Abstract: Objectives: The informal sector is the dominant area of employment and the economy for any developing country including Bangladesh. The cost of productivity loss due to absence from work or presenteeism with illness has rarely been examined in the Bangladesh context. This current study, therefore, attempted to examine the impact of ill health of informal sector workers on labor productivity, future earning, and healthcare-related expenditure. Methodology: A cross-sectional survey was conducted among three occupational groups of informal workers (rickshaw pullers, shopkeepers, and restaurant workers) that were generally found in all urban areas in Bangladesh. A total of 557 informal workers were surveyed for this study. Results: Most of the respondents (57%) reported that they had been affected by some type of illness for the last six months. The overall average healthcare expenditure of informal workers was US $48.34, while restaurant workers expended more (US$53.61). Self-reported sickness absenteeism was highest (50.37 days) in the case of shopkeepers, followed by rickshaw pullers (49.31 days), in the last six months. Considering the income loss due to illness in the past six months, the rickshaw pullers were exposed to the highest income loss (US$197.15), followed by shopkeepers (US$151.39). Conclusions: Although the informal sector contributes the most to the economy of Bangladesh, the workers in this sector have hardly any financial protection. This study provides critical clues to providing financial and social protection to informal sector workers in Bangladesh. (J Occup Health 2016; 58: 209-215) doi: 10.1539/joh.15-0219-FS

Key words: Absenteeism, Informal worker, Presenteeism, Productivity loss
informal sector. The informal sector alone contributes to 63.6% of total GDP, and 75.3% of this comes from the nonagricultural sector. On the other hand, the working conditions of informal sector workers are unsafe and unhealthy. They work long working hours and have low wage rates. It is thus very likely that workers in the informal sector may be more prone to ill-health because they belong to a low-income group with hazardous working conditions.

Inadequate safety and health standards and environmental hazards are particularly evident in the case of informal sector workers. It has been reported that workers in the informal economy suffer from colds, fever, skin disease, respiratory problems, eye problems, electric shock, malnutrition, parasitic diseases, asthma, skin allergies, chemical poisoning, food poisoning, musculoskeletal disorders, traumatic injury, musculoskeletal problems, backache, and muscle disorder symptoms. However, occupational illness is generally less visible and not adequately recognized as a problem in low-income countries. Health is an important indicator explaining an individual’s productivity, and good health reduces morbidity, increases longevity, and decreases sickness absence, resulting in a longer career. Poor health, on the other hand, can affect individual and social welfare by reducing earning capacity and hours worked, especially for informal workers in low- and middle-income countries. Some previous research quantified the losses from poor health, and others showed that an individual’s level of skills is determined by his/her innate ability and investment in human capital (education and training), which is a function of marginal return and marginal cost of financing. Such studies suggest that individuals suffering from illness may be frail, not capable of working and generally unable to support the livelihood of their children and other dependants. Consequently, a high disease burden may have an adverse impact on a country’s productivity, growth, and ultimately, economic development. An individual with good health is able to increase his/her output, which can be translated into increases in labor productivity and standard of living. Another study mentioned that in the labor market, improvement of an individual’s health may result in increased productivity. Ill health, in addition to productivity loss, can cause large levels of out-of-pocket healthcare expenditure, which reduces current and accumulated household savings and pushes individuals into impoverishment and poverty. Furthermore, it can be argued that ill health of workers may also increase financing costs or the production cost of investment of the firms, as more time is required to complete the particular activities. Findings from other studies suggest that the cost of productivity loss may be several times greater than the direct healthcare costs; furthermore, presenteeism (being present at work with illness but working at a reduced capacity) may account for a larger proportion of losses than absenteeism, i.e., being absent from work. Bangladesh has a large group of people involved in the informal sector without adequate social protection. While many health awareness (educational) programs for disease prevention and health promotion are available in Bangladesh, attention is generally not paid to protection against financial risk during illness. However, the cost of productivity loss due to absence from work or presenteeism with illness has rarely been examined in the Bangladesh context. This current study, therefore, attempted to examine the impact of ill health of informal sector workers on labor productivity, future earning, and healthcare-related expenditure.

