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Paschim Islamabad: Looking through the lens of multidimensional poverty

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ABSTRACT

Paschim Islamabad located at Matlab Uttar Upazila in Chandpur district is a village having 599 people from 140 households and is one of the villages selected for the implementation of an action research project entitled 'Poverty Free Model Village' being implemented by Rural Development Academy, Bogura, and designed on the basis of Multidimensional Poverty Index (MPI). The study is an effort to capture multidimensional poverty and its dynamism along with the socioeconomic and demographic characteristics of the villagers in order to select beneficiaries and determine an intervention strategy. The headcount ratio of multidimensional poverty, the intensity of poverty, and the MPI score of the village are 0.66, 0.4 and 0.28 respectively. There are 85 MPI-poor households (60.71%) with a number of 381 members whereas 55 households (39.29%) with 218 household members are MPI non-poor in Paschim Islamabad. A considerable difference between MPI poor and MPI non-poor has been found in most MPI indicators except cooking fuel and child mortality. The correlation coefficient of income and MPI score is -0.13 which indicates that the increase in income of a household does not guarantee the betterment of life in the dimensions of health, education, and living standard. The inverse also holds true. Therefore, it stands to reason that income and non-income approaches should be considered simultaneously while designing the intervention strategy. This argument is also supported by the lessons learned from the pilot project of Kalshimati village in Bogura district. The study recommends a number of strategies categorized as indicator-based and income-generating. Several main indicator-based strategies include particular treatments such as building good standard house, toilet and facilitating safe drinking water and electricity consumption to the beneficiaries. Income-generating strategies include asset transfer, entrepreneurship development, the establishment of market linkage to extend market facilities, providing training, credit, life, and nonlife insurance facilities, and making the natural resources of project area more productive.

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Introduction

Poverty has many faces and needs to be redefined and readdressed over time due to the changing context. Income is mostly used in measuring

the poverty line. However, income alone is not enough to define a poverty line. There is a lot to capture beyond the monetary dimension. Here comes Multidimensional Poverty Index (MPI), a

non-income approach to play a complementary role. The non-monetary dimension of poverty includes but is not limited to education and health services, improved sanitation, life and non-life insurance, safe drinking water, use of clean fuel, consumption of electricity, etc. for a decent life (Ahmed et al., 2022). MPI-based estimation shows that 14.5 percent in urban and 27.4 percent in rural areas were MPI-poor in 2020 (OPHI & IsDBI, 2021). The population in multidimensional poverty in Bangladesh is 24.1 percent and about 39.23 million people are considered MPI poor (UNDP & OPHI, 2021). The people of Bangladesh are still deprived at a higher rate of cooking fuel, years of schooling, sanitation, housing, and assets (ibid.). The Government of Bangladesh enshrines a firm commitment in Bangladesh's 'Perspective Plan 2041' to eliminate absolute poverty by 2041, reduce the national poverty rate below 3.00 percent, and ensure minimum living standards for all citizens by 2041 (General Economics Division, 2020ab). Rural Development Academy (RDA), Bogura has designed and launched an action research project framed on the concept of the MPI in Kalshimati, a village at Sherpur Upazila in Bogura district in harmony with the aforesaid national goals. "The central thrust of the project is to address the multidimensionality and dynamism of poverty felt by the poor" (Ahmed et al., 2022, p. 3). RDA aims to extend the project in the village Paschim Islamabad located at Matlab Uttar Upazila in Chandpur district. Hence the study has been taken to assess the multidimensional poverty of the people living in the village.

Research rationale

Poverty reduction programmes so far have been basically income focused in Bangladesh. Income is a proxy for assessing deprivations such as lack of nutrition and poor housing conditions. However, it may not always be the case. A household having financial ability may not fulfill basic needs due to having little or no access to goods and services. Moreover, households differ in their capacities to convert income into the satisfaction

of needs (Santos & Alkire, 2011). One other important aspect is that income is more of a means to an end rather than an end in itself. Our interest is to know whether a person is well nourished, not whether he or she has the income to get nourished. To overcome such limitations, MPI could be an option or MPI could be applied together with the income approach. "MPI reflects the deprivations experienced by each member of a household and thus provides a deep and complete picture of household poverty. The way the MPI-based project works can contribute to achieving SDGs 1, 2, 3, 4, 6, 7, and 11 simultaneously (Ahmed et al., 2022, p. 4). MPI offers a quantitative way of monitoring poverty status. Therefore, the findings can help policymakers, development planners and practitioners get a comprehensive picture and formulate effective policies to uproot poverty in an all-inclusive approach.

Research objectives

The broad objective is to capture multidimensional poverty, perform a descriptive analysis of the social and economic status of the people of Paschim Islamabad and develop an intervention mechanism. The specific objectives of the study is as follows:

- i. To assess multidimensional poverty;
- ii. To determine the demographic and socio-economic status of the people; and
- iii. To identify target beneficiaries and develop intervention strategies.

Data collection and analysis

RDA carried out an app-based census for 140 households in May 2022. Data has been analyzed to estimate the deprivation score, incidence, and intensity of multidimensional poverty and the multidimensional poverty index. The relevant concepts and the measures have been explained following the technical note derived from the work of Alkire and Jahan (2018).

Headcount ratio: It refers to the proportion of multidimensional poor individuals in the total population and is calculated as q/n : where q = the total number of multi-dimensionally poor individuals identified and n = the total population.

The intensity of poverty: It is the average proportion of deprivations experienced by multi-dimensional poor individuals and is calculated as I/q ; where I = total deprivation score of multi-dimensional poor individuals and q = the total number of multi-dimensionally poor individuals identified.

Multidimensional poverty index (MPI)

MPI is the product of the headcount ratio (H) and intensity (A) of multidimensional poverty. This can also be defined as the share of the population that is multidimensional poor adjusted by the intensity of deprivation. Therefore, MPI “is the share of weighted deprivations faced by multidimensional poor individuals divided by the total population” (Niti Aayog, 2021, p.22).

MPI: Explaining dimension, indicator and weight

The MPI assesses multiple deprivations at the household level in three dimensions and 10 indicators. Each dimension is equally weighted

and further subdivided into its indicators. The total deprivation score is 100 percent and the maximum deprivation score in each dimension is 33.3 percent or $1/3$. To identify MPI-poor people, the deprivation scores for each indicator are summed to obtain the household deprivation score. A cutoff of $1/3$ is used to distinguish between poor and non-poor people. “If the deprivation score is $1/3$ or higher, that household (and everyone in it) is considered multi [1] dimensionally poor. People with a deprivation score of $1/5$ or higher but less than $1/3$ are considered to be vulnerable to multidimensional poverty. People with a deprivation score of $1/2$ or higher are considered to be in severe multidimensional poverty” (Alkire, et al., 2020, p. 8). The dimensions, indicators, deprivations cut off and weights have been presented in Table 1.

Results and discussion

The results have been discussed in five parts: demographic, deprivation and multidimensional

Table 1. Dimensions, indicators, deprivation cut off and weights of MPI

Dimension	Indicator/ weight	Deprivation cut off (deprivation if living in the household where...)	SDG goal
Health (1/3)	Nutrition (1/6)	Any person under 70 years of age for whom there is nutritional information is under nourished.	SDG 2
	Child mortality (1/6)	A child under 18 years has died in the household in the five years period preceding the survey.	SDG 3
Education (1/3)	Years of schooling (1/6)	No eligible household member has completed 6 years of schooling.	SDG 4
	School attendance (1/6)	Any school aged child is not attending school up to the age at which he or she would complete Class 8.	SDG 4
Living standard (1/3)	Cooking fuel (1/18)	A household cooks using solid fuel such as dung, agriculture crop, shrubs, wood, charcoal or coal.	SDG 7
	Sanitation (1/18)	The household has unimproved or no sanitation facility or it is improved but share with other households.	SDG 6
	Drinking water (1/18)	The households' source of drinking water is not safe or saved drinking water is a 30 minutes or longer walk from home and round trip.	SDG 6
	Electricity (1/18)	The household has no electricity.	SDG 7
	Housing (1/18)	The household has inadequate housing materials in any of the three components: floor, roof or walls.	SDG 11
	Asset (1/18)	The household does not own more than one of these assets: radio, tv, telephone, computer, animal cart, bicycle, motorbike or refrigerator and does not own a car or track.	SDG 1

Source: Alkire et al. (2020)

Table 2. Demographic analysis of Paschim Islamabad

Sl. No.	Subjects	Numbers/percentage
1	Total population	599
2	Total households	140
3	Female	299
4	Male	300
5	Percentage of population under 18 years	35.26%
6	Percentage of youth (18-35 years)	28.31%
7	Percentage of population middle age (36-65 years)	31.32%
8	Percentage of population above 65 years	5.11%

poverty index, socioeconomic status, income, and multidimensional poverty and interventions strategy.

Demographic analysis

The demographic analysis has been shown in Table 2. The village has a number of 133 households. The population is 599 out of which the male and females are 299 and 300 respectively. The village has 35.26 percent and 5.11 percent of its population below the age of 18 and above the age of 65 respectively. The youth (18-35) and the middle age group (36-65) constitute 28.31 percent and 31.32 percent of the total population.

Deprivation and MPI

The headcount ratio or incidence of multidimensional poverty is 0.66, meaning that 66 percent of the total population is multidimensional poor. The intensity of poverty is 0.42 which means “the

average deprivation score of the multidimensional poor people” (Santos & Alkire, 2011, p. 13). To put it another way, on average—the poor are deprived in 42 percent of the weighted indicators. The MPI score of the village is 0.28. The MPI score reflects “the proportion of weighted deprivations that the poor experience in a society out of all the total potential deprivations that the society could experience” (ibid., p. 14).

