

Socioeconomic Evaluation of Rickshaw Pulling as an Urban Informal Economic Occupation at Khulna City in Bangladesh

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Abstract

This study investigates the role of rickshaw pulling as an urban informal economic occupation in the Khulna City of Bangladesh. A multistage sampling technique has been applied to select the study area, and stratified random sampling has been used to determine the sample. Logit model and ordinary least squares (OLS) have been used to estimate their willingness to continue rickshaw pulling and determinants of household income, respectively. A household consumption function has been estimated to understand household consumption behaviours. The estimated results from the logit model indicate that the respondents' age and income from rickshaw pulling are positively associated with staying in their current occupation. A significant portion of family income comes from rickshaw pulling, whereas only day shift driving and being the family head leads to decreased household income. The consumption function results reveal that, on average, each household spends 69% of its total income on consumption purposes. The findings of this study will have some policy implications to understand the role of rickshaw pulling and to develop this sector.

Keywords: Rickshaw pulling, informal economy, logit model, OLS, Khulna City Corporation

1 Introduction

1.1 Background of the Study

Rickshaws are one of the most popular and conventional modes of transportation in urban areas in Bangladesh. The word rickshaw origin comes from the Japanese word 'jin-riki-sha,' meaning man-powered vehicle (Gallagher, 1992).

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Initially, it was known as a hand-pulled Rickshaw, but nowadays, it is recognized as a cycle rickshaw. In most major cities in Bangladesh, the typical rickshaw type has one front wheel and two rear wheels. Generally, it can carry two passengers except for the driver. Sometimes, it can carry other goods up to 250 kg (Replogle, 1991). Rickshaw plays a critical role in transportation in city areas of Bangladesh. City people use rickshaws as the primary mode of transportation for daily commuting. Due to easily accessible and cheap fare, rickshaws are invaluable for the city's transportation and economic activities (Hossain & Susilo, 2011; Roy & Hoque, 2016).

In urban areas, the informal sector is the source of income for low-skilled workers. Having no access to basic needs and services, these workers face constraints in earning their daily livelihood activities (Alam, 2012). Rickshaw pulling has become a popular urban informal economic activity because of its demand among the urban dwellers, cheap operating cost, low initial investment, and easy money for the unskilled rural migrants. Many people are engaged in this sector across the country (Karim & Salam, 2019). Some crucial reasons involving rickshaw pulling are the ease of entry into the urban labour market, fewer skills, and an easy escape from poverty. Although it looks like an attractive job opportunity for unemployed rural migrants, this is a menial job requiring extreme physical hard work with no permanent prospects or future (Begum & Sen, 2005; Tamanna, 2012).

Although there are job-related risks and uncertainties in rickshaw pulling, the number of rickshaw pullers has increased over the years. For instance, a study by the Bangladesh Institute of Labour Studies (BILS) concluded that about 1.1 million rickshaws were currently moving across Dhaka, while some 79,554 rickshaws were in 1986. The trend is also similar for the other cities. Another country's southern city, Khulna City, is plundered with three-wheelers, including auto rickshaws, rickshaws, e-rickshaw, and engine vans (Khan & Quaddus, 2020). Most of them are operated by migrants from nearby rural areas. Although the rickshaw's actual number is unknown, according to Khulna City Corporation's official statistics, 17,000 registered rickshaws are currently operating in the city (Khulna City Corporation, 2021). When it comes to rickshaw pulling, most of the previous studies are concentrated on the capital city, Dhaka. However, the role of pulling rickshaws as an informal urban economic activity is absent in the context of coastal towns such as Khulna city. In the present study, this gap has been fulfilled by investigating effectiveness of rickshaw pulling's as an urban informal economic occupation in Khulna city of Bangladesh.

1.2 Objective of the Study

The broad objective of the study is to evaluate the impact of rickshaw pulling on the socioeconomic conditions of urban rickshaw pullers of Khulna city. The specific objectives of the study are specified as follows:

- i. *To explore the current socioeconomic status of the rickshaw pullers:* This objective explores the overall lifestyle of the rickshaw pullers in the study area.

The primary indicators are age, education, family members, housing conditions, occupation status, etc.

