A total of 12,240 households were surveyed, and among them 7,840 households were in rural areas and 4,400 were in urban areas.

3.1 Impact of Education on Health and Health-related behavior

This section investigates the relation between well-being and healthy practices with the education levels of the individuals in the household. Grossman's health capital model theorizes the foundation for the analysis of the demand for health (Grossman, 1972a, 1972b). According to this theory, education may affect on personal health through productive and allocative efficiency. Productive efficiency purportedly causes better health and healthier behavior through a person's ability to produce better health with a given set of inputs. Better-educated persons acquire better health outcomes as they are more informed about nutritional value of the inputs than the less educated. Education equips a person with the knowledge of effects of medical care, cigarettes, alcohol, exercise, etc. which has an impact on his or her behavior and consumption patterns and consequentially affects the health outcomes. Education improves health, as a more educated person has greater opportunity to be employed in better-paying jobs, has greater access to resources like access to health care and consumes healthy inputs. This is consistent with the finding that the health returns to educations increased during 1980s and 1990s at a time when the labor returns on education also increased (Autor, Katz and Kearney 2005). Education enables one to invest more into one's own health and be more likely to afford life-enhancing goods and services. Again, although educated people earn more, this may also increase their demand for health-depreciating goods like cigarettes and alcohol, and they are more likely to be employed in jobs causing sedentary lifestyles. An educated person knows how to allocate and use time, enters into the labor market late and starts employment with relatively high income which has direct health effects. This study accepts the health-

influencing effects of education and its working channels and deems that people with more education and better-quality education experience better health outcomes in their lives. This estimation is based on the following logit model:

$$Y = Log_e[\frac{P(Y=1|X_1,\cdots,X_n)}{(1-P(Y=1|X_1,\cdots,X_n)]} = Log_e\left[\frac{p}{1-p}\right] = \alpha + \beta_1 X_1 + \cdots \beta_n X_n$$

The model estimating well-being and healthier practices is a logistic regression model and in which the coefficient of independent variables is expressed as the odd ratio favoring or disfavoring the binary outcomes of the dependent variables. If the odd ratio is more than 1, it favors the positive outcome; if less than 1 then the odd of occurring the success in the dependent variable is less compared to the odd of the reference group. The binary dependent variables are well-being, whether the women have given birth at a health care institution, availed prenatal and postnatal consultation, have access to hygiene latrines and safe sources of drinking water. Here, the dependent variable, Y=1 if any individual experiences better health and has access to healthier practices and the X_1…….Xn are independent variables and among the independent variables, the variable of interest is the educational attainment of an individual.

The Sustainable Development Goals (SDGs) require bringing down the neonatal death rates, under five mortality and maternal deaths rates to 12 per 1,000, 25 per 1,000, and 70 per 1,00000 respectively and prenatal and postnatal care and consultation play a crucial role in reducing infant and maternal mortality rates. The Norway-India Partnership Initiative found in villages in Bihar, India that the visits and provisions of basic care to newborns at home help prevent newborn deaths. This initiative aimed at breast feeding practices, vaccination, child weight and provided information on maternal and neonatal care. The reduction of infant and maternal mortality requires prioritization of the intrapartum period and intrapartum care strategies that can bring maternal mortality down (*The Lancet* Maternal Survival Series steering group, 2006). Thus, the following equation examines the well-being and access to healthier practices in relation to the educational attainment:

$$Y_i = \beta_0 + \beta_1 Schoolyears_i + \beta_2 Log\ (Age_i) + \beta_3 Log\ (squared\ Age_i) + \beta_4\ (Educationinv_i) + \beta_5\ (Children_i) + \beta_6 Log\ (Dwelling\ asset_i) + \beta_7\ (Totland_i) + \beta_8\ (Income_i) + \varepsilon_i$$

Here, dependent variable Y_i is the well-being and status of access to healthier

practices of individual ***i***. The variable of interest, education is taken here as the total school years and also has been decomposed into different levels of educational attainment. Educational investment is the expenditure made by the household ***i*** and chosen as controls because well-being and investment in health in the household are constrained among other things by decision regarding investment in children's education and the number of children in the household *i*. A low-income household will take into consideration the investment in health that affects family income and the cost of investment in education. As investment on education offers brighter prospect for the children, families may dispense with their health-related investments, and thus educational investment affects the health and well-being-related outcomes in the household *i*. This is equally true for other health related decisions used as dependent variables. The other independent variables are dwelling asset and total land of the household ***i*** and income of the head of the household and number of children in the household ***i***. For well- being of men, in addition to these independent variable, it is control for men's experience not age because it is probable that experience has better association to their respective health and since most of the females are not engaged in formal employment, we have control women's well-being for their age. Experience is calculated from their age subtracting school starting age which is six and number of years an individual has attended school. Education itself does not directly reduce the maternal mortality or infant mortality but better educated mothers are aware of the benefits and consequences of harmful lifestyles, and have prenatal and postnatal care, institutional birth, safe sources of drinking water, and hygienic latrines usable to them.