The Table 3 shows the picture of the multidimensional poverty of the village. There are 85 MPI-poor households (60.71%) with a number of 381 members whereas 55 households (39.29%) with 218 household members are MPI non-poor in Paschim Islamabad. MPI poor category is further subdivided into vulnerable to multidimensional poverty (people with a deprivation score between 0.33-0.49) and severe multidimensional poverty (people with a deprivation score between 0.50-1.00). There are 66 households with 293 people belonging to the multidimensional poverty category and 19 households with 88 people belonging to the severe multidimensional poverty category. Table 3 also shows that average family size has an effect on being multidimensional poor. MPI non-poor, multidimensional poor and severe multidimensional poor categories have an average family size of 4, 4.4, and 4.6 respectively.

As shown in Table 4, no household under any deprivation score-based category is deprived of electricity. The highest deprivation has been found in years of schooling. The deprived households in the MPI poor and MPI non-poor categories are 78 and 22 respectively. The second highest number

Table 3. Household and family size of MPI poor and MPI non-poor

Status	Deprivation score	Population	Number of household	Percentage of household	Average family size
MPI non poor	0.00-0.19	117	28	20.00	4.2
MPI non poor	0.20-0.32	101	27	19.29	3.7
	Sub total	218	55	39.29	3.95
MPI poor	0.33-0.49	293	66	47.14	4.4
MPI poor	0.50-1.00	88	19	13.57	4.6
	Sub total	381	85	60.71	4.5
	Total	599	140	100	4.2

Table 4. Indicator wise deprivation of households across deprivation score based category

Indicator	Deprivation score						
	0.00-0.19	0.20-0.32	0.33-0.49	0.50-1.00	0.00-0.32	0.33-1.00	0.00-1.00
Electricity	0	0	0	0	0	0	0
Sanitation	2	19	44	18	21	62	83
Safe water	1	0	5	4	1	9	10
Housing	1	7	21	17	8	38	46
Cooking fuel	2	7	16	10	9	26	35
Assets	1	2	16	10	3	26	29
Years of schooling	9	13	60	18	22	78	100
School attendance	0	1	10	10	1	20	21
Malnutrition	6	13	45	16	19	61	80
Child mortality	0	0	2	1	0	3	3

of households suffering from deprivation is sanitation. There are 62 households in MPI poor and 21 households in MPI non-poor categories are deprived in this indicator. Households' deprivation in malnutrition, housing, cooking fuel and school attendance also deserves keen attention. There are 61, 38, 26, and 20 households under MPI poor category found deprived in malnutrition, housing, cooking fuel and school attendance respectively.

Socio-economic status

The socio-economic status of people mainly focuses on their education, occupation, and land ownership. The income aspect has been discussed in the income poverty and multidimensional poverty section. Other non-monetary dimensions (health, education, and living standard) have been reflected in the multidimensional poverty index. Table 5 shows educational attainment. The 10 categories of educational attainment have been used to describe the status of the people of Paschim Islamabad. The percentages of illiterate, primary, lower secondary, secondary, and higher secondary groups are 5.68 percent, 22.37 percent, 19.03 percent and 20.53 percent respectively.

There are 17 categories of occupation found in the village. The unemployment rate is 4.67. The students belong to the largest category that constitutes 29.72 percent followed by housewives with 28.71 percent. There are 5.01 percent, 5.84 percent, 3.01 percent and 3.51 percent people who belong to business, private job, day labourers

and farmers categories respectively (Table-6).

Table 7 presents land ownership of households based on deprivation score-based categories. There are 27 households belonging to MPI non-poor category and 62 households belonging to MPI poor category. The households of both categories do not own any land. The households having land in severely poor and vulnerable to multidimensional poor categories are 16 and 46 respectively. It deserves attention that 11 households belonging to MPI non-poor category have the lowest scores (0.00-0.19). In overall consideration, the fact indicates that

Table 5. Status of educational qualification

Sl. No.	Educational qualification	Number of persons	Percentage
1	Infant	52	8.68
2	Can sign/can read and write	48	8.01
3	Illiterate	34	5.68
4	Hafez/Madrasa education	28	4.67
5	Primary	134	22.37
6	Lower secondary	114	19.03
7	Secondary (SSC)	123	20.53
8	Higher secondary	39	6.51
9	Graduation	18	3.01
10	Post-graduate	9	1.50
Total		599	100.00

Table 6. Occupational status

Sl. No.	Name of occupation	Number of population	Percentage
1	Business	30	5.01
2	Children	50	8.35
3	Day labour (Agriculture/ non agriculture)	18	3.01
4	Disable	3	0.50
5	Driver (rickshaw/van/auto rickshaw/truck/ Nachiman)	26	4.34
6	Expatriate	18	3.01
7	Farmer	21	3.51
8	Government job	4	0.67
9	Handicraft/ tailoring	2	0.33
10	Housewife	172	28.71
11	Imam/priest	2	0.33
12	Mechanic (van/ plumbing/ mason/electrician/carpenter/ other)	9	1.50
13	Private job	35	5.84
14	Student	178	29.72
15	Teacher	2	0.33
16	Unemployed	28	4.67
17	Village doctor	1	0.17
Total		599	100.00

land is an important factor for MPI poor and non-poor and land ownership is an advantage. However, it cannot be concluded that households

having land have a greater chance to lift out of multidimensional poverty.

Income poverty and multidimensional poverty

This section presents data on daily income above and below \$1.90 of the households and the people (Tables 8 & 9). The number of households belonging to the MPI poor categories with a daily income above \$1.90 is 36 whereas and the number of households in the MPI non-poor category is 37. The difference between the two groups is ignorable. However, on the basis of a daily income below \$1.90, there is a considerable difference between the two groups, MPI poor category having 49 households and MPI non-poor category having 18 households. A similar picture has been found in the case of people (Table 9). There is no difference between the groups on the analytical basis of daily income above \$1.90. However, the difference is evident when a daily income below \$1.95 is considered. The people in the MPI poor and MPI non-poor groups are 75 and 222 respectively.

In order to know the relationship between income and MPI score variables, the correlation test has been performed. The correlation coefficient found is -0.13 which indicates very weak or no correlation. Moreover, a negative correlation refers to the movement of income and MPI variables in opposite directions. The result of correlation conveys the message that the increase in income of a household does not guarantee the betterment of life in the dimensions of health, education and living standard. The inverse also holds true. However, income is a precondition

Table 7. Land ownership of households based on deprivation score based categories

Land size (acre)	Deprivation score						
	0-0.19	0.20-0.32	0.33-0.49	0.50-1.00	0-0.32	0.33-1.00	0-1.00
0.00-0.00	11	16	46	16	27	62	89
0.00-0.20	9	7	14	3	16	17	33
0.21-0.49	6	2	2	0	8	2	10
0.50-1.00	1	1	3	0	2	3	5
1.01-2.00	1	0	1	0	1	1	2
2.01 above	0	1	0	0	1	0	1

Note: Ownership of cultivable agricultural land and non-agricultural land has been considered.

Table: 8. Number of households having daily income of USD 1.9

Daily income	Deprivation score						
	0.00-0.19	0.20-0.32	0.33-0.49	0.50-1.00	0.00-0.32	0.33-1.00	0.00-1.00
Above USD 1.9 (PPP)	21 (15.00)	16 (11.43)	33 (23.57)	3 (2.14)	37 (26.43)	36 (25.71)	73 (52.14)
Below USD 1.9 (PPP)	7 (5.00)	11 (7.86)	33 (23.57)	16 (11.43)	18 (12.86)	49 (35.00)	67 (47.86)

Note: Percentage has been shown in parenthesis.

and a minimum income is indispensable. Hence both income and non-income approach should be considered as intervention strategy.

Note: Percentage has been shown in parenthesis.

Intervention strategy

The study finds a number of reasonable and proper strategies to adopt and apply on the basis of analysis of multidimensional poverty and socio-economic status and previous experience gained in the pilot project of Kalshimati. Both income and non-income aspects of poverty have been considered as they are mutually reinforcing. To lift the target beneficiaries out of poverty, the study recommends the following indicator-based and income-generating interventions.

i) Indicator-based strategies: Particular treatments such as building a good standard house, and toilet, and facilitating safe drinking water and electricity consumption will be given for each indicator to the beneficiaries who are MPI poor. To be most effective, the treatment policy will be formulated on the basis of the findings of the impact evaluation in Kalshimati village. Besides, efforts will be made to increase the access of beneficiaries to government and non-government services regarding health, education, and nutrition.

ii) Income-generating strategies: Income-generating interventions include asset transfer such as goat, cow, chick, sewing machine and plant, entrepreneurship development, the establishment of market linkage to extend market facilities, providing training, credit, life, and

nonlife insurance facilities, making natural resources of project area more productive and establishment of off-farm small and medium industries.

Key findings

The population of the village Paschim Islamabad is 599 from 140 households. The male and female populations are 300 and 299 respectively. In the village, 35.26 percent of its population is below the age of 18. The youth (18-35) and the middle age group (36-65) constitute 28.31 percent and 31.32 percent of the total population. The head-count ratio of multidimensional poverty and intensity of poverty are 0.66 and 0.42. There are 85 MPI-poor households (60.71%) having 381 family members whereas 55 households (39.29%) with 218 family members are MPI non-poor. MPI poor are further subdivided into vulnerable to multidimensional poverty and severe multidimensional poverty. There are 19 households with 88 people belonging to the severe multidimensional poverty category. The MPI score of the village is 0.28.