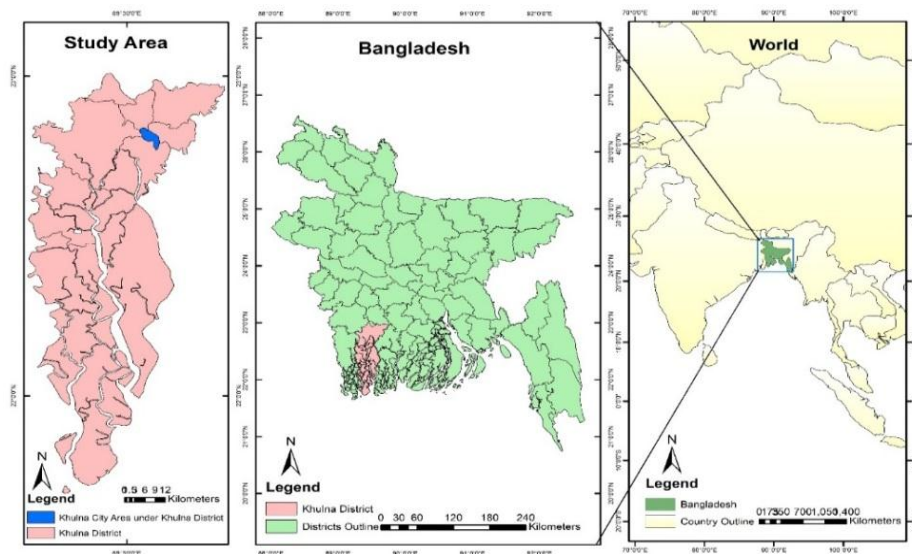
- ii. *To understand the factors affecting the willingness to change the rickshaw-pulling occupation:* Under this objective, we attempt to identify the factors that influence the rickshaw-pullers decision to stay or leave their current occupation in the future. There might be some instances where the earnings from rickshaw pulling are not enough to maintain their livelihood due to inflation and low earnings. Besides, the motivation to earn extra income encourages the rickshaw pullers to change their current occupation.
- iii. *To identify the determinants of household income and estimate household consumption function:* In this objective, we intend to find the factors that affect the rickshaw-pullers total household income. The primary purpose of identifying these factors is to understand how these factors influence the income of rickshaw pullers. Besides, to understand the consumption behaviours of the respondents, we aim to estimate the consumption function.

2 Methodology

2.1 Study Area

The present study was conducted at Khulna city, the 3rd largest metropolitan city in Bangladesh's southern region (Figure 1). The size of the Khulna City Corporation (KCC) area is 40.79 square kilometres, which is located between 24°45' and 24°54' north latitudes and between 89°28' and 89°35' east longitudes (Palit, 2014). This city

Figure 1: Location of the study area



Source: Authors' compilation

has been chosen because it offers a wide range of economic activities, and a large number of people migrate to this place in the hope of getting income opportunities. At present, about 1.5 million people live in the city (Khulna City Corporation, 2021). There are many schools and colleges in the town. Besides, the city bus service is restricted, and only accessible are main roads; hence the rickshaw is the most used as an intracity transport.

2.2 Sampling Technique

The study was constructed as a primary data survey, and selected rickshaw pullers were interviewed using a complete structured questionnaire. The questionnaire was surveyed through a face-to-face interview with the rickshaw pullers in Khulna city. We used stratified random sampling to select the survey points. We stratified the different busiest traffic points of the city. Among them are eight locations: Sonadanga Bus stop, Khulna Medical College Point, Khalishpur traffic signal, Mailapota crossings, Nirala Bazar, Zero-point crossings, Dackbunglo point, and Rupsa Ferry Ghat have been selected through random sampling technique. The survey was conducted in the selected location. We employed the sample size determination formula expressed in Equation 1 to determine sample size (Taherdoost, 2017).

$$n = \frac{p(100-p)z^2}{e^2} \quad (1)$$

Where, n = required sample size

p = percentage occurrence of a condition

e = percentage maximum error required

z = value corresponding to the level of confidence required.

In the research, the value of e was a 5 percent margin of error acceptable in social research. The value of z was 95 percent level, and the value of p was 50 percent to maximize the variance and keep the sample size maximum. The total number of registered rickshaw pullers in the Khulna City corporation was 17000 (Khulna City Corporation, 2021). According to Equation 1, for a population of 25000, only a 378-sample size is required. Our study used a judgmental sampling process to interview rickshaw pullers as a sample to adjust the total number of rickshaws (both registered and unregistered) moving around the city. A total of 531 rickshaw pullers were interviewed from the selected location during November and December 2019. After the quality control and data cleaning process, 31 questionnaires were cancelled, and 500 questionnaires remained for study analysis.

