

# Effect of Strenuous Occupation on Health: A study on rural Bangladesh

**Authors:**

Md. Azhar Uddin  
Institute of Health Economics  
University of Dhaka

K.M. Nafiz Ifteakhar  
Institute of Health Economics  
University of Dhaka

Presented by:  
Md. Azhar Uddin

Presented at SANEM Annual Economists' Conference, 2016

Date: 20 February, 2016

# Outline of the Presentation

- Background
- Objective
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- Theoretical framework
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- Results and discussion
- Findings and recommendations
- Conclusion

# Background

- Health is as desired as other commodities. To maintain a good health people need proper diet, good livings and so on, which can be availed by earnings from work.
- Occupation can be physically demanding i.e. Rickshaw pulling; others require mental effort i.e. teaching. There are ample of evidences which show that occupation demanding high physical involvement can causes negative impact on health, mainly focused on formal sector of urban workforce mostly from developed countries.
- We know very little about how the health of rural labor in developing and less developed countries (i.e. Bangladesh), are influenced by occupations which are predominantly manual and requires high physical involvement.

# Background

In Bangladesh

- about 75.5% of labor force are active in rural areas. Those who are working in rural areas, about 70% of them are male having 83.3% participation rate (Labor Force Survey 2010).
- These labor are characterized by low level of education and health related awareness, less access to necessary health services, suffering from both economic and nutritional poverty.
- On the other hand the rural production technology is still solely labor based and because of this, labor time and effort is critical to health of labor.

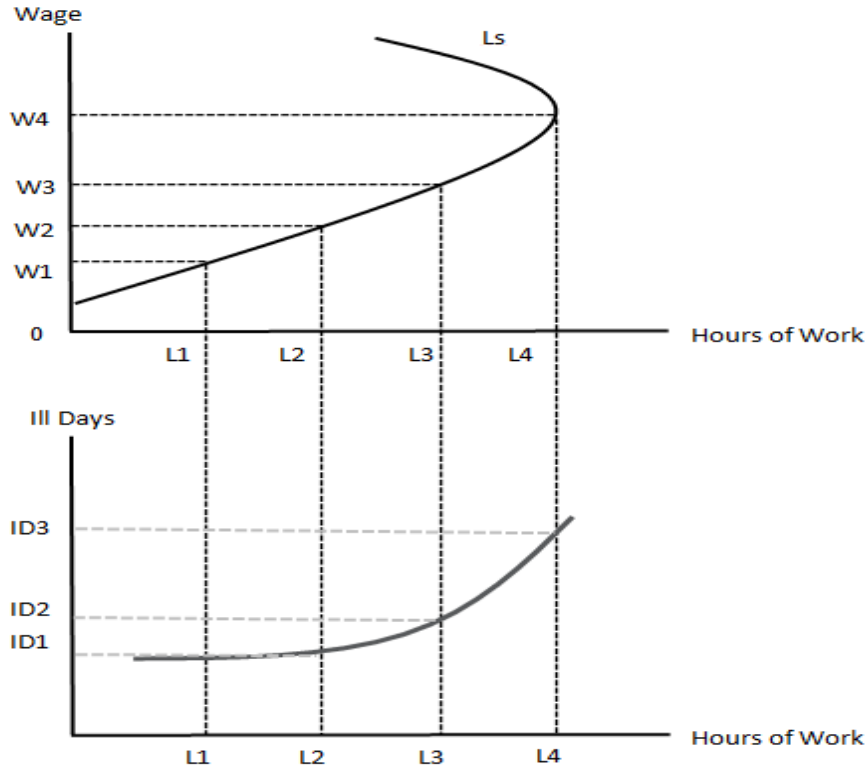
# Objectives

- To find the effect of strenuous occupation measured in terms of **longer working hour** on health of the rural labor force of Bangladesh.
- To figure out if there prevails any adverse effect of longer working hour on labor's health, conditional on **occupation classification**.