The total population deprived in assets, housing, cooking fuel, sanitation, safe water, malnutrition, years of schooling, and school attendance under the MPI poor category are 76, 172, 101, 286, 45, 308, 358, and 98 respectively whereas, under MPI non-poor category, the total population corresponding to those indicators are 7, 26, 31, 70, 1, 74, 76 and 5. There is a slight difference of deprivations between MPI poor and MPI non-poor in cooking fuel and child

Table: 9. Number of population having daily income of USD 1.9

Daily Income	Deprivation score						
	0.00-0.19	0.20-0.32	0.33-0.49	0.50-1.00	0.00-0.32	0.33-1.00	0.00-1.00
Above USD 1.9 (PPP)	85 (14.19)	58 (9.68)	148 (24.71)	11 (1.84)	143 (23.87)	159 (26.54)	302 (50.42)
Below USD 1.9 (PPP)	32 (5.34)	43 (7.18)	145 (24.21)	77 (12.85)	75 (12.52)	222 (37.06)	297 (49.58)

mortality but a considerable difference between MPI poor and MPI non-poor in all other indicators. As to educational attainment, the percentages of illiterate, primary, lower secondary, secondary, and higher secondary groups are 5.68 percent, 22.37 percent, 19.03 percent, and 20.53 percent of the total population respectively. There are 17 categories of occupation found in the village. The unemployment rate is 4.67. The students belong to the largest category which constitutes 29.72 percent followed by housewives with 28.71 percent. There are 5.01 percent and 5.84 percent, 3.01 percent and 3.51 percent of people who belong to the business, private job, day laborers, and farmer categories respectively. The 27 households belonging to MPI non-poor category and 62 households belonging to MPI poor category do not own any land. Land ownership has been found to be an important factor that could be an advantage for a household to defend it from falling into the severe poverty trap. However, as the data shows, it cannot be concluded that households having land have a greater chance to lift out of multidimensional poverty.

The difference found in terms of daily income above \$1.90 between MPI poor and MPI non-poor groups is ignorable. However, on the analytical basis of a daily income below \$1.90, there is a considerable difference between the two groups, MPI poor category having 49 households with 222 people and MPI non-poor category having 18 households with 75 people. The correlation coefficient of income and MPI score variables is -0.13 indicating a very weak or no correlation. Moreover, a negative correlation refers to the movement of income and MPI variables in opposite directions. The result of the correlation conveys the message that the increase in income of a household does not guarantee the betterment of life in the dimensions of health, education, and living standard. The inverse also holds true. However, income is a precondition and a minimum income is indispensable. Hence income and non-income approaches should be considered simultaneously while designing intervention strategies to lift the beneficiaries

out of the poverty line. The study recommends a number of strategies categorized as indicator-based and income-generating to adopt and apply on the basis of the analysis of multidimensional poverty and socio-economic status and previous experience gained in the pilot project of Kalshimati. Several main indicator-based strategies include particular treatments such as building good standard houses, and toilets and facilitating safe drinking water and electricity consumption to the beneficiaries. Besides, efforts will be made to increase the access of beneficiaries to government and non-government services regarding health, education, and nutrition. Income-generating strategies include asset transfer, entrepreneurship development, the establishment of market linkage to extend market facilities, providing training, credit, life, and nonlife insurance facilities, and making the project area more productive natural resources.

Conclusion

The study intends to capture multidimensional poverty and its dynamism along with the socio-economic and demographic characteristics of villagers in order to select beneficiaries and determine intervention strategies. The study has identified 381 beneficiaries who belong to 85 MPI poor households. Uplifting their income and non-income status is the main concern. Intervention strategies have also been developed based on the overall and household specific analysis. Poverty is multifaceted. Its face and effect change over time. Context matters to identify enablers and obstacles in a particular situation to fight against poverty. The multidimensional poverty index reasonably shows us a more sustainable way out to address the poverty issue. Hence the application of MPI to deal with poverty may result in long-lasting benefits to eradicate poverty in the context of Bangladesh.

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Role of NGOs in financial inclusion towards achieving Sustainable Development Goals in Bangladesh

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ABSTRACT

Presently, according to the report of Asian Development Bank, 26,000 non-government organizations (NGOs) are operating their activities in Bangladesh. Although the evolvments of NGOs have some abstract criticisms, NGOs are ensuring its contribution for the development of the economy of the country. However, to what extent NGOs have fostered financial inclusion in Bangladesh towards achieving SDGs residues an issue of exhaustive investigation. Accordingly, this study attempts to evaluate the role of NGOs in financial inclusion toward achieving SDGs in Bangladesh. In this study, data have been collected by surveying 312 structured questionnaires to the members of NGOs across the whole country using the purposive sampling method. In this study, we have used percentage analysis to draw the conclusion and results have been shown in both table and figure with explanations. The result of the study revealed that activities of NGOs have a significant positive influence on financial inclusion which have the capability to enhance the credit accessibility to underprivileged communities, reduce inequality, eradication of poverty, gender justice, women empowerment, community awareness, and involvement, climate change resilience, disaster management, racial equality which have association with UN stated SDGs. Though NGOs are contributing positively to financial inclusion, it is criticized as debt traps for the borrowers. Therefore, this study ensures useful insights for the policymakers and stakeholders of NGOs as the findings can play a significant role for ensuring greater accountability and transparency of NGOs in relation to contributing to financial inclusion to a greater extent towards achieving SDGs by 2030 in Bangladesh.

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Introduction

In recent past, Bangladesh has graduated from the least developed economy list to developing economy. Bangladesh had a tremendous

experience in accomplishing Millennium Development Goals (MDGs) in time. Now, Bangladesh is targeting to accomplish Sustainable Development Goals (SDGs) by 2030 though

the outbreak of the pandemic, COVID-19 and geo-political unrest between Russia and Ukraine has been the reason of headaches for the government (Ameli et al., 2022; Del et al., 2022). Financial inclusion can be said one of the prominent contributors which can be played role of several indicators of SDGs regarding gender equalization, women empowerment, racial equalization, eradication of poverty, and inclusive development.

Financial inclusion

Financial inclusion has been considered a policy priority in many countries and the importance of financial inclusion has been widely recognized (Sarma, 2008). For improving the living conditions of poor farmers, rural non-farm enterprises, and other vulnerable groups, financial inclusion is considered an important aspect. Lack of access to take loans from formal financial institutions is high for the small and marginal farmers, and other social groups, and it is termed financial exclusion which is creating obstacles to gaining business opportunity and social responsibility. Delivery of banking services to the deprived and low-income groups at an affordable cost is financial inclusion (Ghosh, 2022). The process of making financial services including not only the loan but also the insurance, remittances, and savings facilities accessible; affordable to all, and removing the barriers of financial exclusion is financial inclusion (Dasgupta, 2009). In these regards, formal banking institutions and microfinance institutions are entitled for playing an important role (Dev, 2006). Age, education, financial literacy, income, and internet connectivity, are found to have a positive association with financial inclusion but documentation required for opening bank accounts and distance to the nearest access point were found to have a negative association with financial inclusion (Sanderson et al., 2018). Financial inclusion was found to have a positive impact on enhancing financial stability (Hanning, 2010).

Components of financial inclusion

The availability and accessibility of basic financial services, protection of consumer's

rights, proportional surveillance, promotion of digital technology, financial literacy, financial behaviour, financial attitude, financial knowledge, savings behaviour, creation of financial literacy programme, national and sociological characteristics, wellbeing awareness, and involvement as well use are the prime factors of ideal financial inclusion practice (Schoofs, 2022). While, lack of funds, distrust of banking services, unacceptable pricing policy of banks also be part low-level financial inclusion (Prymostka et al., 2020; Morgan & Long, 2020). Financial inclusion can be affected by three distinct indicators such as technological, economical, and political factors (Kabakova & Plaksenkov, 2018).

Financial inclusion and SDGs

For ensuring sustainable development, financial inclusion is an important substance and carries positive influence on the sustainable development (Soyemi et al., 2020). Human development, income, inequality, literacy, urbanization, and physical structure for connectivity and information are considered important factors associated with financial inclusion as well as sustainable development of a nation (Sarma, 2011). Financial inclusion was found to have a positive impact on financial sustainability (Le et al., 2019). In the developing world, as an instrument of poverty eradication, financial inclusion has been presented. Financial inclusion has capabilities in minimizing financial shocks of poor families, carrying out human capital investment in health and education, involve in modest asset accumulation, and finally creating investment opportunities in their economics which is able to serve the poorest segments of the populations in poverty reduction and stimulating sustainable growth and development (Kuada, 2019). In other words, financial inclusion ensures vulnerable groups of peoples to access the credit which carries a significantly direct impact on poverty eradication, improving health and education, and reducing gender and racial inequality (Amponsah et al., 2021). In particular, these are the most important aspects of UN stated SDGs. There is a general belief that in emerging countries;

women are deprived from formal loan facilities, otherwise paid extra (Kulkarni & Ghosh, 2021). Furthermore, nonwhites, ethnic minorities, and immigrants are found to be excluded from formal loan facilities poses to be extended inequalities in societies (Santoso et al., 2016). In this regard, financial inclusion gives access to credit to all groups of people without considering race, gender, and ethnicity and will help to attain UN stated SDGs (Kara et al., 2021).

NGOs and financial inclusion

In the development of Bangladesh, NGOs has been considered as one of the most prominent contributors. Now, in Bangladesh, more than 26,000 NGOs are operating including largest one from the world. It is claimed that NGOs have an imperative impact on achieving SDGs through social inclusion. As a most densely populated country, Bangladesh has to face multifaceted challenges. However, many NGOs have given efforts to address socioeconomic challenges. In many cases, programmes taken by NGOs have shown positive contribution in fostering equity and reducing social exclusion (Taufiq, 2021).

Globally, it is estimated that 2.5 billion people are out of access from formal financial services (Shah & Dubhashi, 2015). To achieve inclusive growth of the country, financial inclusion plays a vital role. In particular, NGOs are found to play vital role in addressing and deducting community-based disaster risk which is very effective for Bangladesh as the world fifth most hazard-prone nation poses to apprehension for rural farmers and coastal communities with limited access to infrastructure. Most importantly, NGOs development programmes contributes to strengthening the communities' capacity (Seddiky et al., 2022). Micro-finance and micro-credit are considered as two of the major programmes implemented by NGOs to minimize the poverty, women empowerment, and socioeconomically inclusive society. Though the programmes experienced both success and failure in conducting micro-finance and micro-credit in Asia, Africa, and Latin America, at present world, it is a contemporary agenda (BK & Bhandari, 2021). Therefore, NGOs are

also considered as a matter of fact in addressing SDGs in their operations like alleviate poverty, creating partnership with external organizations to offer credit, and noncredit services (Mousa & Ozil, 2022).