Materials and Methods

Study settings and sample size

A cross-sectional descriptive survey was conducted among occupational groups of informal workers (rickshaw pullers, shopkeepers and restaurant workers) that were generally found in all urban areas in Bangladesh. We selected subjects from three levels of administrative hierarchy in Bangladesh to achieve a national representation; a metropolitan city (Dhaka), a district town (Chandpur), and a subdistrict (Savar). A sampling frame comprising all informal sector workers in the selected study locations did not exist because informal sector workers are not officially registered. However, a number of formal or informal worker cooperatives exist in all areas. To identify the study participants, we identified worker cooperatives and marketplaces using transect walks and informal group discussions with community members and leaders. A list of workers was collected from the representatives/leaders of cooperatives or marketplaces. The inclusion criteria were age (18 years or above) and experience (working in the same occupation for at least the past year). The Central Limit Theorem (CLT) suggests that at least 30 cases are required for calculating the mean value with the assumption of a normal distribution. Ultimately, we randomly selected 594 subjects from the list of potential subjects, and 557 responded to the survey. Data were collected from 15 December 2010 to 15 April 2011.

Conceptual framework

Exiting the labor force because of ill health is already known to be associated with poorer financial conditions and a major driver of income poverty. Healthier working people are likely to be more productive, and they can obtain better goods and services to shape their environment in ways that make them healthier through improvement of their living standards. Better health enhances worker productivity by increasing both physical and mental ability, reducing sickness absence, and decreasing morbidity or increasing longevity, resulting in a longer
career. However, labor productivity loss during ill health may reflect income and large out-of-pocket medical expenses that reduce household savings, which may have effects on daily livelihood, including that of dependents. Further, current and accumulated savings tend to diminish, and borrowing from relatives, friends and others, selling assets, living in an unhygienic habitat, and reducing food consumption force these workers to work with ill health, which creates a vicious circle that is very hard to break.

Data collection and analysis

Informal workers were interviewed through a structured questionnaire; pretesting of the questionnaire was performed, and any modifications or corrections necessary were made. The data collectors and supervisors received training on the objective, confidentiality of information, respondents’ rights and interview techniques prior to data collection. The questionnaire was developed to cover the conditions of the working environment, absenteeism, presenteeism, healthcare expenditures, and perceptions about economical protection and financial coping mechanisms used to cover healthcare expenditures. Absenteeism and presenteeism were measured by asking respondents how many days they were absent from work because of ill health and how many days they worked when ill. A descriptive analysis was employed. Data were entered into Microsoft Excel 2007, and all entries were manually double-checked and verified by the investigators. Subsequently, statistical analysis was performed using STATA 12.0. All costs were expressed in the US$, applying the exchange rate (US$1=81.82 BDT) for the fiscal year 2011.

Ethical considerations

The research protocol of this study was approved by the Institutional Review Board of the icddr,b. All study participants signed an informed consent form. All data were de-identified and kept confidential.

Results

Sociodemographic characteristics

The socioeconomic and demographic characteristics of the respondents are shown in Table 1. All respondents were agreed to participate in the study. Most of the respondents were male (95%), and most of them were married (61%); their average age was 30 years (range, 25-34 years). Educational level was determined based on the higher level of education they had completed, and it was found that most of them had completed the primary level of education (30%). Among all respondents, the highest education level (11.92%) was observed in shopkeepers, followed by restaurant workers (4%), whereas most of the rickshaw pullers (44%) had less than one year of education (30%). Among all respondents, the highest level of education they had completed, and it was also observed that self-reported monthly household expenditure was relatively higher than the monthly income among the occupational groups.

Illness and income loss

Most of the respondents (57%) reported that they had been affected by some type of illness in the last six months. The majority of the workers (94%) received some form of the treatment during an illness. The average healthcare expenditure was US$48.34, while restaurant workers expended more for healthcare (US$53.61), followed by shopkeepers (US$52.11). Self-reported sickness absenteeism was highest (50.37 days) in the case of shopkeepers, followed by rickshaw pullers (49.31 days). A similar pattern of sickness presenteeism was also observed among groups. Considering the income loss due to illness in the past six months, the rickshaw pullers were exposed to the highest income loss (US$197.15), followed by the shopkeepers (US$151.39).