2.3 Data Analysis

The study applied several statistical tools to analyze the collected data. The descriptive statistics, for example, mean, standard deviation, minimum, maximum, and range, were used to observe the respondents' socioeconomic conditions. The study used a logit model and ordinary least squares (OLS) technique to estimate the willingness to continue rickshaw pulling and the determinants of total households' Income.

2.4 Econometric Analysis

2.4.1 Logit model

One of the objectives of the study was to investigate the factors influencing the decision to continue the current occupation or not by the rickshaw puller. The choice is dichotomous, i.e., either yes or no. A commonly used econometric approach to dichotomous model outcomes is logistic regression or logit regression. It is a multidimensional technique of dichotomous outcomes and is used in decision-making-related subjects. The dependent variables take two outcomes, 1 and 0. Code 1 indicates an event to occur, and code 0 shows otherwise. Parameters in the logit regression model are calculated using the maximum likelihood estimation (MLE) approach. The logistics regression model (Equation 2) can be explained as follows (Islam et al., 2021; Neog & Buragohain, 2020).

$$P_i = E(a + \beta_{xi}) = \frac{1}{1+e^{-(\beta_1+\beta_2x_i)}} \quad (2)$$

P_i represents the probability of taking continued current occupation subject to x_i , where x_i is the independent vector variable, and e is the natural logarithm. The complete model has been specified in Equation 3.

$$\text{Ln} \left[\frac{P_i}{1-P_i} \right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \varepsilon_i \quad (3)$$

Here, P_i refers to the probability of taking a continued occupation; specifically, if $P_i = 1$ indicates the decision to stay in the current occupation, and $P_i = 0$ means not continuing the occupation. In Equation 3, the dependent variable in this study is the respondents' decision to take either continue the occupation or not. There are eight explanatory variables used in equation 3, such as respondents' Age expressed in years (X_1), Education of respondents (X_2) in terms of years of schooling, Marital status (X_3) expressed in dummy (Yes = 1, Otherwise = 0), Income from rickshaw pulling per month in BDT (X_4), Family head (X_5) expressed in dummy (Self = 1, Otherwise = 0), Earning member (X_6) expressed in number, Health problem (X_7) expressed in dummy (Yes = 1, Otherwise = 0), Rickshaw Ownership (X_8) expressed in dummy (Yes = 1, Otherwise = 0). Besides, β_0 is the intercept and β_1 to β_9 are coefficients, and ε_i is the error term.

2.4.2 Ordinary Least Squares (OLS)

Another objective of the study was to identify the determinants of household income of rickshaw pullers. We applied a multiple linear regression to fulfil the objectives. We assume zero multicollinearity among the independent variables, and there is no existence of homoscedasticity in the error terms. The general form of the regression model is given in Equation 4.

$$Y_i = \gamma_0 + \gamma_i Z_i + \mu_i \quad (4)$$

In Equation 4, Y is the dependent variable indicating the logarithmic form of household total monthly income (BDT), which is the summation of income from rickshaw pulling, wives' income, income from assets, and other family members.

Here, Z_i is the vector of independent variables expressed in nine explanatory variables such as Household Head's (HH) Age defined in years (Z_1), Log transformation of income from rickshaw pulling per month in BDT (Z_2), Marital status expressed in dummy (Married = 1, Otherwise = 0) (Z_3), Having health problem expressed in dummy (Yes = 1, Otherwise = 0) (Z_4), Driving shift expressed in dummy (Only day = 1, Otherwise = 0) (Z_5), Driving duration daily expressed in hours (Z_6), Ownership expressed in dummy (Owned = 1, Otherwise = 0) (Z_7), Family head expressed in dummy (self = 1, Otherwise = 0) (Z_8), and Residence location expressed in dummy (Urban = 1, Otherwise = 0) (Z_9). Also, γ_0 is the intercept and γ_1 to γ_9 are coefficients, and μ_i is the error term.

2.4.3 Estimation of Household Consumption Function

A household consumption function has been specified to measure the responsiveness of household consumption level with the change in household income (Equation 5).

$$C_i = \alpha_0 + \alpha_1 Y_i + e_i \quad (5)$$

In Equation 5, C represents the log transformation of monthly household consumption in BDT, and Y is the log transformation of monthly household income. Also, α_0 is the intercept and α_1 is the coefficients, and e_i is the error term.