As a developing economy, Bangladesh is aiming at concurring the landmark of achieving SDGs by 2030. In this regards, financial inclusion is an important as it assists to ensure poverty eradication, gender equality, women empowerment, financial literacy, rural economy, health, education, social safety, and so on.

But, the question is to what extent NGOs have fostered financial inclusion of Bangladesh towards achieving SDGs To find out the answer, this study attempts to know the role of NGOs in financial inclusion towards achieving SDGs in time in Bangladesh.

Literature review

NGOs role toward financial inclusion

Initiatives taken by NGOs to address socioeconomic challenges have shown positive influence in fostering equity and reducing social exclusion (Taufiq, 2021). Community level programmes delivered by NGOs operating in Bangladesh are found to have positive contribution in strengthening the communities' capacity as well as increasing long term vulnerability of the beneficiary community (Seddiky et al., 2022). NGOs prime activities are micro-finance and micro-credit are operating to minimize the poverty, foster women empowerment, and improve socioeconomic condition but it has both success and failure history (BK & Bhandari, 2021). In improving financial literacy and human development which are directly associating with financial inclusion, NGOs can play an important role (Aniruddh & Kumar, 2021). Illiteracy, poor health, and unemployment are the main obstacles to break the cycle of poverty which are common in developing countries. In these regards, NGOs can be the cure to sort out the global issue (Garrity & Martin, 2018). Microfinance initiatives and programmes of NGOs are playing prime role in alleviation of poverty in rural areas (Ab-Rahim & Shah,

2019). Microfinance institutions are delivering the credit facilities for the peoples who are below poverty line, especially to poor women housewife poses to encourage poverty, increase production diversity, and maximize utilization of available resources (Bent, 2019). In providing basic rural services, providing soft loan for small projects to the disadvantaged villagers, supporting basic services for health and education, reducing the gap of rural-urban, NGOs found to have proven role (Sadek et al., 2018). Financial literacy is getting importance day by day because of low or lack of financial literacy poses to remain out of a large number of populations from formal financial set up. Financial education programme found to have positive impact on financial literacy improvement (Arya, 2018). In improving financial literacy, many NGOs found to have numerous initiatives and efforts.

NGOs and SDGs

It is impossible to the government to execute all of its vision and development agendas with a single hand. In these regards, various development partners can assist the government with their initiatives and efforts. NGOs in developing countries like Bangladesh are considered as indispensable part of all development agendas. In achieving SDGs within time frame of Bangladesh, NGOs are also playing some vital rules which are highly encouraged in association with SDGs. Accordingly, all Women empowerment can be created through the creation of ventures and entrepreneurship which can be achieved by proper training and information regarding government policies, networking, and customer relationships. In these issues, NGOs can help women (Gupta, 2021). For ensuring social justice, universal basic education is a key requirement. In the education sector of many developing countries, NGOs played a very significant role (Reza, 2022). Increasing income, use of good transformation, good accommodations, and feeding and sleeping materials are the benefits that can be achieved from NGOs but limited operations and limited accessibility are the key challenges (Gisaor, 2021). NGOs alternatively,

microfinance institutions of Bangladesh have taken a key role in poverty alleviation efforts such as granting financial loans to poor people who lack capital and savings (Jahan, 2021). For eradicating poverty from third world countries, a microfinance initiatives effort taken by NGOs has been considered as panacea. In Bangladesh, partial success has been found in microfinance initiatives in the eradication of poverty (Hassan & Islam, 2019). In Africa's biggest success stories, the contribution of the NGOs sector seems to have played an important role over the last 20 years, especially in combating HIV/AIDS, educational development, and economic development (Finn & Sarangi, 2008).

Financial inclusion and SDGs

Eradication of poverty, improving health and education, and reducing inequality are the UN stated SDGs that can be minimized by access to credit to the underprivileged, poor, and marginal communities to a great extent by financial inclusion. In access to credit, demographic characteristics such as gender, race, and socioeconomic features such as income, and education affects their ability but it can be solved by financial inclusion (Kara et al., 2020). The principal of achieving SDGs is to ensure grain security. From the production and distribution link, advancement of financial inclusion improves grain security efficiency through the effects of residents' income distribution, residents' income growth, and consumption capacity upgrading which is directly associated with the promotion of SDGs (Jia et al., 2021). Delivering financial services to all parts of society at an affordable cost is financial inclusion which enables people to manage their financial obligations, eradicate poverty and support promote wider economic growth, and play a core role in achieving the SDGs (Buckley et al., 2021). Financial access measures were found to have a statistically significant impact on extreme poverty reduction which is associated with United Nations stated SDGs (Emara & Mohieldin, 2020). Though the United Nations stated SDGs is not dedicated to directly with finance but in some aspects

financial instruments, especially financial inclusion is highly correlated with some of the seventeen SDGs (Ferrata, 2019).

Numerous studies highlighted the contribution of NGOs to financial inclusion and achieving SDGs. Majority of the study argue that financial inclusion has a positive influence on achieving SDGs. But in UN-stated SDGs, there is no concrete evidence of connecting NGOs and financial inclusion with no poverty, zero hunger, ensuring good health and wellbeing, quality education, clean water and sanitation, affordable clean energy, gender equality, decent work, and economic growth, reducing inequality, sustainable consumption, sustainable production,

small and medium-sized enterprises, fighting against corruption, and increasing mobilization financial resources. Accordingly, this study attempted to evaluate the contribution of NGOs in ensuring financial inclusion toward achieving SDGs in Bangladesh.

Material and methods

Instrument development

The survey questionnaire encompassed eleven constructs, namely accessing basic financial services, protection of consumers' rights, promotion of digital technology, financial literacy, financial knowledge, financial behaviour and financial attitude, financial literacy programme, savings, wellbeing awareness, human development, gender justice, and racial equality information for each respondent. These all construct has been derived from past studies and modified to Bangladesh's circumstances.

Questionnaire development

Self-administered structured questionnaires have been used in this study. Authors developed questionnaires by evaluation and examination from educational and professional researchers' perspectives. In order to ensure the consistency and relevancy of the questionnaire, we have modified it several times to reach in final one by completing the pilot survey.

Dataset

We have dispatched the questionnaire to 500 respondents who are active members of different NGOs. Employing efficient data enumerators from different parts of Bangladesh, this study collected data from different religions, regions, races, income groups, ages, professions, and gender from June 2021 to December 2021. By preprocessing, 312 datasets were considered for this study after removing missing data.

Results and discussion

Table 2. depicts the details of the demographic characteristics of respondents. General profiles of the respondents are analyzed through frequency analysis shown in percentage. Out of 312 respondents, the number of female respondents 207 were greater than male respondents 105 in

Table 1. Constructs and items

Construct	Symbol	Items
Accessing basic financial services	ABFS	Mode of credit, terms of credit, types of credit.
Protection of consumers rights	PCR	Right awareness, basic knowledge sharing
Promotion of digital technology	PDT	Using online banking facilities, mobile banking, SMS banking, SMS alert
Financial literacy programme	FLP	Basic guidelines, training and development
Financial knowledge	FK	Briefing financial term, options and meaning
Financial behaviour and attitude	FBA	Pattern of having loan, custody options
Savings	SV	Options, duration, and encouragement of savings
Wellbeing awareness	WA	Child caring, family wellbeing, basic health issue
Human development	HD	Trainings and development for innovations, entrepreneurship, and startup.
Gender justice	GJ	Equality in membership, loan selection, approval, disbursement
Racial equality	RE	equality and priority to underprivileged section of the community

Table 2. Demographic profile of the respondents

Characteristics (N = 312)	Frequency	Percentage
Gender		
Male	105	33.65%
Female	207	66.35%
Religion		
Islam	184	58.97%
Hindus	60	19.23%
Buddhists	5	1.60%
Christians	6	1.92%
Tribe	57	18.28%
Region (Division)		
Dhaka	35	11.22%
Rajshahi	65	20.83%
Rangpur	82	26.28%
Khulna	25	8.01%
Sylhet	23	7.37%
Barishal	33	10.58%
Chattogram	34	10.90%
Mymensingh	15	4.81%

Source: Survey data, 2021

66.35 percent and 33.65 percent, respectively. The ratio crystal that in the case of membership of NGOs females are getting preferences. From the religious beliefs of the respondents, Muslims are 58.97 percent, Hindus are 19.23 percent, Buddhists are 1.60 percent, Christians are 1.92 percent and tribe who are pursuing their traditional beliefs is about 18.28 percent. Out of eight

administrative divisions in Bangladesh, Rangpur has the highest number of respondents while the lowest one is from Khulna division.

Table 3 shows the accessibility of financial services by NGOs associated with financial inclusion. This accessibility of financial services is evaluated under three subsections namely; mode of credit, terms of credit, and types of credit. Almost all NGOs have micro-credit and micro-finance initiatives (94.55%) while some of them have non-financial activities (5.45%). In the case of Terms of Credit, all most all NGOs provide loans to the members based on non-mortgage options which accounts for 92.95 percent. There are many types of loans schemes are available in field level but a huge portion of NGOs prefer providing agricultural loans.

Protection of consumers' rights is another important aspect of financial inclusion. In this study, we have evaluated the right awareness and basic knowledge sharing towards financial initiatives of NGOs with members and borrowers. Right awareness programmes have been initiated by NGOs about 80.13 percent. On other hand, basic knowledge has been shared by 76.92 percent of NGOs with its members are shown in Table 4.

Using of FinTech in financial operations is considered as another top most prominent contributor to financial inclusion nowadays. NGOs initiated and encouraged mobile banking, online banking, SMS banking, and SMS alert services to the members and borrowers in operating financial operations. Mobile banking facilities stated about 89.74 percent of NGOs,

Table 3. Accessing basic financial services (ABFS)

	Characteristics (N = 312)	Frequency	Percentage
Mode of credit	Microcredit and Finance	295	94.55%
	Non-Financial Activities	17	5.45%
Terms of credit	Non mortgage loan	290	92.95%
	Mortgage loan	22	7.05%
Types of credit	Agricultural loan	135	42.27%
	Small business initiative	75	24.04%
	Education loan	22	7.05%
	Others	80	

Source: Survey data, 2021

Table 4. Protection of consumers' rights (PCR)

	Characteristics (N = 312)	Frequency	Percentage
Right awareness	Initiated	250	80.13%
	Non initiated	62	19.87%
Basic knowledge sharing	Knowledge shared	240	76.92%
	No initiatives	72	23.08%

Source: Survey data, 2021

54.49 percent are online banking, 51.28 percent are SMS banking, and 44.87 percent are SMS alerts service shown in Table 5.