Perceptions regarding the working environment and financial security

Table 3 presents the perceptions of informal workers about their working environment like health hazardous, working environment, financial security in case of instantaneous accident and the future accumulation of financial arrangement which can secure to access health care service during health shocks while in working. Among the informal workers, the rickshaw pullers had the highest proportion of workers (98.39%) who believed they were working in a higher-risk environment, followed by the restaurant workers (34.27%). On the other hand, most of the shopkeepers (84.97%) were satisfied with their working environments. Considering the accidental prevention in the working environment, the rickshaw pullers had the highest proportion of workers (82.8%) who believed they were working in a high-risk environment, followed by the restaurant workers (30.34%). However, most of the groups of workers sturdily agreed that during illness, financial security is essential while working.

Coping mechanism

Table 4 depicts the coping mechanisms of informal sector workers during ill health. It was observed that the majority of the workers (68%) paid their healthcare costs from their regular incomes, followed by borrowing (15%). However, shopkeepers also paid their healthcare costs from savings (12%), as did restaurant workers (7%) and rickshaw pullers (7%).
Table 1. Socioeconomic and demographic characteristics of the respondents

| Variables                          | Rickshaw-Puller N (%) | Shop-keeper N (%) | Restaurant-workers N (%) | Total N (%) |
|------------------------------------|------------------------|-------------------|--------------------------|-------------|
| **Age group**                      |                        |                   |                          |             |
| 15-24                              | 34 (6.10)              | 91 (16.34)        | 54 (9.69)                | 179 (32.14) |
| 25-34                              | 81 (14.54)             | 67 (12.03)        | 71 (12.75)               | 219 (39.32) |
| 35-44                              | 44 (7.90)              | 25 (4.49)         | 31 (5.57)                | 100 (17.95) |
| 45-54                              | 17 (3.05)              | 6 (1.08)          | 15 (2.69)                | 38 (6.82)   |
| 55-64                              | 8 (1.44)               | 3 (0.54)          | 5 (0.90)                 | 16 (2.87)   |
| 65+                                | 2 (0.36)               | 1 (0.18)          | 2 (0.36)                 | 5 (0.90)    |
| **Sex**                            |                        |                   |                          |             |
| Male                               | 185 (99.46)            | 190 (98.45)       | 156 (87.64)              | 531 (95.33) |
| Female                             | 1 (0.54)               | 3 (1.55)          | 22 (12.36)               | 26 (4.67)   |
| **Education level**                |                        |                   |                          |             |
| Less than one year                 | 82 (44.09)             | 19 (9.84)         | 43 (24.16)               | 144 (25.85) |
| Primary                            | 42 (22.58)             | 63 (32.64)        | 64 (35.96)               | 169 (30.34) |
| Secondary                          | 9 (4.84)               | 63 (44.56)        | 29 (16.29)               | 124 (22.26) |
| Higher secondary and higher        | 1 (0.54)               | 23 (11.92)        | 7 (3.93)                 | 31 (5.57)   |
| No education                       | 52 (27.96)             | 2 (1.04)          | 35 (19.66)               | 89 (15.98)  |
| **Marital status**                 |                        |                   |                          |             |
| Married                            | 154 (82.80)            | 73 (37.82)        | 115 (64.61)              | 342 (61.40) |
| Widowed                            | 1 (0.54)               | -                 | 1 (0.56)                 | 2 (0.36)    |
| Separated                          | -                      | -                 | 1 (0.56)                 | 1 (0.18)    |
| Unmarried                          | 31 (16.67)             | 120 (62.18)       | 61 (34.27)               | 212 (38.06) |
| **Family size**                    |                        |                   |                          |             |
| Children (0-14 years)              | 1.82                   | 1.17              | 1.40                     | 1.46        |
| Adults (15 years and above)        | 2.82                   | 4.33              | 3.45                     | 3.55        |
| Overall                            | 3.57                   | 4.19              | 3.29                     | 3.70        |
| **Monthly income (US$)**           | 108.49                 | 82.75             | 79.18                    | 90.21       |
| **Monthly household expenditures (US$)** | 122.80                   | 163.98            | 107.05                   | 132.04      |
| **Geographical area**              |                        |                   |                          |             |
| Metropolitan city                  | 62 (33.33)             | 62 (32.12)        | 60 (33.71)               | 184 (33.03) |
| District town                      | 60 (32.26)             | 61 (31.610)       | 57 (32.02)               | 178 (31.96) |
| Subdistrict                        | 64 (34.41)             | 70 (36.270)       | 61 (34.27)               | 195 (35.01) |