3.2 Data and Variables

The education system in Bangladesh is not uniform and varies among public and private provisioned education in Bangla language, privately supplied education in English language and education provided by the religious institutions. Religious institutions also differ in contents and curriculums. Some institutions follow curriculums that contain both religious and non-religious contents of national curriculums, and some supply purely religious education in Arabic. Quality of education rendered differs as well among and between public, private and religious institutions. Even the employment prospects for religious and other institutions are not the same.

There are discrepancies in tertiary education because one could have a graduate

degree with two, three and four years of schooling after higher secondary education. Moreover, the survey does not provide any information about which type of graduate degree participants have. Since 1998, honors course in graduate level has been made of four years irrespective of institutions. But prior to 1998, honor's courses were both three and four years depending on course and institution, and two years degree pass course was made three years in 2003. To get around this problem age, institution type has been taken into consideration and assigned the schooling years one has completed. Those who were 40 years of age or younger in 2010 and passed from university or colleges have been assigned with 16 years of schooling and those who were more than 40 years of age and passed from colleges and universities have been assigned with 14 years of schooling. Those who had vocational and technical education were assigned 10 years of schooling, because the survey does not include information on what level of vocational and technical education one has, and one can take short vocational and technical courses (and also secondary and higher secondary comparable vocational and technical education) after completion of 8 or 9 years of education. The sample having vocational and technical education for women is very small, so even if there is any overestimation, it may not have a significant effect on outcomes of variables. In regression with the education level variable, the reference group is people with no education or who have fewer than 5 years of schooling. People who have 5 but less than 10 years of schooling, have been assigned to have primary and some secondary education and people having secondary and higher secondary education is leveled as "SscHsc" education. People who have 10 years or 12 years equivalent technical education and vocational training is leveled as "Tvet" and level 3 consists of people with tertiary educations.

For well-being and health-related outcomes in relation to education, the dependent variables are whether the head of the household, or his/ her spouse has reported being in good health, the usability institutional childbirth, the use of prenatal and postnatal consultation, use of hygiene mode of defecation, and has access to safe drinking water. The HIES 2010 data does not include any information on self-reported health status, but it provides the information related to health and wellbeing. The survey asked the respondents what chronic illness/disabilities they suffered from. It provides 15 categories of chronic illness and disability which are fever, injuries-disabilities, heart diseases, breathing troubles, dysentery, gastric/ulcer, blood pressure, rheumatism, eczema, diabetes, cancer, leprosy, paralysis, epilepsy and others to be specified by the respondent. Another health-related question the survey asked was what symptoms/diseases respondents

suffered from.

Since HIES-2010 data does ask its respondent to use a scale in order of best to worst to report their health status like other papers have used, we constructed a kind of reported health status on this information of diseases. Anyone suffering from any of the fifteen chronic illness/disabilities was deemed to report in bad health, and those not suffering from these chronic illness/disabilities was deemed to be in good health. The reasons are someone suffering from chronic diseases must suffer for a long period and these diseases limit daily activities related to livelihood. It requires continuous medical treatment and according to National Center for Chronic Disease Prevention and Health promotion (NCCDPHP), United States of America seven in ten deaths each year results from chronic diseases. To construct the well-being variable, people who did not report suffering from any of these diseases, take the value Y = 1 representing good health and Y = 0 if suffering from any of these diseases represents poor health. Likewise, to estimate the healthy behaviors (institutional birth, prenatal and postnatal care, access to sanitation and safe drinking water), the dependent variable Y takes the value 1 for positive out comes and 0 otherwise.

This paper deems childbirth safe if childbirth took place at any health care centers. The health care centers where women gave birth are satellite clinic, union health and family welfare center (UHFWC), upazilla health complex, district hospitals, NGO health center, medical college hospital, and private hospitals. Births were assisted by family member, neighbor and trained and untrained midwife, nurses and doctors. Bangladesh Directorate General of Family Planning (DGFP) established about 3,900 union health and family welfare centers in rural areas around the country. The one of the important services these health centers provide is normal delivery services round the clock in rural areas and for this DGFP has upgraded more than 50% of the UHFWCs with necessary staffs. The Family welfare Visitors posted at UHFWCs perform only about 0.3 percent of the deliveries and 64% of the deliveries occurred at home assisted largely by unskilled or traditional birth attendants (Noorunnabi Talukder et al., 2015). So, birth occurred at satellite clinic and UHFWCs could be said to be safe because if there were no delivery facilities and skilled attendants, these service centers would not have accepted to assist delivery and birth at home has not been considered safe as there is no way to ascertain whether it was assisted by skilled birth attendant or not. Other facilities like upazilla health complex, district hospital, NGO health center (NGOs that have permission, must have resources to

work in respective field), medical college hospitals and private hospitals has both or either skilled birth attendant or gynecology division to assist birth.