The financial literacy programme contains basic guidelines, training, and development,

Table 5. Promotion of digital technology

Characteristics (N = 312)	Frequency	Percentage
Mobile banking	280	89.74%
Using online banking facilities	170	54.49%
SMS banking	160	51.28%
SMS alert	140	44.87%

Source: Survey data, 2021

Table 6. Financial literacy programme (FLP)

Characteristics (N = 312)	Percentage
Basic guidelines	Initiated 270 86.54%
	Not initiated 42 13.46%
Training and development	Arranged for members 288 92.31%
	Not arranged 24 7.69%
Briefing financial term	Properly briefed 182 58.33%
	Not properly briefed 130 41.67%
Options and meaning	Aware 125 40.06%
	Not aware 187 59.94%

Source: Survey data, 2021

briefing financial terms and conditions to the members of the NGOs and loan receivers of the NGOs. The greater the financial literacy programme initiatives have taken the greater the influence on financial inclusion. Basic guidelines initiatives initiated by 86.54 percent of NGOs. Training and development programmes for members have been arranged by 92.31 percent of NGOs. Further, NGOs briefed their financial terms and conditions about 58.33 percent and though terms and conditions are briefed larger part (59.94%) of the respondents are unaware of the meaning and consequences of loan terms and conditions are shown in Table 6.

Table 7 informs about financial behaviour and attitude of the loan receivers. Financial behaviour and attitude are also considerable factors of financial inclusion. According to findings, greater numbers of respondents have a negative attitude.

Savings, savings patterns, the scope of savings, and savings willingness are the major parts of financial inclusion. Table 8 shows that 43.59 percent of NGOs ensured savings facilities

Table 8. Savings

Characteristics (N = 312)	Frequency	Percentage
Compulsory Savings	136	43.59%
Benevolent Savings	115	36.86%
No Savings facilities	61	19.55%

Source: Survey data, 2021

Table 7. Financial behaviour and attitude

	Characteristics (N = 312)	Frequency	Percentage
Pattern of having loan	Positive attitude	125	40.06%
	Negative attitude	170	54.49%
	Neutrality	17	5.45%

Source: Survey data, 2021

Table 9. Wellbeing awareness

	Characteristics (N = 312)	Frequency	Percentage
Family panning	Initiated	245	78.53%
	Not initiated	67	21.47%
Sanitations	Initiated	250	80.13%
	Not initiated	24	19.87%
Health issue	Initiated	222	71.15%
	Not initiated	90	28.85%
Climate change resilience	Initiated	175	56.09%
	Not initiated	137	43.91%
Natural disasters campaign	Initiated	285	91.35%
	Not initiated	27	8.65%
Child caring	Initiated	195	62.5%
	Not initiated	117	37.5%

Source: Survey data, 2021

and options as compulsory measures and 36.86 percent of NGOs have this option as benevolent.

Well-being aspects including family planning, sanitation, health issues, climate change resilience, natural disasters management, and child care are crucial aspects of financial inclusion and have a direct impact on SDGs. In this study, Table 9 shows family planning initiatives have been taken by 78.53 percent of NGOs. Sanitation-related health issues have been addressed by 80.13 percent of NGOs. Maternal health and women's health issues have been addressed by 71.15 percent of NGOs. Climate resilience camping has been initiated by about 56.09 percent of NGOs. Disasters related camping and awareness programmes were initiated by 91.35 percent of NGOs. Child caring issues are addressed by the members of about 62.5 percent of NGOs.

Achieving SDGs is relatively impossible without proper human development, innovations, entrepreneurship, and startup, and effective execution of financial inclusion. Table 10 portrays that innovations related initiatives for human development have been taken by 93.27 percent NGOs. Entrepreneurship initiatives on small and medium enterprises, cottage, and handloom have been offered by 88.47 percent NGOs. Whereas, startup-related knowledge sharing facilities have been initiated by about 57.37 percent NGOs.

Gender justice, especially gender equality in loan selection, approval, and disbursement also derive the financial inclusion as well as SDGs. Table 11 informs that women receives extra attention of NGOs as membership candidates in loan selection, approval, and disbursement, (60.90 percent).

Depriving in accessing financial services

Table 10. Human development

	Characteristics (N = 312)	Frequency	Percentage
Innovations related initiatives	Initiated	291	93.27%
	Not initiated	21	6.73%
Entrepreneurship initiatives	Initiated	276	88.47%
	Not initiated	36	11.54%
Startup initiatives	Initiated	133	42.63%
	Not initiated	179	57.37%

Source: Survey data, 2021

Table 11. Gender justice (in membership, loan selection, approval, disbursement)

Characteristics (N = 312)	Frequency	Percentage
Priority for men	50	16.03%
Priority for women	190	60.90%
Neutralism	72	23.08%

Source: Survey data, 2021

of larger group of society are termed as financial exclusion poses to create obstacle in sustainable growth and development. Table 12 demonstrates that almost 85 percent of a community receiving

Table 12. Racial equality (equality and priority to underprivileged section of the community)

Characteristics (N = 312)	Frequency	Percentage
Priority for underprivileged section of the community	265	84.94%
Neutralism	47	15.06%

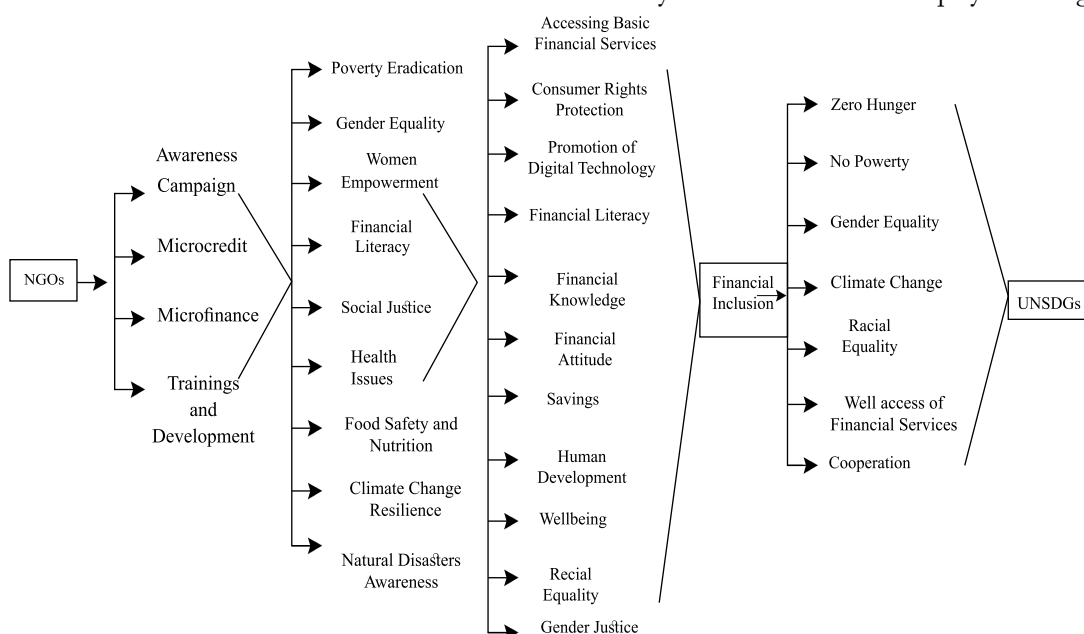
Source: Survey data, 2021

loan or facilities from NGOs are underprivileged section of the society. Overall findings of the study have been shown in Figure 1.

Conclusion

Bangladesh is one of the most densely populated countries in the world. It is estimated that millions of people are excluded from basic financial services from formal financial institutions. It is not possible for the government to cover all the people in the facilities of financial services like loans, credit, insurance, savings, and remittances facilities. In this regard, globally, it is found to play a strong role by NGOs. Right now, over 26,000 NGOs are operating in Bangladesh.

In this study, we have evaluated the contribution of NGOs in financial inclusion in achieving SDGs. Bangladesh showed good performance in achieving MDGs. As a coastal state, Bangladesh is now facing strong challenges in adopting climate change to ensure a smooth sustainable development to concur the landmark of SDGs by 2030. Financial inclusion has direct influences on inclusive growth and development. So, without ensuring inclusive development, it is impossible to achieve SDGs. On the other hand, NGO operations have a direct influence on financial inclusion. Financial inclusion promotes inclusive development through accessing loan facilities for the underprivileged sections of society. In our study it is found that NGOs plays a strong

**Figure 1.** Contribution of NGOs in financial inclusion in achieving SDGs

role in the eradication of poverty, providing financial services to the underprivileged section of society to a great extent, reducing gender inequality by financial empowering women, creating awareness about the right of women, providing basic financial literacy, positive attitude, creating employment opportunity, initiating uses of digital technology, guiding about sanitation, food safety, minimum nutrition intake, child caring, climate change resilience, natural disasters management, human development on innovations, entrepreneurship and startup through the training and development activities which are directly associated with financial inclusion as well helps to achieve SDGs in Bangladesh.

Policy implications

It is becoming increasingly apparent that addressing financial inclusion is a must for inclusive growth and development which is a precondition of achieving SDGs. Without involving all people under the umbrella of financial services it is impossible to ensure financial inclusion. Accordingly, it is required to create awareness about financial products, basic loan facilities, education, advice on money management, savings behaviour, financial knowledge sharing, financially empowering the women, engaging women in financial activities and employments, promoting digital financial technology (ATM, mobile banking, SMS banking, online banking, and SMS alert), basic guidelines on health issues, nutrition, sanitation, climate change, disaster management and so on. In this regard, policymakers can engage NGOs in accelerating financial inclusion for the people who are now out of accessing basic financial services such as ethnic groups, tribes, women, disabled, transgender, and others. In response to climate change resilience in coastal areas, NGOs can play a vital role by ensuring relative assistance to the members. In preparing and responding to natural disaster management, policymakers can use NGOs manpower, infrastructure, and other facilities. Successful operations of NGOs will booster the financial inclusion and achieve

SDG within time and help to ensure sustainable growth and development of Bangladesh.

