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Field Study

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

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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 shop keepers, 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 the shop keepers (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.
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The informal sector is the dominant area of employment and the economy for any developing country including Bangladesh. In many sectors, especially in manufacturing, commerce, and agriculture in both urban and rural areas, informal employment is the dominant form of employment and the informal economy accounts for the dominant share of economy. The informal sector consists of business units that are unincorporated and produce goods or services for sale or barter, and they are usually unregistered, not legal entities of their owners, small, or do not maintain a complete set of accounts[1]. Informal sector workers such as day laborers; rickshaw pullers; van drivers; wholesale and retail traders; and restaurant, manufacturing, transport, storage and communication workers are commonly found in Bangladesh. The frontier of the informal sector and the number of informal workers are increasing each year in Bangladesh[2]. According to the latest labor force survey in Bangladesh, about 87.5% of the employed population is employed in the informal sector, and the greatest shares both of male (85.5%) and female (92.3%) workers are engaged in work in the informal sector[3]. Furthermore, the limited job opportunities of the formal sector push people to engage themselves in the

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informal sector[4]. The informal sector alone contributes to 63.6% of total GDP, and 75.3% of this comes from the nonagricultural sector[5,6]. 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[4]. 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[7]. 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[8-10]. However, occupational illness is generally less visible and not adequately recognized as a problem in low-income countries[11]. 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[12]. 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 rate of return and marginal cost of financing[13-15]. 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[16]. 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[17]. Another study mentioned that in the labor market, improvement of an individual's health may result in increased productivity[18]. 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[12]. 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[19,20]. 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[21]. 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[22-24]. 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[25]. 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[12]. However, labor productivity loss during ill health may reflects income and large out-of-pocket medical expenses that reduce household savings, which may have effects on daily livelihood, including that of dependents[26]. 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[12,26].

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. Considering the level of income, the highest monthly income (US$108.50) was found in the rickshaw pullers, followed by shopkeepers (US$82.75). However, 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 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[27]. 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[3]. 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[28]. 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[4]. However, as a public health problem, work-related injuries affect large numbers of workers, especially young people at productive ages[29]. 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 (38.34-170.19)

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

	Rickshaw pullers	Shopkeepers	Restaurant workers	Total	F-statistic
Risky to health					
Yes	98.39 (95.09-99.48)	11.92 (8.033-17.33)	34.27 (27.64-41.58)	47.94 (45.13-50.75)	
Neutral	-	3.11 (1.39-6.77)	5.06 (2.64-9.46)	2.69 (1.63-4.41)	77.55***
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)	
Accident prevention					
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)	
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)	58.56***
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)	
Financial security an important issue during illness					
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)	
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)	
Financial protection can ensure access to healthcare services during illness					
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)	
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)	

Note: **p<0.05; ***p<0.01.

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

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[30]. 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 of 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 level[32,33]. 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[12]. 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[4,35]. 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.

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

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