This model also seeks to investigate education levels and hygiene way of defecation. Education is supposed to make people aware of the benefits of hygienic latrines. HIES (2010) asked the respondents what types of latrines they used for defecation. They were given six options to choose from. These options were sanitary, water sealed *pacca*[1] latrine, *pacca* pit latrine, permanent or temporary open pit *kacha*[2] latrine and if none of these latrine types were present, respondents were asked to specify. This paper regarded sanitary latrine, water sealed *pacca* latrine and *pacca* pit latrines as hygienic latrine.

4. Estimated Results:

4.1 Well-Being and Education

Well-being of the male heads of the household and their spouses are estimated and reported as odd ratio as opposed to the reference group. Reference group consists of people who have no schooling or less than five years of schooling. In first regression (Table 1), women's well-being is regressed on the years of school a woman attended which is Fm_ Schooling and controlled for her age, Fm_Age, household investment in education, ln edu_ investment, number of children in the household, HH_Children, and ln_dwelling_asset and ln total_land that are dwelling asset and total land a household possess. The sample is divided into two groups in respect of the mode of earning of the household head namely monthly wage earner and daily wage earner and controlled for respective income.

Females' schooling year is positively associated with their well-being in both monthly wage and daily wage earners' subsample. In monthly wage earners' subsample, the odds of well-being among the spouses (not suffering from chronic disease) who have more or equal to five years of schooling is 1.03 times greater than the odds of well-being of the spouse who have no education or less than five years of education. Whereas, this odd in daily wage earners' subsample is 1.01 times the odds of well-being of the reference group. However, the association for the years of school attained by women in both subsamples are insignificant and no level of educational attainment except the secondary and higher secondary education in the monthly wage earners' subsample, significantly favored women's well-being. In monthly wage earner subsample, the odd of well-being among the women who have at least primary, but less than 10 years of schooling, secondary and

higher secondary education, and tertiary education are 1.17, 1.64 and 1.61 times odd of well-being of the people in the reference group. In daily wage earner group, though the association is insignificant only the women who have secondary and higher secondary education enjoy well-being by 1.37 times the odd of the reference group. In monthly wage earner subsample, women having technical education and vocational training predicts well-being successfully and so “Tvet” for women is dropped and 2 observation is not used. Again, in daily wage earner subsample, women with tertiary and technical education and vocational training respectively predicts well-being and failure to enjoy well-being perfectly and so they dropped, and two observation for tertiary and one for “Tvet” is not used.

The model estimated the well-being of the heads of the households, in relation to their school years using the same controls, and the results is reported in Table 2. For monthly and daily wage earner subsamples, the odd of well-being against the reference group is 0 .99. So, it could be said that the incidence of well-being among the people who have at least primary education as opposed to the people who have less than primary education is quite the same. Like women’s well-being, well-being of heads of the households is examined as well against their levels of educational attainment as opposed to reference group (household head with less than 5 years of schooling). The odds of well-being among people having primary and less than secondary education, secondary and higher secondary education, tertiary education and technical education and vocational training are respectfully 0.8, 1.13, 0.78 and 1.97 times the odd of well-being of the refence group in monthly wage earner subsamples. These odds for daily wage earner subsample against the odd of reference group are 1.04, 1.37, 0.37 and 0.53 respectfully. However, the coefficients of educational attainment levels for both wage groups are insignificant and people having secondary and higher secondary and technical and vocational training employed in monthly paid jobs enjoy better health outcome.

In daily wage earner subsample, better health outcome occurs among people with primary and secondary and higher secondary education. The reason well-being was not positively associated with individual having tertiary education may be related to the nature of occupation. We have investigated the monthly wage earners’ data and found that about 80% of the wage earners in HIES data for 2010 work for the government, autonomous bodies and private offices, and except for people employed in education sector and in some NGOs, these jobs are generally concentrated in urban areas and which could be upazilla head quarters to the bottom at least. Physical inactivity and unhealthy dietary