Discussion

The labor market in Bangladesh can be divided into three types of market: formal, rural informal, and urban informal. However, only a small portion of the total labor force (12.5%) works under the formal labor market framework, which represents 6.8 million people. During the period of 1999-2000 to 2010, there was negative growth (3.4%) in the formal sector and a strong positive rate of growth (4.9%) for informal sector workers has been observed. Although the Government of Bangladesh has taken several initiatives for employment such as five-year plan for strategic directions and policy framework, small and medium entrepreneur, there are growing numbers of informal workers in the country who work in hazardous working environments. However, as a public health problem, work-related injuries affect large numbers of workers, especially young people at productive ages. These types of workers mainly depend on their daily wage, and they neither have written legal agreements with their employers nor any adequate social protection in general. They are often the main income earners of their family, and consequently their good health is key to the livelihood of the family. The current study showed that the average numbers of days of sickness absenteeism and presenteeism were approximately 8 and 9 days per month, respectively. The average numbers of days of sickness absenteeism and sickness presenteeism were similar among rickshaw pullers and shopkeepers, but the values for the restaurant workers were relatively better among the groups. Productivity loss due to sickness absenteeism is easier to estimate using a human capital approach, i.e., by using the income loss for the number of
Table 2. Illness and income loss for the last six months, % (CI)

| Variables                        | Rickshaw pullers | Shopkeepers | Restaurant workers | Total     |
|----------------------------------|------------------|-------------|--------------------|-----------|
| Average daily income (US$)       | 3.80 (3.62-3.98) | 2.89 (2.64-3.14) | 2.67 (1.85-3.49) | 3.12 (2.84-3.41) |
| Illness (%)                       | 57.53 (50.28-64.46) | 51.81 (44.74-58.81) | 61.80 (54.42-68.67) | 56.91 (52.76-60.97) |
| Treatment during illness         | 93.46 (86.83-96.87) | 96.00 (89.74-98.50) | 93.64 (87.18-96.96) | 94.32 (91.14-96.41) |
| Average healthcare expenditure (US$) | 39.29 (21.47-57.11) | 52.11 (34.24-69.98) | 53.61 (26.52-80.71) | 48.34 (35.99-60.69) |
| Absenteeism (average days)       | 49.31 (42.84-55.77) | 50.37 (43.74-57.01) | 44.54 (37.54-51.54) | 48.15 (44.30-52.00) |
| Presenteeism (average days)      | 50.80 (44.16-57.43) | 53.41 (46.70-60.11) | 49.09 (42.09-56.09) | 51.15 (47.26-55.04) |
| Income loss due to absenteeism (US$) | 197.15 (167.29-227.01) | 151.39 (124.85-177.93) | 112.57 (87.44-137.69) | 154.26 (147.29-170.19) |

Table 3. Perceptions of informal workers about health risk of the workplace and financial risk protection, % (CI)

| Risky to health | Rickshaw pullers | Shopkeepers | Restaurant workers | Total | F-statistic |
|-----------------|------------------|-------------|--------------------|-------|-------------|
| Yes             | 98.39 (95.09-99.48) | 11.92 (8.03-17.33) | 34.27 (27.64-41.58) | 47.94 (45.13-50.75) | 77.55*** |
| Neutral         | -                | 3.11 (1.39-6.77) | 5.06 (2.64-9.46) | 2.69 (1.63-4.41) | 58.56*** |
| No              | 1.61 (0.52-4.91) | 84.97 (79.18-89.37) | 60.67 (53.28-67.61) | 49.37 (46.42-52.33) | 51.15 |

| Accident prevention | Rickshaw pullers | Shopkeepers | Restaurant workers | Total | F-statistic |
|---------------------|------------------|-------------|--------------------|-------|-------------|
| No                  | 82.8 (76.65-87.59) | 7.25 (4.33-11.9) | 30.34 (24.00-37.52) | 39.86 (36.80-43.00) | 51.16-57.96 |
| Neutral             | 1.08 (0.27-4.22) | 8.81 (5.53-13.74) | 6.74 (3.86-11.52) | 5.57 (3.95-7.79) | 46.42-52.33 |
| Yes                 | 16.13 (11.49-22.17) | 83.94 (78.03-88.49) | 62.92 (55.56-69.73) | 54.58 (51.16-57.96) | 18.45** |