3. Results and Discussion

3.1 Socio-Demographic Information

The respondent rickshaw pullers' average age is 37 years, with a minimum of 15 years and a maximum of 70 years (Table 1). Most of the respondents have completed primary education with an average year of schooling of 4.47. On average, every family has five members, including the respondent. There is only one family member

Table 1: Summary statistics

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Age of the respondent (age)	500	37.11	10.84	15	70
Education of the respondent (years of schooling)	500	4.47	3.31	0	12
Family size (number)	499	5.02	2.10	1	18
Earning member (number)	500	1.36	.62	1	6
Household monthly income (BDT)	500	14,329.8	5,739.68	1,000	46,000
Household monthly expenditure (BDT)	500	12,339.6	4,865.35	4,000	36,000
Household monthly savings (BDT)	493	1,373.24	2,204.52	0	20,000
Income from rickshaw pulling (BDT)	500	12,461.2	4,019.20	600	27,000
Rickshaw age (years)	500	2.85	1.14	1	6

Source: Authors' compilation based on field survey, 2019

in some extreme cases, while there are 18 members in the family. The number of earning members in the family varies from one to 6, with an average of 1.36 members. From the survey data, it has been found that, on average, each household earns BDT14,000 per month, which includes only earning from the rickshaw pulling amounted to BDT12,000 per month. On average, families spend BDT12,000 per month. The monthly average income from rickshaw pulling is similar to the latest findings of the latest survey conducted by the Bangladesh Institute of Labour Studies (BLIS) (The Financial Express, 2019).

The socio-demographic characteristics of the rickshaw puller in the Khulna city corporation are shown in Annex Table A1. It has been seen that most of the respondents (85 percent) are the household head. Only 14 of the families are headed by the father of the respondents. Mostly these families are of a nuclear type. Among the total families, about 66 percent are nuclear families, and 31 percent are extended-type families. Almost all of the respondents (88 percent) are married, and the rest are unmarried.

Since the rickshaw pullers operate in the city area, the rickshaw pullers' families also take shelter in the city or nearby area. Survey data show that 52 percent of the respondents live with families in the city centre and others find accommodation nearby. Most of them live together with other family members such as wives and children (70 percent), and the others live either single or with relatives. According to the survey data, the living house condition is not up to the standard. Only 13 percent enjoy living in concrete houses, and 55 percent of the respondents live in semi-concrete houses. Some managed to get their own home (36 percent), while others lived in rented houses (58 percent). Living in the city corporation area paves the way to getting access to drinking water from deep tube wells. Almost all of them (95 percent) have access to safe drinking water. Besides, they have access to electricity facilities as well.

Among the respondents, 63 percent reported that they get leisure time, while the others are beyond that opportunity. Before taking rickshaw pulling as an occupation, 28 percent worked as agricultural labor, and 30 percent were construction labor, similar to Hossain et al. (2018). More than half of them (63 percent) owned a rickshaw, while the rest used rented rickshaws from the owners. In general, rickshaw pulling requires hard labour with continuous effort. Hence, 69 percent of the respondents work daily and at night to earn money. They have reported that 65 percent are willing to leave the job if another suitable opportunity arises, while the others prefer to stay in business. Almost 80 percent of them have reported having any health problems. Among the health issues, more than half are affected by fever and gastrointestinal illness (Islam et al., 2016). Another 23 percent reported having aches and pain-related issues.

3.2 Determinants of Willingness to Continue Rickshaw Pulling

No job other than rickshaw pulling attracts rickshaw pullers who have been in this profession for a long time. Still, some of them desire to leave the occupation if a

Table 2: Factors affecting willingness to continue Rickshaw pulling

Variables	Symbol	Coef.	Robust Std. Err.	t-value	p-value	Marginal Effect
Independent Variables						
Age of respondent	X ₁	0.031***	0.01	3.16	0.00	0.007
Education of respondent	X ₂	-0.034	0.03	-1.09	0.27	-0.008
Marital status	X ₃	-0.431	0.37	-1.15	0.24	-0.096
Income from rickshaw	X ₄	0.063**	0.02	2.51	0.01	0.014
Family head	X ₅	-0.929***	0.32	-2.85	.00	-0.206
Earning member	X ₆	-0.321	0.22	-1.40	.16	-0.071
Health problem	X ₇	0.125	0.25	0.48	.62	0.028
Rickshaw ownership	X ₈	0.198	0.22	0.90	.37	0.044
Constant	-	-1.121	0.70	-1.58	.11	-
Dependent Variable						
Desire to continue rickshaw pulling in future						
Pseudo r-squared	0.04	SD dependent var.			0.47	
Chi-square	25.77	Number of obs.			500	
		Prob>chi2			0.00	