Table 1: Women's Well-Being and Education

VARIABLES	Well-being vs school years		Well-being vs Education	
	Monthly wage earner group	Daily wage group	Monthly wage earner group	Daily wage group
	Odds ratio	**Odds ratio**	**Odds ratio**	**Odds ratio**
Fm _primary			**1.166**	**0.95**
			0.205	**0.132**
Fm _SscHsc			**1.644****	**1.25**
			0.378	**0.652**
Fm _Tertiary			**1.614**	
			0.476	
ln edu_investment	**0.858****	**0.871*****	**0.847*****	**0.874*****
	0.0517	**0.0375**	**0.0517**	**0.0375**
HH_children	**1.066**	**1.029**	**1.076**	**1.027**
	0.0619	**0.0453**	**0.062**	**0.0453**
Fm_Age	**0.915****	**0.955**	**0.917****	**0.951**
	0.0384	**0.034**	**0.0386**	**0.0339**
Fm_agesqr	**1**	**1**	**1**	**1**
	0.000469	**0.000422**	**0.000471**	**0.000423**
ln dwelling_asset	**1.038**	**1.02**	**1.025**	**1.025**
	0.0631	**0.0582**	**0.0625**	**0.0585**
ln total_land	**1.042**	**0.977**	**1.043**	**0.978**
	0.0451	**0.0337**	**0.0452**	**0.0338**
ln monthly_wage	**0.902**		**0.892**	
	0.0872		**0.0862**	
Fm_Schoolyears	**1.03**	**1.01**		
	0.0183	**0.02**		
ln daily_income[3]		**1.275****		**1.270****
		0.124		**0.124**
Constant	**165.4*****	**3.843**	**209.5*****	**4.179**
	-189.3	**4.177**	**240.5**	**4.573**
Observations	**1,281**	**2,065**	**1,279**	**2,062**

Standard errors in parentheses, *** p < 0.01, ** p < 0.05, * p < 0.1

habit coupled with genetic predisposition lead to increased risk of abdominal adiposity, diabetes and cardiovascular disease (Qin et al., 2010). Prevalence of physical inactivity in 2002 in Bangladesh was 52.3% and inactivity was defined as people who never perform light/moderate activities (Ranasinghe, Ranasinghe, Jayawardena, & Misra, 2013). It is reasonable that the inactivity prevalence among the people employed in service sectors in

Table 2: Men's Well-being and Education

VARIABLES	Well-being vs school years		Well-being vs Education	
	Monthly wage earner	Daily wage earner	Monthly wage earner	Daily wage earner
	Odds ratio	**Odds ratio**	**Odds ratio**	**Odds ratio**
M_primary			**0.80**	**1.04**
			0.153	**0.139**
M_SscHsc			**1.13**	**1.37**
			0.24	**0.46**
M _Tertiary			**0.78**	**0.37**
			0.182	**0.246**
M_Tvet			**1.97**	**0.53**
			2.2	**0.47**
ln edu_investment	**0.95**	**0.92***	**0.934**	**0.92****
	0.056	**0.038**	**0.056**	**0.038**
Experience	**.877*****	**0.95****	**0.87*****	**0.95****
	0.025	**0.019**	**0.025**	**0.019**
Experience_sqr	**1.0012*****	**1**	**1.001*****	**1**
	0.0004	**0.00031**	**0.000433**	**0.000308**
HH_children	**0.994**	**0.998**	**0.999**	**1.001**
	0.055	**0.042**	**0.055**	**0.043**
ln dwelling_asset	**0.99**	**0.936**	**0.993**	**0.93**
	0.059	**0.052**	**0.059**	**0.052**
ln total_land	**1.07**	**0.97**	**1.061**	**0.97**
	0.046	**0.033**	**0.046**	**0.033**
ln monthly_wage	**1.14**		**1.12**	
	0.108		**0.107**	
M_Schoolyears	**0.99**	**0.99**		
	0.015	**0.016**		
ln daily_income		**1.29*****		**1.29*****
		0.123		**0.124**
Constant	**19.39*****	**4.66***	**25.96*****	**4.92***
	17.24	**4.19**	**23.63**	**4.46**
Observations	**1,308**	**2,093**	**1,308**	**2,093**

relatively densely populated urban area will be generally high and that may explain why the odds with the higher education is not positively associated to men's well-being. Another reason is people with higher education in the monthly wage earner subsample compared to daily wage earner group, is relatively better placed in respect of job security and stable income. Since they have secured job and stable source of income, their education makes

them aware of their health condition and they take care of their health and thus, the members of this income group can readily provide their health status.

The lowest two education levels for the daily wage earner's subsample favoring wellbeing may be because of their profession that require physical activity.

It is found that the household investment in children's education decreases the odds of well-being of both male and female. However, it is women's well-being that is more adversely affected by the household investment in education and this association is statistically significant for both income group. Although the severity of the adverse effect of household investment in education, compared to women is less to men, the relationship of household investment and men's well-being is significant in daily wage earners' subsample.

4.2 Healthy Practices and Education

Institutional birth or safe childbirth in relation to education is shown in Table 3. Women's years of schooling and level of educational attainment except at least primary education level in monthly wage earner subsamples, irrespective of their spouse's mode of earning, favor having women to have safe birth or birth in a health care institution. For the monthly wage earner subsample, the odds are 0.97, 2.41, 8.21 and 3.02 for at least primary, secondary and higher secondary education, tertiary and for technical and vocation education respectively to the odd of women who have less than five years of schooling giving safe birth. These odds for daily wage earner subsamples are 1.22 5.12, and 8.44 against the reference group.