| Financial security an important issue during illness | Rickshaw pullers | Shopkeepers | Restaurant workers | Total | F-statistic |
|------------------------------------------------------|------------------|-------------|--------------------|-------|-------------|
| No                                                   | 1.61 (0.52-4.91) | 0.52 (0.072-3.62) | 1.12 (0.28-4.41) | 1.08 (0.48-2.38) | 1.44 |
| Neutral                                             | 3.23 (1.45-7.02) | 8.29 (5.13-13.13) | 2.25 (0.84-5.86) | 4.67 (3.20-6.76) | 2.45** |
| Yes                                                  | 95.16 (90.94-97.47) | 91.19 (86.26-94.47) | 96.63 (92.67-98.48) | 94.25 (91.99-95.91) | 1.44 |

| Financial protection can ensure access to healthcare services during illness | Rickshaw pullers | Shopkeepers | Restaurant workers | Total | F-statistic |
|-------------------------------------------------------------------------------|------------------|-------------|--------------------|-------|-------------|
| No                                                                            | 1.61 (0.52-4.91) | 0.52 (0.07-3.62) | 0.56 (0.078-3.92) | 0.90 (0.373-2.14) | 1.44 |
| Neutral                                                                        | 5.38 (2.91-9.73) | 8.29 (5.13-13.13) | 3.37 (1.52-7.33) | 5.75 (4.09-8.02) | 1.44 |
| Yes                                                                            | 93.01 (88.31-95.91) | 91.19 (86.26-94.47) | 96.07 (91.95-98.12) | 93.36 (90.96-95.15) | 1.44 |

Note: **p<0.05; ***p<0.01.
days (self-reported or registered) absent from work due to sickness along with the wage rate. On the other hand, such estimation from sickness presenteeism is complex, and for most jobs there is no true account of productivity with which to assess an employee’s performance 50. This study therefore estimated the productivity loss due to sickness absenteeism. Our results showed an overall loss of earnings of 28.5%, whereas the losses of shopkeepers and rickshaw pullers were 30.5% and 30.2%, respectively. Additionally, spending for healthcare services was estimated as 8.9% of income overall. About 90% of the workers, included in the current study were below 45 years of age, which represents a population with low cost healthcare. This costs would be much higher if people in higher age groups were included, since healthcare costs increase with higher age 31. In this study, we found that most of the workers (68%) received health services from a local pharmacy (data not presented in table). Due to lack of social protection for health, the costs of healthcare were not reimbursed for the workers, though most of the workers (94%) believed that financial protection for health is essential during illness.

Health is one of the most important assets and is both a result and a determinant of labor and hence income 32-34. In the case of a work performed in teams, absenteeism of one worker results in lower performance for the whole team 34. An earlier study in a similar setting found that good health has a significant positive impact on productivity in both rural and urban areas of Bangladesh 35. The informal labor force has been increasing over the last few years in Bangladesh, and most of the workers work in precarious and unsafe conditions, without sanitary facilities, potable water, or proper waste disposal 36. For the sake of productivity, improvement of working conditions and access to adequate healthcare at affordable price for informal workers is unavoidable.

This was an empirical study on ill health and productivity loss of informal workers in the context of Bangladesh, but it has some limitations that need to be taken into account when interpreting the results. Three occupational groups of workers were included, as they were found in all urban areas in Bangladesh. But many other occupations were not included in this study. The estimation of productivity loss did not include that due to sickness presenteeism, and this means that productivity loss was underestimated to some extent.

Conclusions

Although the informal sector contributes the most to the economy of Bangladesh, but workers in this sector have hardly any financial protection. The study suggests that government should invest more to provide better healthcare facilities for informal sector workers, which would further help in enhancing the productivity of the economy. However, the concerned authorities should show also pay close attention to improvement of the working conditions, earnings, job security, and social security of informal workers.

Acknowledgments: icddr,b acknowledges with gratitude the commitment of the International Labour Organization (Microinsurance Innovation Facility) to its research efforts. icddr,b is thankful to the Governments of Australia, Bangladesh, Canada, Sweden, and the UK for providing core/unrestricted support. The authors are grateful to Dr. Basanta Kumar Barmon, Chairman of the Department of Economics of East West University, for his comments on an earlier draft of the manuscript.

Conflict of Interest: The authors declare that they have no competing interests.