# Literature review

- A. E. Dembe et al. (2005) found association between extended working hours and occupational injuries and illness. Nathell et al. (2000) found that for manual labor (agriculture worker) the incidence of respiratory disease is higher than the service worker.
- Another study based on longitudinal survey confirms that occupation types do have impact on self-reported health (Gueorguieva et al, 2009).
- Review of past studies confirm that most of them are suffered by the biasness due to the presence of reverse causality among health and occupation.
- And at the same time most of the earlier studies in this area considered self-reported health status to measure health which may not capture the actual health status uniformly among the sample.

# Theoretical framework



# Methodology

**Data** - “Bangladesh Integrated Household Survey 2012” - a village level household survey conducted by IFPRI from October 26, 2011 to March 15, 2012. The sample size comprises of 10,233 working age labor (aged between 15 and 65), both female and male.

**Regression model** - ‘Censored Poission’ model.

**Dependent variable** - ‘health status’ , measured as total number of ill days in last four week from the day of survey. Someone can be ill for more than 4 weeks preceding the survey date which is top coded as 31 days in the survey. This results in censored dependent variable.



# Methodology

**Key independent variables** - 'daily hours of work' is used as predictor of occupation strenuousness (A. E. Dembe et al., 2005), dummies for occupation classification in terms of contract (i.e. wage, salary and self-employed labor) as well as in terms of types of activity (i.e. farm, non-farm) and their interaction terms with 'daily hours of work'.

**Other control variables** - age, education level, gender, monthly labor income, monthly labor income of other family members, sanitation facility, physical disability, nutritional poverty, body mass index (BMI), distance from health facility, feed the future zone dummy has been included to standardize for the individual and family characteristics.

# Methodology

## Estimation Challenges and proposed remedy

- **Reverse causality** among ‘hours of work’ and health of labor which implies that not only hours of work could affect the health of labor but also the health could affect the ‘hours of work’.
- ‘hours of work’ – the labor supply can not be estimated directly as wage rate and labor supply are **determined simultaneously** in the labor market.

To overcome these problems we have modeled a three equation simultaneous equation system.

# Methodology...

## Simultaneous equation model

$$\text{health} = \beta_0 + \beta_1 \text{ daily hours of work} + \gamma Z_1 + \mu_1 \text{ ----- } (1)$$

$$\text{daily hours of work} = \alpha_0 + \alpha_1 \text{ health} + \alpha_2 \text{ wage rate} + \theta Z_2 + \mu_2 \text{ ----- } (2)$$

$$\text{wage rate} = \delta_0 + \delta_1 \text{ daily hours of work} + \pi Z_3 + \mu_3 \text{ ----- } (3)$$

- There are no substantial literatures that confirmed that number of dependents per earner should appear in the STRUCTURAL equation of HEALTH OF LABOR. On the other hand there are ample of studies that have used number of dependents per earner as an important exogenous variable in the STRUCTURAL equation of labor supply. So number of dependents per earner is used as an IV of hours of work to estimate equation of health (the equation 1)
- **Experience** has been used as an IV to estimate labor supply equation (equation 2) by following the methodology of Wooldrich (2002).

Variables	Obs.	Mean	Std. Dev.	Min	Max
Ill days	10233	4.19	9.15	0	31
Female	10233	0.39	0.49	0	1
No education	10233	0.42	0.49	0	1
Primary	10233	0.29	0.46	0	1
Secondary	10233	0.25	0.44	0	1
Higher Secondary and above	10233	0.04	0.18	0	1
Daily working hour	10233	4.93	3.48	0	16.5
Non-farm	10233	0.33	0.47	0	1
Wage	10233	0.16	0.37	0	1
Salary	10233	0.05	0.23	0	1
Self-employed	10233	0.79	0.41	0	1
Daily per labor calorie consumption (aged 15 to 65)	10233	2530	802.78	0	6596.2
Nutritional poverty dummy (kcal<1805)	10233	0.13	0.33	0	1
Monthly labor income	10233	3422.10	5194.55	0	144000
Number of dependents per earner	10233	2.04	1.53	0	12
Distance from nearest health post (km)	10233	1.28	0.56	1	4
Physical disability dummy	10233	0.29	0.45	0	1
Sanitary toilet (Water sealed)dummy	10233	0.27	0.45	0	1
Feed the future zone dummy	10233	0.33	0.47	0	1