Technical education and vocational training predict failure successfully and was dropped and one observation is not used. Except for odds associated with primary and technical and vocational education, all odds are significant to the level of 1% and for daily wage earner odds that is significantly and positively associated with safe birth is of secondary and higher secondary education. One of the reasons of higher odds of women with higher education giving birth at institutions is increasing number of women availing antenatal consultation. The percentage of women who had at least one antenatal consultation (ANC) in Bangladesh increased from 24.4 percent in 1991 to 60.3 percent in 2004 (Collin, Anwar, & Ronsmans, 2007). Another reason is increased incidence of caesarean delivery and it is highest among the higher educated women and lowest among the women without formal education in Bangladesh and caesarean section delivery increased from 3.5 percent in 2004 to 23% in 2014 and in private clinic and hospitals 80

Table 3: Safe birth, hygienic latrine uses and women's education

VARIABLES	Safe birth and Women's School years: Spouse monthly wage Earner	Safe birth and Women's School years: Spouse Daily wage Earner	Hygiene latrine and Female's School years	Hygiene latrine and Female's Education level
	Odds ratio	**Odds ratio**	**Odds ratio**	**Odds ratio**
Fm _primary	**0.97**	**1.22**		**1.68*** **
	0.19	**0.224**		**0.098**
Fm _SscHsc	**2.41*** **	**5.12*** **		**3.25*** **
	0.53	**2.32**		**0.44**
Fm_Tertiary	**8.21*** **	**8.44**		**7.74*** **
	2.44	**12.17**		**3.33**
Fm_Tvet	**3.02**	**-**		**-**
	4.33			
ln edu_investment	**1.20*** **	**0.939**	**1.30*** **	**1.33*** **
	0.08	**0.06**	**0.03**	**0.023**
Fmwellbeing	**0.53*** **	**0.56*** **	**1.01**	**1.002**
	0.083	**0.09**	**0.06**	**0.06**
HH_children	**0.84*** **	**0.84*** **	**0.90*** **	**0.90*** **
	0.05	**0.06**	**0.02**	**0.018**
ln dwelling_asset	**1.12***	**0.95**	**1.49*** **	**1.00*** **
	0.07	**0.08**	**0.04**	**7.64E-08**
ln total_land	**0.86*** **	**1.02**	**0.97** **	**0.984**
	0.04	**0.05**	**0.016**	**0.0157**
ln daily_income		**1.59*** **		
		0.25		
ln monthly_wage	**1.44*** **			
	0.164			
Fm_Schoolyears			**1.10*** **	
			0.01	
Pay_type			**1.29*** **	**1.31*** **
			0.10	**0.102**
Ru_Rban			**1.42*** **	**1.48*** **
			0.09	**0.09**
Constant	**0.00124*** **	**0.014*** **	**0.001*** **	**0.08*** **
	0.00126	**0.019**	**0.0003**	**0.013**
Observations	**1,308**	**2,092**	**7,423**	**7,536**

Standard errors in parentheses, *** p < 0.01, ** p < 0.05, * p < 0.1

Table 4: Safe drink source and women's education

VARIABLES	Safe drink source vs school years		Safe drink source vs education	
	Monthly wage earner	Daily wage earner	Monthly wage earner	Daily wage earner
Safedrink	**Odds ratio**	**Odds ratio**	**Odds ratio**	**Odds ratio**
Fm _primary			**2.22***	**0.51****
			1.02	**0.14**
Fm _SscHsc			**1.38**	**0.50**
			0.74	**0.53**
Fm_Tertiary			**1.13**	
			0.79	
ln edu_investment	**0.93**	**0.93**	**0.94**	**0.92**
	0.14	**0.09**	**0.14**	**0.09**
Fm_well-being	**0.58**	**1.30**	**0.54**	**1.30**
	0.25	**0.35**	**0.23**	**0.35**
HH_children	**1.12**	**0.98**	**1.05**	**0.97**
	0.17	**0.11**	**0.16**	**0.10**
ln dwelling_asset	**0.99**	**1.05**	**1.02**	**1.06**
	0.16	**0.15**	**0.17**	**0.15**
ln total_land	**1.17**	**0.99**	**1.18**	**0.99**
	0.15	**0.08**	**0.15**	**0.084**
ln monthly_wage	**0.82**		**0.89**	
	0.22		**0.23**	
RuRban	**1.42**	**1.08**	**1.55**	**1.09**
	0.57	**0.35**	**0.64**	**0.35**
Fm_Schoolyears	**1.07**	**0.92****		
	0.05	**0.04**		
ln daily_income		**1.99*****		**1.95*****
		0.38		**0.37**
Constant	**223.80****	**0.11**	**83.26***	**0.14**
	530.30	**0.21**	**196.5**	**0.27**
Observations	**1,281**	**2,065**	**1,306**	**2,090**

Standard errors in parentheses, *** p < 0.01, ** p < 0.05, * p < 0.1

percent of all deliveries are caesarean deliveries (Khan, Islam, Shariff, Alam, & Rahman, 2017).