References

1) International Labour Organization (ILO). Statistical update on employment in the informal economy. Statistical update on employment in the informal economy. Geneva, Switzerland. [Online]. 2012. Available from: URL: http://laborsta.ilo.org/informal_economy_E.html
2) Sarker AR, Khan JA. Informal workers in Bangladesh. An analysis from socio-economic perspective. Asian journal of research in business economics and management 2013; 3(6).
3) Bangladesh Bureau of Statistics (BBS). Report on Labour Force Survey 2010. Bangladesh Bureau of Statistics, Statistics Division, Ministry of Planning, New Panama Printing Press. Dhaka, Bangladesh. [Online]. 2011. Available from: URL: www.bbs.gov.bd
4) Ali AM. Informal Labour Force, Dhaka, Bangladesh. [Online]. 2013. Available from: URL: www.unnayan.org
5) Maligalig DS, Cuevas S, Rosario A. Informal Employment in

Table 4. Coping mechanism* for healthcare spending during illness in informal workers, n (%)

| Workers        | Regular income | Saving | Borrowing | other | Total |
|----------------|----------------|--------|-----------|-------|-------|
| Rickshaw pullers | 95 (67.86)     | 10 (7.14) | 27 (19.29) | 8 (5.17) | 140 (100) |
| Shopkeepers     | 91 (67.91)     | 16 (11.94) | 18 (13.43) | 9 (6.72) | 134 (100) |
| Restaurant workers | 98 (69.50)   | 10 (7.09) | 18 (12.77) | 15 (10.64) | 141 (100) |
| All            | 284 (68.43)    | 36 (8.67) | 63 (15.18) | 32 (7.71) | 415 (100) |