Limitation

Despite having significant policy implications, this study also contains some limitations that can extend future research opportunities. Firstly, we have surveyed 312 respondents which are representing a very small proportion of the large population. Secondly, in this study, we just compute the percentage of respondents answering with frequency whereas; the deep methodical analysis will draw better results. Thirdly, in most cases, respondents are unwilling to cooperate with some questions. Fourthly, some respondents include their fear about the interest rates, service Chagres' and debt traps of NGOs. These factors are not incorporated in this study.

Future research direction

Consequently, we suggest that, in the future, researchers should incorporate the interest rate, service charges, and debt traps of NGOs in the context of Bangladesh as well as the changes in the financial status of the borrower. Moreover, an extensive survey can conduct to detect more precise scenario of the NGOs performance and contribution.

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The macroeconomic determinants of remittance in Bangladesh

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ABSTRACT

The growth of remittance inflows in Bangladesh in the last 13 years (2009–2021) has been appreciable. Currently, Bangladesh ranks eighth among the top 10 remittance-receiving countries. This study pursues to find out the macroeconomic factors behind the growth of remittance receipts in Bangladesh. This kind of study has been very less in the economy of Bangladesh. Here the latest time series data of macroeconomic variables such as exchange rate, per capita GDP of the home country, and per capita GDP of the host country are considered. Johansen co-integration test and the corresponding vector error correction model (VECM) are used for data analysis. Analyzing the results of this study, it can be seen that efficient management of exchange rates as part of strong monetary policy has an effect on remittance receipts. In the case of the exchange rate, the short-run impact of depreciation is positive and statistically significant. Remittance receipts in Bangladesh have a positive relationship with the GDP growth of eleven host countries. On the other hand, there is a negative relationship between the GDP growth of Bangladesh and the remittance receipt. Analysis of data shows that skilled workers are playing a significant role in receiving remittances. The government of Bangladesh needs to deliver efficient management of the exchange rate, provide extensive training to improve the skills of workers and send workers to countries where the GDP growth rate is high.

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Introduction

The condition of the economy of the expatriate workers' home country is identified as one of the factors for expatriates' receipt of remittances. The altruistic motive plays a very important role in sending remittances; the inflow of remittances depends on the poor economy of the expatriate workers' home countries and the decrease in the income of the families of the expatriate workers. Generally, remittance flow depends on three trends namely exchange, insurance and investment. Sending remittances does not rely

on altruistic motivation for expatriate workers of higher rates of receiving countries (France and Germany). With the exchange motive, the expatriate workers transfer to their families in exchange for services offered for their welfare of themselves. Migrants are supposed to remit even if the family income increases as the quality of services their remittance can buy increases. Migrant workers send remittances to their family members for feeding, schooling, health, and protection of children. They endorsed remittance as an insurance alternative to protect against the

economic uncertainty of their family. Workers make family investments in their own countries with the expectation of higher returns to ensure a better future for themselves and their children. The macroeconomic stability in the home and host countries determines the remitting decision of the migrant (Lucas & Stark, 1985). On the other hand, remittances are frequently analyzed using two broad approaches to remitting, namely, altruism and portfolio.

These two attitudes (altruism and portfolio) are not the only persuasive dynamics for sending remittances. The scale of remittance movements is affected by per capita income or real remuneration variances between home and host countries for given expertise, the condition of the business cycle and economic scenarios in both home and host countries, network effects, migration policies, costs of expatriates' migration, cultural gaps between countries and geographical space and closeness (Solimano, 2002). I would like to discuss the magnitude of the remittance inflow in Bangladesh and explain the influencing macroeconomic factors on remittance using econometric methods.

Magnitude of worker outflow from Bangladesh

Expatriates' worker outflow has tremendously increased from Bangladesh over the years. Expatriates worker employment in Bangladesh was sluggish during the decade of 1980 but augmented later, e.g. from 2.16 million in the

year 1991-2000 to 3.28 million in 2001-2008. The remittance receiving rate of Bangladesh shifted tremendously in last 13 years. During the period 1976-2008, the number of Expatriates worker outflow from Bangladesh is assessed at about 6.27 million and the total number of workers is assessed at about 8.60 million in the year from 2009 to November 2022. Expatriates' worker outflow rose in 47 years about 58 percent in the last 14 years (Figure 1). On the other hand, exhausting visits or student visas a huge figure of unrecorded expatriates have gone to the USA, UK, Singapore, Sri Lanka, Malaysia and Maldives, and other countries from Bangladesh (Figure 2). There must be some factors and government special initiatives responsible for this augmentation of migrants that need to be examined.

There are two types of unskilled workers like semi-skilled and less-skilled workers. Most expatriates are unskilled and less skilled working in different countries and out of total worker outflow from 1976 to 2021 48.02 percent are less-skilled and 14.81 percent are semi-skilled. This type of migrant does not have even five years of schooling and has no special trade-related training and they do not communicate in English. Out of the total migrant outflow from Bangladesh to different countries from 1976 to 2021, 33.83 percent of worker is skilled workers. The skilled worker can earn more because they have some training in welding, electrical works, and plumbing. They have also engaged themselves in manufacturing sectors

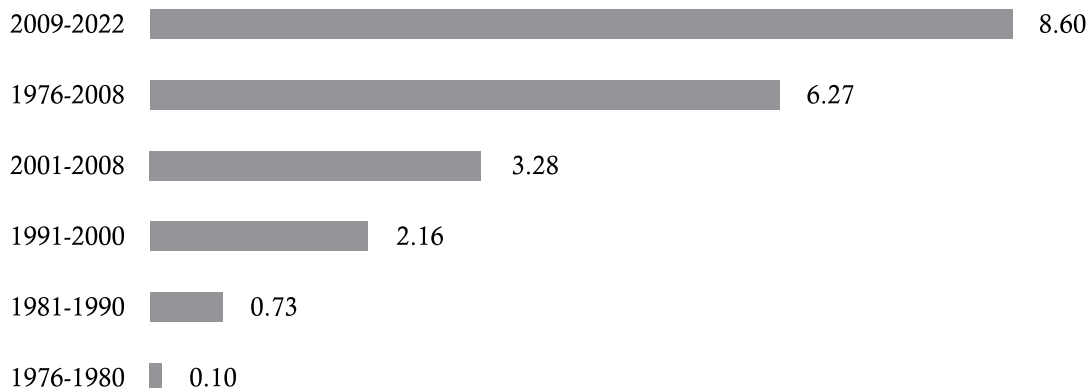


Figure1. Total number of worker outflow from Bangladesh (million)

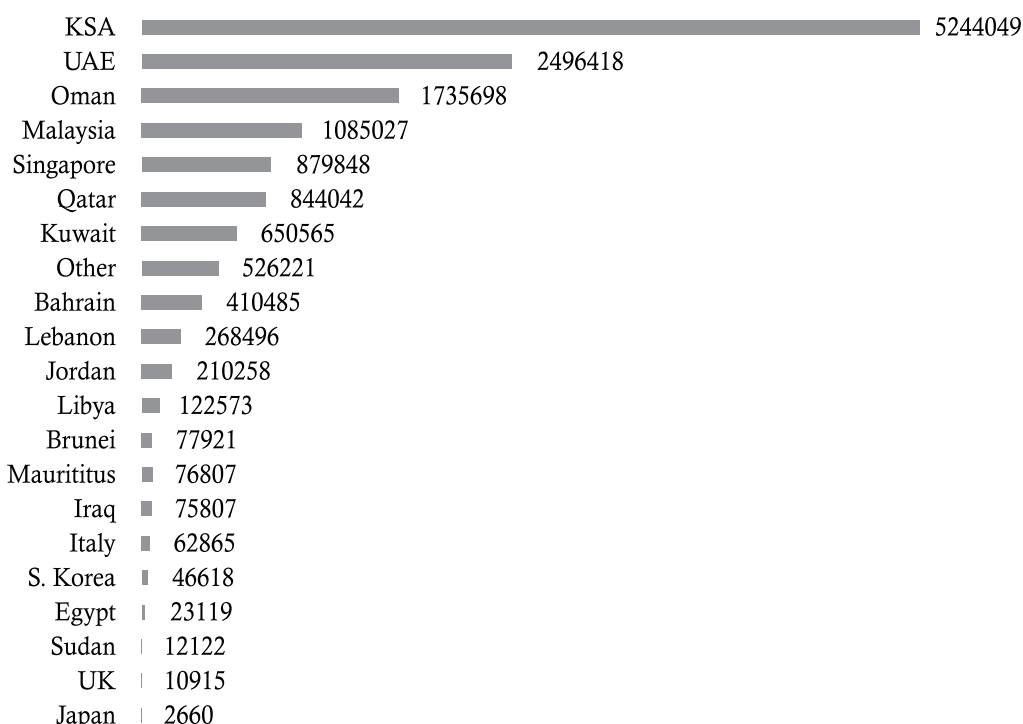


Figure 2. Worker outflow from Bangladesh in different countries from 1976 to 2022
BMET 2022 (up to November)

Table 1. Categories of migrant worker outflow from Bangladesh in 1976-2021

Year	Professional	Skilled	Semi-skilled	Less-skilled	Others	Total
1976-2008	179910	1955997	1007249	3070193	52680	6266029
2009-2021	58279	2690634	1026772	3525217	167230	7468132
Total (1976-21)	238189	4646631	2034021	6595410	219910	13734161
Percentage	1.73	33.83	14.81	48.02	1.60	100.00

Source: BMET, BBS Pocket Book 2020, 2021

like shipbuilding, construction, heavy machinery, and industrial manufacturing. 1.73 percent of migrants are teachers, engineers, doctors, pharmacists, accountants, and agriculturists and they are treated as the professional category workers (Table 1). Professional categories of workers are getting 6-10 times more income than unskilled categories of workers. There are many recruiting agencies in Bangladesh and agencies are sending a good number of workers to host countries but a bulk number of workers has to go with the help of legal or illegal social networks and own initiatives.