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# Regression Results

Dependent variable: number of ill days		
	Model 1 – Contract	Model 2 – Activity
Explanatory Variables	Coefficient	Coefficient
<b>Female</b>	<b>-0.122***(0.02)</b>	<b>-0.142***(0.023)</b>
Age	0.04***(0.005)	0.049***(0.005)
Age sqr (square of age)	-0.0005***(0.0001)	-0.00051***(0.0007)
Primary (dummy, base category is no education)	0.09***(0.021)	0.098***(0.021)
Secondary (dummy, base category is no education)	-0.03(0.024)	-0.031(0.024)
<b>Higher secondary or above(dummy, base category is no education)</b>	<b>-0.19***(0.06)</b>	<b>-0.24***(0.057)</b>
BMI (Dummy, =1 if BMI index is between 18 and 25)	-0.16***(0.018)	-0.165***(0.018)
Labor monthly income	-0.0132***(0.002)	-0.012***(0.002)
Other family member income	-0.0013(0.001)	-0.0017(0.001)
<b>Nutritional poverty (Dummy, =1 if kcal&lt;1805)</b>	<b>0.11***(0.025)</b>	<b>0.113***(0.025)</b>
<b>Distance from nearest health post</b>	<b>0.25***(0.022)</b>	<b>0.248***(0.022)</b>
Physical disability (Dummy,=1 if any physical disability)	0.37***(0.029)	0.37***(0.029)
Pacca toilet(Dummy, base category kacha toilet)	-0.14***(0.021)	-0.142***(0.021)
<b>Sanitary toilet (Dummy, base category kacha toilet)</b>	<b>-0.11***(0.025)</b>	<b>-0.11***(0.025)</b>

## Dependent variable: number of Ill days

	Model 1 – Contract	Model 2 – Activity
Explanatory Variables	Coefficient	Coefficient
Daily hours of work+ +	0.19***(0.025)	0.15***(0.016)
Wage (wage labor dummy, base category is self-employed work)	0.53*(0.31)	-
Wage*average daily hours of work (interaction terms)	-0.10**(0.05)	-
Salary (salary labor dummy, base category self-employed labor)	-0.79(0.62)	-
Salary*average daily hours of work (interaction term)	0.05(0.09)	-
Non-firm (non-firm dummy, =1 if labor is involved in non-firm activity)	-	0.24**(0.12)
Non-farm*average daily hours of work (interaction term)	-	-0.06***(0.022)
FTF (feed the future zone dummy, =1 if labor is belongs to feed the future zone)	0.27***(0.018)	0.27***(0.018)
Constant	-1.77***(0.13)	-1.63***(0.12)
Test Statistics		
N	10233	10233
Wald chi square	2794***	2771***
AIC Statistics	4.9	4.9
LM Value	3007***	3006***
Test of endoginity (Hausman)- chi2(16)	39.11***	86.81***

Note: \*\*\*, \*\* and\* indicate statistical significance at the 1, 5 and 10 percent levels respectively. ++ indicates the predicted value from first stage regression. The figures in the parentheses are the standards errors.



# Findings and Recommendations

- Differential adverse effect of occupations and working hour on health of rural labor has been found even after controlling for several individual, family and behavioral characteristics.
- Day by day non-farm sector is absorbing labor at an increasing rate, as a result higher ill days of non-farm labor compare to farm labor will result in productivity loss.
- Literature endorses that education improves health status of labor. Furthermore, current study found that education level of labor has to be high enough (HSC and above) to have any positive impact on health.

# Findings and Recommendations

- Estimated coefficient of 'distance from nearest health post' suggests that improvement of health system at primary level through establishing more health posts will increase accessibility to health services, hence the health of labor.
- Labor residing in FTF zone have lower health status compare to the rest which could impede the goal of FTF initiatives. To enhance the outcome of FTF initiatives health related interventions for labor should be included.

# Conclusion

- Therefore, it is clear that current study results have several useful policy implications.
- However, there is further scope in defining the risk factors of strenuous occupations to formulate more pragmatic and effective policy suggestion for betterment of rural labor and labor force as a whole.

**Thank You**