*Multiple responses considered
Bangladesh, Philippines: 2009.
6) Khan J, Ahmed S. Impact of educational intervention on willingness-to-pay for health insurance: A study of informal sector workers in urban Bangladesh. Health Economics Review 2013; 3(12).
7) Nastiti A, Prabaharyaka I, Roosminni D, Kunaefi TD. Health-associated Cost of Urban Informal Industrial Sector: An Assessment Tool. Procedia - Social and Behavioral Sciences 2012; 3: 112-122. Available from: URL: http://linkinghub.elsevier.com/retrieve/pii/S1877042812004806
8) Sutarjo US. Ergonomics policy in Indonesia. Journal of human ergology 2007; 36(2): 57-61. Available from: URL: http://www.ncbi.nlm.nih.gov/pubmed/18572796
9) Loewenson RH. Health impact of occupational risks in the informal sector in Zimbabwe. Int J Occup Environ Health 1998; 4(4): 264-274.
10) Sumon AI. Informal economy in Dhaka City-Automobile Workshop and Hazardous Child Labor. Pakistan Journal of Social Science 2007; 4(6): 711-720.
11) Loewenson R. Globalization and occupational health: a perspective from southern Africa. Bulletin of the World Health Organization 2001; 79(9): 863-868.
12) Huq MN, Howlader SR, Kabir MA. The Impact of Health on Productivity in Bangladesh. Global Journal of Quantitative Science 2014; 1(2): 24-31.
13) Cooper BS, Rice DP. The Economic Cost of Illness Revisited. Paper presented at the American Public Health Association Meetings (Chicago) November 1975. Available from: URL: https://www.ssa.gov/policy/docs/ssb/v39n2/v39n2p21.pdf
14) Grossman M. Household Production and Consumption. The Correlation between Health and Schooling. National Bureau of Economic Research. [Online]. 1976. Available from: URL: http://www.nber.org/chapters/c3962
15) Becker GS. Human Capital and the Personal Distribution of Income: An Analytical Approach. Michigan: University of Michigan, Institute of Public Administration; 1967.
16) Cole M, Neumayer E. The Impact of Poor Health on Total Factor Productivity. Journal of Development Studies 2006; 42 (6): 918-938.
17) Tompa E. The impact of health on productivity: empirical evidence and policy implications. The Review of Economic Performance and Social Progress. 2002. p. 181-202.
18) Bloom DE, Canning D. The Health and Wealth of Nations. Science 2000; 287(5456): 1207-1209.
19) Goetzl RZ, Long SR, Ozminkowski RJ, Hawkins K, Wang S, Lynch W. Health, absence, disability, and presenteeism cost estimates of certain physical and mental health conditions affecting U.S. employers. J Occup Environ Med 2004; 46: 398-412.
20) Loepke R, Hymel PA, Lofland JH. Health-related workplace productivity measurement: general and migraine-specific recommendations from the ACOEM Expert Panel. J Occup Environ Med 2003; 45: 349-359.
21) Levin RI, Rubin DS. Statistics for management. 5th ed. New Jersey: Prentice Hall PTR; 1991.
22) Brazenor R. Disabilities and labour market earnings in Australia. Aust J Labour Econ 2002; 5: 319-334.
23) Schofield D, Passey M, Percival R, Shrestha R, Callander E, Kelly S. Retiring early with cardiovascular disease—impact on individual’s financial assets. International journal of cardiology 146(1): 125-126. Available from: URL: http://www.sciencedirect.com/science/article/pii/S0167527310008077
24) Schofield DJ, Callander EI, Shrestha RN, Percival R, Kelly SJ, Passey ME. Premature retirement due to ill health and income poverty: a cross-sectional study of older workers. BMJ Open 2013; 3(5): Available from: URL: http://bmjopen.bmj.com/cgi/doi/10.1136/bmjopen-2013-002683
25) William D, Schultz T. Wealth from health: linking social investments to earnings in Latin America. Washington DC: Inter-American Development Bank; 2000.
26) Bloom DE, Canning D. Population Health and Economic Growth. Working Paper No 24. The Commission on Growth and Development. Washington DC: 2008.
27) Titumir R, Hossain J. Learning for Skill Formation and Employability: A Strategic Framework for Informal Sector in Bangladesh. Journal of the Institute of Bangladesh Studies (Bangladesh) 2003; XXVI: 17-38.
28) Basak JK. Dynamics of labour force. Dhaka, Bangladesh: 2013.
29) Salah Eldin W, Hirshon JM, Smith GS, Kamal A-AM, Abou-El-Fetouh A, El-Setouhy M. Health-related quality of life after serious occupational injury in Egyptian workers: a cross-sectional study. BMJ open 2012; 2(6): Available from: URL: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=353107&tool=pmcentre&rendertype=abstract
30) Mattke S, Balakrishnan A, Bergamo G, Newberry SJ. A review of methods to measure health-related productivity loss. American Journal of Managed Care 2007; 13(4): 211-217.
31) Sarker AR, Mahumud RA, Sultana M, Ahmed S, Ahmed W, Khan JA. The impact of age and sex on healthcare expenditure of households in Bangladesh. SpringerPlus 2014; 3(1): 435. Available from: URL: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=4153877&tool=pmcentre&rendertype=abstract
32) Aguayo-rico A, Guerra-turrubiates IA, Instituto RMDO. Empirical Evidence of the Impact of Health on Economic Growth. Issues in Political Economy 2005; 14(August).
33) Weil DN. Accounting for the effect of health on economic growth. Quarterly Journal of Economics 2005; 122: 1265-1306. Available from: URL: http://www.nber.org/papers/w11455http://www.mitpressjournals.org/doi/abs/10.1162/qjec.12.2.1265
34) Pauly MV, Nicholson S, Xu J, et al. A general model of the impact of absenteeism on employers and employees. Health Economics 2002; 11(3): 221-231.
35) Alam N. A Socio-economic Study of Informal Sector Workers of Dhaka City. Bangladesh e-Journal of Sociology 2012; 9(2).
Minerva Access is the Institutional Repository of The University of Melbourne

Author/s:
Sarker, AR; Sultana, M; Mahumud, RA; Ahmed, S; Ahmed, MW; Hoque, ME; Islam, Z; Gazi, R; Khan, JAM

Title:
Effects of occupational illness on labor productivity: A socioeconomic aspect of informal sector workers in urban Bangladesh.

Date:
2016-05-25

Citation:
Sarker, A. R., Sultana, M., Mahumud, R. A., Ahmed, S., Ahmed, M. W., Hoque, M. E., Islam, Z., Gazi, R. & Khan, J. A. M. (2016). Effects of occupational illness on labor productivity: A socioeconomic aspect of informal sector workers in urban Bangladesh. J Occup Health, 58 (2), pp.209-215. https://doi.org/10.1539/joh.15-0219-FS.

Persistent Link:
http://hdl.handle.net/11343/255934

File Description:
Published version

License:
CC BY-NC-SA