Remittance inflow of Bangladesh

The remittance inflow to Bangladesh has been over 15 billion US dollars every year for the last four years. In 2021 total of 22.20 billion US dollars in remittances are received by Bangladesh (Figure 3). India, the Philippines, and Egypt are high remittance receiver countries but the performance of Bangladesh is much better than these countries over the period.

Bangladesh ranks eighth among the top 10 remittance-receiving countries in 2021. (Table 2).

Although Bangladesh is sending an increasing number of workers to Saudi Arabia (KSA)

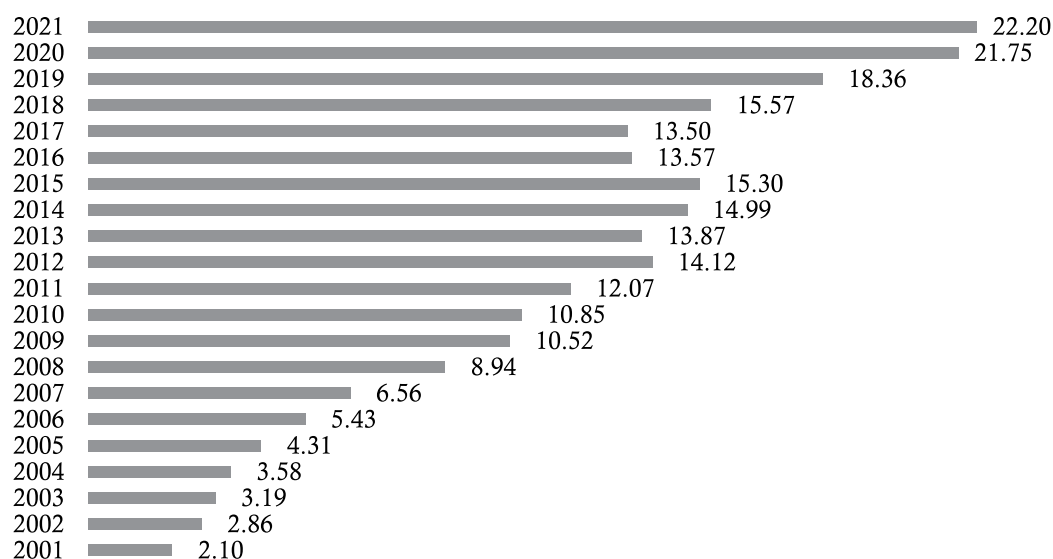


Figure 3. Trend of remittance (billion US dollar) received by Bangladesh in 2001-2021

Source: WDI, 2022

and the United Arab Emirates (UAE), the comparative share of remittance inflow from these countries is declining over time. About 46 percent of Bangladesh's total remittances in 2001-02 and 23 percent of total remittances in 2020-21 came from KSA (Figure 4.2). This is because remittances received from Malaysia, the UK, Singapore, Qatar, and Oman is increasing at a higher rate. In FY 2020-21, remittances inflow from KSA was 5.72 billion, USA 3.46 billion, UAE 2.44 billion, and UK 2.02 billion US dollars to Bangladesh. Bangladesh received

13.64 billion dollars from these four countries out of total remittances of 22.20 billion dollars in the FY 2020-21. That is, 61.44 percent of the total remittances received by Bangladesh from these four countries. The USA ranks second and the UK third in terms of total remittances received by Bangladesh from different countries (Figure 4.1).

Migrants send their remittances either using the formal legal framework or the Hundi (informal channel). The amount of remittance inflow into Bangladesh through informal channels has decreased significantly due to the

Table 2. Bangladesh has retain its position as 8th highest amount of remittance recipient nation in 2021

Country	Remittance (billion US dollar)	World ranking
India	89.38	1
Mexico	54.13	2
Philippines	36.69	3
France	32.08	4
Egypt	31.49	5
Pakistan	31.31	6
China	22.48	7
Bangladesh	22.20	8
Germany	20.41	9
Nigeria	19.48	10

Source: WDI, 2022

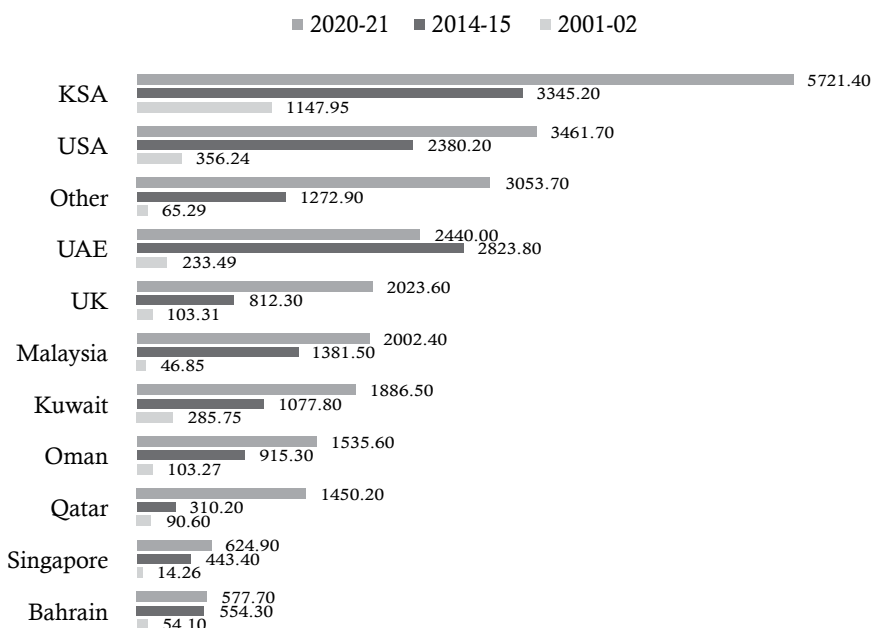


Figure 4.1. Remittance received by Bangladesh from different countries in 2001-02, 2014-15 and 2020-21 (Million US Dollar)

strict enforcement of anti-money laundering laws by the government and the improvement of services by commercial banks. Two studies conducted by Bangladesh Bank and Financial Action Task Force (FATF), a global anti-money laundering body in 2010 and they find about

17-24 percent of the total remittances derive to Bangladesh through unauthorized channels. FATF conducted a survey and got 54-60 percent of remittances sent by migrants through unauthorized channels. A Study conducted by the International Monetary Fund (IMF) finds 59

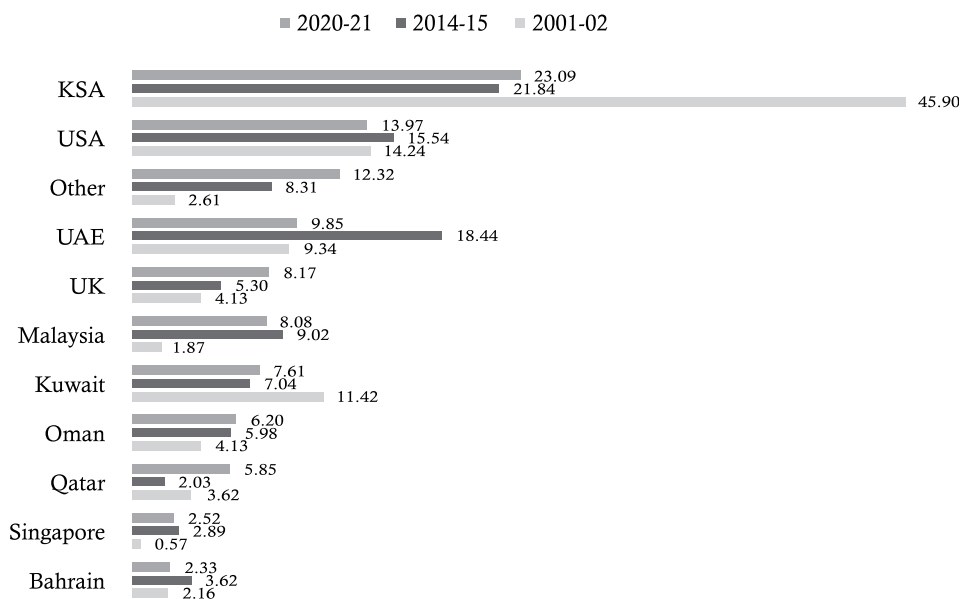


Figure 4.2. Percentage of remittance received by Bangladesh from different countries in 2001-02, 2014-15 and 2020-21

percent of remittance received by Bangladesh from 1980 to 2000 is unrecorded. In 2003, IOM and UNDP finds 54 percent of remittances is unrecorded in a study. World Bank's Global Economic Prospects 2006 estimated the share of informal remittance inflow at 54 percent (Byron, 2010).

Last 10-15 years Bangladesh has performed competent Government to Government negotiations with Malaysia, KSA, and Qatar and sent a huge number of migrants with low migration costs to different countries. Female migrants are being sent to different countries by Bangladesh from 1991 to November 2022 is estimated to be about 1.10 million. Bangladesh has taken several initiatives so that female migration has increased enormously in the last 20 years. Mostly they are going to KSA, UAE, Oman, Jordan, Lebanon, Hong Kong, Qatar, and Mauritius is the destination of female migrants. Considering all the factors for the upward trend of migration and remittance we need to identify causal factors using econometric methods for future policy implications.

Research questions

This paper will focus on influencing macroeconomic factors on the remittance inflow of Bangladesh. I use time series data to achieve the following:

- a. Assessment of the magnitude of influence of different macroeconomic variables over the remittances received by Bangladesh.
- b. Identify long-run and short-run relative associations between remittance and macroeconomic variables.