Source: Authors' compilation based on field survey, 2019

Note: ** = significant at 5% level and *** = significant at 1% level

Table 3: Determinants of household income of Rickshaw puller

Variables	Symbol	Coef.	Robust Std. Err.	t-value	p-value
Independent Variables					
Age of household head	Z ₁	0.0003	0.00	0.18	0.85
Log Income from rickshaw pulling	Z ₂	0.444***	0.10	4.27	0.00
Marital status	Z ₃	-0.032	0.05	-0.55	0.58
Health problem	Z ₄	-0.011	0.03	-0.27	0.78
Rickshaw driving shift	Z ₅	-0.085**	0.03	-2.25	0.02
Rickshaw driving duration daily	Z ₆	0.0002	0.00	0.02	0.98
Rickshaw ownership	Z ₇	-0.061*	0.03	-1.68	0.09
Family head	Z ₈	-0.182***	0.05	-3.54	0.00
Residence location	Z ₉	-0.017	0.03	-0.50	0.61
Constant	-	5.586	0.99	5.64	0.00
Dependent Variable					
Log Household monthly income in BDT					
R-squared	0.29	SD dependent var.			0.42
F-test	8.31	Number of obs.			500
Mean VIF	1.18	Prob>chi2			0.00

Source: Authors' compilation based on field survey, 2019

Note: * = significant at 10% level ** = significant at 5% level and *** = significant at 1% level

better jobs are available. Table 2 provides statistical evidence of factors influencing the rickshaw puller to continue their current work or switch to another profession. Age plays a positive and statistically significant role in influencing the rickshaw puller to stay in the existing business. Besides, income earned from rickshaw pulling increases the probability of staying in the current occupation. On the other hand, being the household head of the family increases the likelihood of switching the current profession to another job. The other factors presented in Table 3 are found statistically insignificant.

3.3 Household Income Determination of Rickshaw Pullers

The monthly income of a rickshaw puller depends on a set of crucial socioeconomic factors. Among them, income from rickshaw pulling contributes a significant portion of the total household income. According to the estimated results presented in Table 3, it has been clear that a 1 percent increase in income from rickshaw pulling tends to increase total household income by 0.44 percent, and the result is significant at a 1 percent level. On the other hand, only day shift driving rickshaw rather than day and night shift tends to decrease the total income by 11 percent as $\exp(-0.085) \sim 1.089$, which is statistically at 5 percent. In terms of ownership of the rickshaw, it has been found that being the rickshaw owner does not help increase total household income, and a similar result is also reported by Wadood and Tehsum (2018). In the study area, it has been noted that ownership of a rickshaw causes a decrease in household income by 11 percent as $\exp(0.061) \sim 1.063$, which is significant at the 10 percent level. The reason may be that all sorts of rickshaw maintenance costs are not a concern for the rented rickshaw, whereas it is the owners' responsibility. The rented rickshaw is usually over-utilized by the drivers to maximize earnings. Besides, being a household head tends to decrease total household income by 12 percent as $\exp(0.182) \sim 1.199$ compared to the rickshaw pullers who are not household heads. The reasons are evident in this case. There are a lot of duties and responsibilities maintained by the household head. As a result, earning money by the family head is less than the earnings of other family members.

3.4 Estimation of Rickshaw Pullers' Household Consumption Function

Table 4: Estimation of household consumption function

Variables	Coef.	Robust Std. Err.	t-value	p-value
Log Household monthly income in BDT	0.69***	0.07	9.25	0.00
Constant	2.78	0.71	3.90	0.00
Dependent Variable				
Log Household monthly expenditure in BDT				
R-squared	0.55	SD dependent var.		0.39
F-test	85.49	Number of obs.		500
		Prob>F		0.00

Source: Authors' compilation based on field survey, 2019

Note: *** = significant at 1% level

After determining the rickshaw pullers' household income and expenditure (Table 1), an attempt has been made to estimate respondent rickshaw pullers' consumption behaviour. A general form of consumption has been used to estimate the consumption function (Equation 5). The calculated result is presented in Table 4. It has been seen that a 1 percent increase in income is accompanied by a rise in household consumption by 0.69 percent, and it is statistically significant at a 1 percent level. In other words, the marginal propensity of household consumption is 0.69, meaning that BDT69 is spent against BDT100 earnings. The rest of the earnings are either saved or paid for productive purposes.