Generally, women years of schooling have positive association with the household having access to hygienic latrine (Table 3). The odd of having a household access to hygienic latrine is 1.10 times of the odd of having access to hygienic latrine of the people

having less than five years of schooling and the association is significant to 1% level of significance. If women's educational attainment level is considered, odds associated to women's educational attainment of at least primary, secondary and higher secondary, and tertiary education are respectively 1.68, 3.25 and 7.74 times the odd of access to hygienic latrine of the reference group and these odd ratios are significant to the 1% level of significance. Technical and vocational education predicts success or access to hygienic latrine successfully and dropped and 7 observation is not used.

Healthier practices like women having availed prenatal and postnatal consultation by women is examined in relation to their individual school years and level of education (Appendix A). Practices such as availing prenatal and postnatal consultation also have significant favorable association with education. The odds associated with all education levels favor women having prenatal and postnatal consultations and increased education levels favor the odds increasingly of having used these services. The Women's education in monthly wage earner subsample have positive association with access to safe source of drinking water (Table 4). Compare to reference group, the odds are 2.22, 1.38, and 1.13 for educational attainment of at least primary, secondary and higher secondary and tertiary education respectively and odd ratio with primary education is significant to 10% level of significance. In daily wage earner subsample, these odds are 0.51, 0.50 associated to women's education of at least primary and secondary and higher secondary education and odd ratio with the attainment of at least primary education but less than 10 years of education is significant to 5% level of significance and these odds mean that the people with less than primary education has 2 times the odd of access to safe drinking by the people having primary, secondary and higher secondary education. This relation in case of daily wage earner subsample is not clear and demands further investigation. One probable explanation is, this relation can be affected through the marriage market matching in urban area for the daily wage earners' subsample.

5. Conclusion:

In policies to reduce child, infant and maternal mortality, Bangladesh has mostly emphasized the provision of services and infrastructures, and factors important for the households to make decisions to use the services of pre and postnatal consultation women giving safe childbirth, use of hygienic latrine etc. are poor behavioral practices by the health professional, financial, distance to the health care facilities, social factors like

neighbor influence and cultural issues. Most of the factors mentioned here could be eased through the attainment of education. Besides, non-governmental organizations and government of Bangladesh has also taken extensive awareness program relating to the importance of nutrition, regular consultation during pregnancy, how to make family prepare for delivery during emergency, breast feeding. It also has taken measure to sensitize for the benefit of use hygienic latrine, building practices among people to wash hands properly after defecation in the form of performance of street drama, drama dedicated to these factors televised in public radio and television during prime time. However, formal education is the channel that is not used as strenuously. This paper finds that irrespective of their spouses' ways of earning, women's years of schooling has positive association with their well-being, but the coefficient is insignificant. Men and women with secondary and higher secondary education in both monthly and daily wage earner group enjoy well-being more than that of the people with less than primary education. This association for secondary and higher secondary education is significant in case of women in monthly wage earners' subsample. Men's wages favor wellness and but their educational attainment does not, and odd ratio of daily wage is significant to 1% level of significance. The reasons for this may be explained by the nature of their profession in monthly wage earners' subsample. Whereas in daily wage earner subsample, uncertainty of the employment and income along with miss match of profession with expectation and education may explain the negative relation of education and well-being and match of profession and income probably have positively affected the well-being in daily wage earner subsample.

Education in respect of safe childbirth and use of hygienic latrine, this paper finds that the households with higher levels of education tend to choose safer modes of childbirth. Patterns of hygienic latrine use have positive and significant associations with all level of educational attainment. Investment made in education adversely affects the well-being of the heads of the households and their spouses and it affects women's well-being more adversely, but investment made in education is crucial to prevent intergenerational poverty (Harper, Marcus, & Moore, 2003) and for growth and development of the country. However, it is father's well-being that determines the continuity of children education not the mother's (Glick, Sahn, & Walker, 2016). Bangladesh has been implementing project like Primary Education Stipend Program, Secondary Education Quality and Access Enhancement Project, Secondary education Investment Program to provide financial assistance to poor households that send children

to school. Since, education has positive association to women's health and healthier practices and household investment in education has health depreciating effect, government of Bangladesh should transfer more through these kinds of projects and programs to complement poor households' investment in education. This could be a way for Bangladesh to achieve better education and health outcomes.

Acknowledgement

Earlier versions of this paper have been presented in the 4th International Conference on Business and Economics: Spectrum of Opportunities through Innovation and Technology organized by Faculty of Business Studies, University of Dhaka, Bangladesh (October 29–30, 2019) and 3rd International Conference of Economic Structures 2019 (ICES 2019) at Ritsumeikan University (18–19 march,2019), Japan. We appreciate the chairpersons and discussants of the above conferences for their useful comments. We also grateful to the editor and anonymous referees of the journal. Any errors are solely the authors' responsibility.

Notes

1 made of cement and bricks

2 made of mud, bamboo or corrugated iron sheet

3 Daily_income = daily average wage*number of days a laborer work in a month

References

Bhalotra, S., & Rawlings, S. B. (2011). Intergenerational persistence in health in developing countries: The penalty of gender inequality? *Journal of Public Economics*, *95* (3–4), 286–299. https://doi.org/10.1016/j.jpubeco.2010.10.016

Chowdhury, A. M. R., Bhuiya, A., Chowdhury, M. E., Rasheed, S., Hussain, Z., & Chen, L. C. (2013). The Bangladesh paradox: Exceptional health achievement despite economic poverty. *The Lancet*, *382* (9906). https://doi.org/10.1016/S0140-6736(13)62148-0

Clarke, R., Emberson, J., Fletcher, A., Breeze, E., Marmot, M., & Shipley, M. J. (2009). Life expectancy in relation to cardiovascular risk factors: 38 year follow-up of 19 000 men in the Whitehall study. *BMJ (Online)*, *339* (7725). https://doi.org/10.1136/bmj.b3513

Cole, M. A., & Neumayer, E. (2006). The impact of poor health on total factor productivity. *Journal of Development Studies*, *42*(6), 918–938. https://doi.org/10.1080/

00220380600774681

Collin, S. M., Anwar, I., & Ronsmans, C. (2007). A decade of inequality in maternity care: Antenatal care, professional attendance at delivery, and caesarean section in Bangladesh (1991–2004). *International Journal for Equity in Health*, *6*, 1–9. https://doi.org/10.1186/1475-9276-6-9

Cutler, D. M., & Lleras-Muney, A. (2010). Understanding differences in health behaviors by education. *Journal of Health Economics*. https://doi.org/10.1016/j.jhealeco.2009.10.003

Dahl, E., & van der Wel, K. A. (2013). Educational inequalities in health in European welfare states: A social expenditure approach. *Social Science and Medicine*, *81*. https://doi.org/10.1016/j.socscimed.2012.12.010

Glick, P. J., Sahn, D. E., & Walker, T. F. (2016). Household shocks and education investments in Madagascar. *Oxford Bulletin of Economics and Statistics*, *78* (6), 792–813. https://doi.org/10.1111/obes.12129

Gøtzsche, P. C., & Jørgensen, K. J. (2013). Screening for breast cancer with mammography - Cochrane Database Syst Rev. *The Cochrane Library*, *39* (6). https://doi.org/10.1002/14651858.CD001877.pub5.

Guldan, G. S., Zeitlin, M. F., Beiser, A. S., Super, C. M., Gershoff, S. N., & Datta, S. (1993). Maternal education and child feeding practices in rural Bangladesh. *Social Science and Medicine*, *36* (7). https://doi.org/10.1016/0277-9536(93)90084-H

Harper, C., Marcus, R., & Moore, K. (2003). Enduring poverty and the conditions of childhood: Lifecourse and intergenerational poverty transmissions. *World Development*, *31* (3), 535–554. https://doi.org/10.1016/S0305-750X(03)00010-X

Johnston, D. W., Lordan, G., Shields, M. A., & Suziedelyte, A. (2015). Education and health knowledge: Evidence from UK compulsory schooling reform. *Social Science and Medicine*, *127*. https://doi.org/10.1016/j.socscimed.2014.10.026

Khalid, M. (2014). *Human Development Report 2014 Sustaining Human Progress: Human Development Report 2014 Team Director and lead author*. New York, USA.

Khan, M. N., Islam, M. M., Shariff, A. A., Alam, M. M., & Rahman, M. M. (2017). Socio-demographic predictors and average annual rates of caesarean section in Bangladesh between 2004 and 2014. *PLoS ONE*, *12* (5), 1–15. https://doi.org/10.1371/journal.pone.0177579

Kim, J. (2010). *ADB Economics Working Paper Series*. (218).