3.5 Constraints to Rickshaw Pulling

Further investigation has been carried out to identify the rickshaw puller's problems in their day-to-day operation. The survey data show that the rude behaviour of police (Islam et al., 2016) and poor condition of the roads (Karim & Salam, 2019) are major constraints to rickshaw pulling. Besides, they also reported a lack of stoppage for rickshaws around the city. Sometimes, they are treated with low fares by the passengers.

4. Concluding Remarks and Policy Implications

Rickshaw pulling is one of the largest informal employment opportunities provided for unskilled people in urban areas of Bangladesh. As an essential and 3rd largest metropolitan city, Khulna city has become the primary place of interest for the rural unemployed people from coastal areas. Most of them settled in the city, working as rickshaw pullers. Due to high demand among city dwellers, this profession is still lucrative for poor people to maintain their livelihood. In Khulna city, most rickshaw pullers have little education and skill. Many are willing to stay in the rickshaw-pulling occupation, while others want to switch to this profession. A large amount of the household income comes from rickshaws pulling apart from other works.

Policy implications should focus on providing easy access to credit with low interest to the rickshaw pullers. With that loan, they can buy new rickshaws and manage rickshaw safety during rickshaw pulling. Besides, training on traffic rules could be provided to the rickshaw puller regularly to avoid unnecessary accidents and road congestion. In addition, regulations on issuing new licenses should be made more accessible to prevent problems related to illegal rickshaws. Also, young rickshaw pullers should be provided training on different development skills to increase their human capital. The training facility would give them many opportunities to earn more money and improve their lifestyle. Rickshaw pulling could be a crucial urban informal economic activity and a sustainable income source for the country's unemployed and poor, unskilled labour force by addressing these challenging issues.

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Annex

Table A1: Socio-Demographic Profile

Category	Frequency (N = 500)	Percent	Cumulative Percent
Head of the family			
Father	70	14	14.8
Mother	5	1	15
Self	425	85	115.2
Total	500	100.00	
Type of family			
Nuclear family	331	66.20	66.20
Extended family	158	31.60	97.80
Single parent family	11	2.20	100.00
Total	500	100.00	
Marital status			
Unmarried	61	12.20	12.20
Married	439	87.80	100.00
Total	500	100.00	
Current residence			
Sub-urban	239	47.80	47.80
Urban	261	52.20	100.00
Total	500	100.00	
Living arrangement			
With spouse and children	350	70.00	70.00
With spouse only	52	10.40	80.40
With relatives	60	12.00	92.40
Alone	38	7.60	100.00
Total	500	100.00	
Type of house			
Concrete	66	13.20	13.20
Semi-concrete	276	55.20	68.40
Tin-shed	158	31.60	100.00
Total	500	100.00	

Category	Frequency (N = 500)	Percent	Cumulative Percent
Ownership of house	Freq.	Percent	Cum.
Owned	181	36.20	36.20
Rented	294	58.80	95.00
Slum-dwellers	25	5.00	100.00
Total	500	100.00	
Source of drinking water			
Pond/Canal	13	2.60	2.60
River	1	0.20	2.80
Deep Tube-well	478	95.60	98.40
Rainy Water	8	1.60	100.00
Total	500	100.00	
Access to electricity			
Yes	476	95.39	95.39
No	23	4.61	100.00
Total	499	100.00	
Having leisure time			
Yes	315	63.00	63.00
No	185	37.00	100.00
Total	500	100.00	
Previous occupation			
Agricultural labor	144	28.80	28.80
Labor in construction works	150	30.00	58.80
Hawker	28	5.60	64.40
Sweeper	12	2.40	66.80
Worker in hotel	64	12.80	79.60
Non-worker	80	16.00	95.60
Others	22	4.4	100.00
Total	500	100.00	
Ownership of rickshaw			
Owned	323	64.60	64.60
Rented	177	35.40	100.00
Total	500	100.00	
Rickshaw driving shift			
Only day	152	30.40	30.40
Both day and night	348	69.60	100.00
Total	500	100.00	
Desire to continue driving the rickshaw			
No	329	65.80	65.80
Yes	171	34.20	100.00
Total	500	100.00	
Having health problem			
Yes	399	79.80	79.80
No	101	20.20	100.00
Total	500	100.00	
Major health problems			
Fever of all types	138	33.99	35.47
Gastrointestinal illness	110	27.09	62.56
Aches and pain	94	23.15	85.71
Respiratory illnesses	19	4.68	90.39
Skin/Eye/ENT related illnesses	18	4.43	94.83
Water-borne illness	20	6.66	100.00
Total	399	100.00	

Source: Authors' compilation based on field survey, 2019