Lim, S. S., Updike, R. L., Kaldjian, A. S., Barber, R. M., Cowling, K., York, H., … Murray, C. J. L. (2018). Measuring human capital: a systematic analysis of 195 countries and territories,

1990–2016. *The Lancet*, *392*(10154). https://doi.org/10.1016/S0140-6736(18)31941-X

Liu, S. Y., Walter, S., Marden, J., Rehkopf, D. H., Kubzansky, L. D., Nguyen, T., & Glymour, M. M. (2015). Genetic vulnerability to diabetes and obesity: Does education offset the risk? *Social Science and Medicine*, *127*. https://doi.org/10.1016/j.socscimed.2014.09.009

Matsuoka, S., Aiga, H., Rasmey, L. C., Rathavy, T., & Okitsu, A. (2010). Perceived barriers to utilization of maternal health services in rural Cambodia. *Health Policy*, *95*(2–3). https://doi.org/10.1016/j.healthpol.2009.12.011

Montez, J. K., & Hayward, M. D. (2014). Cumulative Childhood Adversity, Educational Attainment, and Active Life Expectancy Among U.S. Adults. *Demography*, *51*(2). https://doi.org/10.1007/s13524-013-0261-x

Noorunnabi Talukder, M., Rob, U., Zafar Ullah Khan, A., Rahman Noor, F., Roy, S., & Fatema Noor, A. (2015). *Union Health and Family Welfare Centers in Chittagong and Munshiganj Are They Ready to Provide 24-Hour Normal Delivery Services?* Retrieved from https://www.popcouncil.org/uploads/pdfs/2015RH_UHFWCs-ChittagongMunshiganj.pdf

Qin, L., Corpeleijn, E., Jiang, C., Thomas, G. N., Schooling, C. M., Zhang, W., … Lam, T. H. (2010). Physical activity, adiposity, and diabetes risk in middle-aged and older Chinese population: The Guangzhou Biobank cohort study. *Diabetes Care*, *33*(11), 2342–2348. https://doi.org/10.2337/dc10-0369

Rana, A. K. M. M., Wahlin, Å., Lundborg, C. S., & Kabir, Z. N. (2009). Impact of health education on health-related quality of life among elderly persons: Results from a community-based intervention study in rural Bangladesh. *Health Promotion International*, *24* (1). https://doi.org/10.1093/heapro/dan042

Ranasinghe, C. D., Ranasinghe, P., Jayawardena, R., & Misra, A. (2013). Physical activity patterns among South-Asian adults: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, *10*. https://doi.org/10.1186/1479-5868-10-116

Ribound, M., Savchenko, Y., & Tan, H. (2007). *The Knowledge Economy and Education and Training in South Asia*. (May).

Ross, C. E., & Wu, C. (2006). The Links Between Education and Health. *American Sociological Review*, *60* (5). https://doi.org/10.2307/2096319

Sharma, R. (2018). Health and economic growth: Evidence from dynamic panel data of 143 years. *PLoS ONE*, *13* (10), 1–20. https://doi.org/10.1371/journal.pone.0204940

Tilak, J. B. G. (2007). Post-elementary education, poverty and development in India. *International Journal of Educational Development*, *27* (4). https://doi.org/10.1016/j.ijedudev.2006.09.018

von dem Knesebeck, O., Verde, P. E., & Dragano, N. (2006). Education and health in 22 European countries. *Social Science and Medicine*, *63* (5). https://doi.org/10.1016/j.socscimed.2006.03.043

WHO (2014), *United Nations Children's Fund. Committing to Child Survival: A Promise Renewed. Progress Report.*

Appendix A: Prenatal and postnatal consultation and education

VARIABLES	Prenatal consultation and education		Postnatal consultation and education	
	School Years	Education Level	School Years	Education Level
	Odds ratio	**Odds ratio**	**Odds ratio**	**Odds ratio**
Fm _primary		2.079***		1.741***
		0.116		0.144
Fm _SscHsc		4.752***		3.681***
		0.513		0.444
Fm_Tertiary		9.274***		6.661***
		2.118		1.234
Fm_Tvet		3.932		6.218**
		3.308		4.809
ln edu_investment	0.9996206	1.008	1.013	1.024
	0.0196094	0.0196	0.0294	0.0298
Fm_well-being	0.928643	1.014	0.854**	0.894
	0.0504674	0.0542	0.0654	0.0684
HH_children	1.142139 ***	1.150***	1.140***	1.141***
	0.0223046	0.022	0.0322	0.0316
ln dwelling_asset	1.057677**	1.048**	1.191***	1.183***
	0.0248658	0.0244	0.0393	0.039
ln total_land	.8945597 ***	0.896***	0.892***	0.893***
	0.0136143	0.0135	0.02	0.02
n_RuRban	1.031015	1.036	0.764***	0.757***
	0.0621877	0.0622	0.067	0.0668
Pay_type	.8613796**	0.850**	1.064	1.055
	0.0602463	0.0591	0.0944	0.0945
Fm_Schoolyears	1.138625 ***		1.124***	
	0.008002		-0.0104	
Constant	.335885 ***	0.333***	0.0120***	0.0127***
	0.089719	0.0884	0.00454	0.0048
Observations	7,423	7,540	7,423	7,540

Standard errors in parentheses, *** p < 0.01, ** p < 0.05, * p < 0.1