Justification of the study

The main shortcoming of most of the previous studies is that they reached conclusions not considering any econometric co-integration methods in examining the data. There is an absence of studies on the recent booming time of remittance inflow. In the present study, I estimated the co-integration technique as well as the error correction models with the purpose of determining the short-run dynamics of macroeconomic determinants such as per capita

GDP of the home country, simple average of per capita GDP of host countries (KSA, Singapore, UAE, UK, USA, Qatar, Jordan, Bahrain, Kuwait, Oman, and Malaysia) and exchange rate within a long run as well as the short-run relationship with remittances in Bangladesh.

The present research paper dealing empirically with macroeconomic determinants of remittances in Bangladesh with the latest data would add a new dimension to the existing literature on migration and remittances in Bangladesh.

Review of literature

In this chapter macroeconomic determinant of remittance related studies and their highlighting parts with different aspects are discussed.

Barua et al. (2006) use a panel data set of remittance receipts from ten major host countries for Bangladeshi migrants over the period 1993 to 2005. Using this data they find a positive relationship between the income gap between the host country and the home country's inflow of remittances. However, they found remittance flows to be negatively correlated with inflation differentials between home and host countries. That is, if inflation in the home country is higher than that of the host country, the remittances of the workers tend to decrease.

Ali (2012) using 1976-2011 data found that professional and unskilled migrants have very low negative significant coefficients but semi-skilled migrants have positive and significant regression coefficients. Among the macroeconomic factors, negative significant coefficients of interest rate on deposits and positive significant coefficients of foreign exchange rate were found. Foreign remittances have bidirectional causality with semi-skilled and unskilled migrants, and unidirectional causality of remittances and remittances to share price indices of all types in the Dhaka Stock Exchange from professional migrants. Macroeconomic indicators such as interest rate differentials or per capita GDP of home country variables were not considered.

Shah and Amir (2011) estimate time series data from 1975 to 2010 of remittance inflow to Bangladesh, GDP at the current price,

remittances, oil price, foreign exchange rate, and the number of migrants. This study just explains that there exist short-run adjustments towards long-run relationships among the estimated variables suggesting that the GDP at the current price, remittances, oil price, foreign exchange rate, and number of migrants as the significant determinants of remittance for Bangladesh.

Ryhan et al. (2009) investigate the role of remittances on household expenditure and poverty in Bangladesh. They found in the study that remittances have a positive role in the economy and remittances play one of the most important roles in reducing poverty. The study found that an increase in remittances reduced the poverty headcount ratio by 1.7 out of the 9 percentage points in 2000–2005. They mean that while there is a negative impact on the total manufacturing sector and domestic sales, there is a positive impact on the export-oriented sector. Their study finds that exports increase and imports decrease when remittance shocks and real exchange rate increases occur. In this context, the decrease in remittance flow leads to a massive reduction in domestic demand, and hence exports increase and imports decrease. It is easily conceivable that the increase and decline in GDP are associated with the increase and decline in remittances. In this study, the researcher does not study the direct influence of macroeconomic factors on remittances

Ahmad et al. (2008) explore the causes of the outflow of migration from Pakistan. Correlation and vector error correction models are used to find out the long-term and short-term relationships between the determinants' parameters using data from 1973–2005. This study found that immigration from Pakistan had a positive effect on the country's inflation and unemployment rates and a negative effect on the real wage rate. According to researchers, inflation rate, unemployment, and declining wages are the push factors for international migration from Pakistan, and remittance flows can be safely considered as pull factors for international migration from the country.

Gupta (2005) researching an IMF working paper found that remittance flow to India is

increasing due to an increase in expatriate outflow rate and an increase in the total income of migrants. Remittances tend to be increased when good economic conditions are in the host countries and tend to be countercyclical for India, that is, remittance increases during periods of low economic growth. Note here that remittances are not affected by the exchange rate depreciation, interest rates, political uncertainty, or any of the economic or political indicators. Even the movement of oil prices could not have any effect on remittances. According to the researcher, remittances are higher in drought years in India and remittances will be higher if the economic conditions of the host country are better.

Hasan (2008) found in his study that inflation, interest rate, exchange rate, and GDP of five remittance-sending countries these macroeconomic variables affect remittances significantly. According to the researchers, if the interest rate increases by 1 percent, the remittance increases by 1.94 percent, and if the GDP of the remaining five countries increases by 1 percent, the remittance increases by 3.06 percent. In this study, the researcher did not deal with the home country's GDP, migrant workers, broad money, or other macroeconomic indicators.

Schiopu and Siegfried (2006) examine altruistic versus investment factors motives of bilateral flows using a panel data set from 2000 to 2005 of 21 Western Europe to 7 European neighboring countries. They find that an altruistic motive is important for sending remittances, as the GDP differential between home and host countries is positively correlated with the average remittance per migrant. On the other hand, interest rate differentials are insignificant, recommending a weak investment motive. Expatriates' skills promote remittances but a large informal economy in the sending country decreases authorized remittance flows.

Most of the studies do not consider the economic condition of either host country or home country and none of the studies has any scope of taking latest time series data. These studies are failed to explain recent flourishing situation of remittance inflow of a country.

Table 3.1. Variables definition

Variables	Definition	Expected signs
Remittance	Personal Remittances (% of GDP) received by Bangladesh at U.S. dollars.	
Exchange Rate	Official exchange of Bangladesh is calculated as an annual average based on monthly averages (local currency units relative to the U.S. dollar).	Positive/ Negative
Per Capita GDP of Home Country	Per capita GDP of home country (Bangladesh) at current U.S. dollars.	Positive/ Negative
Per Capita GDP of Host Countries	Average per capita GDP of 11 migrant receiving countries at current U.S. dollars.	Positive

Data Sources: All other data collected from WDI (2022), BBS, BMET and IMF

Data sources and methodology

The main focus of the research is to explore the macroeconomic determinates of remittance inflow of Bangladesh using the most recent data taken from the World Development Indicators (World Bank, 2022), IMF, Bangladesh Bureau of Statistics (BBS) and Bureau of Manpower Employment and Training (BMET). This paper will use yearly time series data from 1976 to 2021. Most of the data for variables are measured at US current price. The co-integration analysis is used for establishing long-run equilibrium

and short-run relationship among remittance, per capita GDP of the home country, per capita GDP of the host country, and exchange rate using Stata software.

Data and empirical model

Time series data has been collected from different sources like World Bank, IMF, BBS and BMET from 1976 to 2021. To estimate a long run relationship among variable in specifying the empirical model as follows (in log linear form):

$$\ln rem_t = \beta_0 + \beta_1 \ln er_t + \beta_2 \ln gdp_{home_t} + \beta_3 \ln gdp_{host_t} + e_t,$$

where, $\ln rem_t$ is the log of remittance received, $\ln er_t$ is the log exchange rate of taka per US Dollar, $\ln gdp_{home_t}$ is the log of per capita GDP of Bangladesh as the home country, and $\ln gdp_{host_t}$ is the log of per capita GDP of the migrant host country. Definition of variables included in the model is explained below:

Econometric specification

At the very outset, I need to examine the time series properties of each series and need to explore the presence of a long-run association among the time series (remittance GDP ratio, per capita GDP of home country, per capita GDP of host country, and exchange rate). I used the unit root tests. The tests showed that each of the series is the first difference-stationary (Table 3.2). Therefore, a multivariate co-integration test, the Johansen test, is applied to check for the number of co-integrating relations. Table 3.4 shows that there is one co-integrating relation according to the trace test. Given the economic relationships, we do not expect the exchange rate or home or host country per capita GDP

Table 3.2. Augmented dickey-fuller test results of stationarity

Variable	Model	Test statistic	Critical value (1%)	Decision
Remittance GDP Ratio (%)	ADF with trend	-1.734	-4.205	Non stationary
Exchange Rate	ADF with trend	-1.612	-4.205	Non stationary
Per Capita GDP Home Country	ADF with trend	-0.635	-4.205	Non stationary
Average Per Capita GDP 11 Host Country	ADF with trend	-2.626	-4.205	Non stationary
Remittance GDP Ratio (%)	ADF with constant	-4.147	-3.621	Stationary
Exchange Rate	ADF with constant	-4.375	-3.621	Stationary
Per Capita GDP Home Country	ADF with constant	-4.079	-3.621	Stationary
Average Per Capita GDP 11 Host Country	ADF with constant	-4.654	-3.621	Stationary

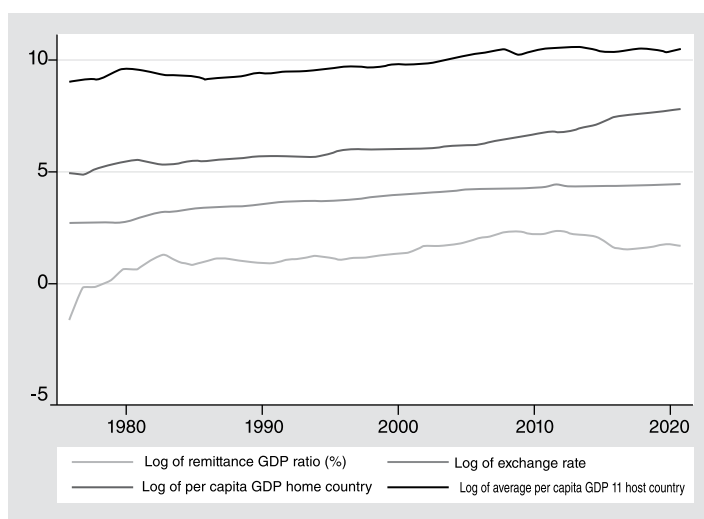


Figure 5. Time series line graphs of the variables

Table 3.3. Lag selection for Johansen test-1 lag using BIC criteria

Lags	Log likelihood	LR test	FPE	AIC	HQIC	SBIC
0	5.256		0.000	-0.063	-0.002	0.106
1	243.950	477.390	1.6e-10*	-11.198	-10.892*	-10.353*
2	260.415	32.930	0.000	-11.221	-10.671	-9.701
3	275.334	29.838	0.000	-11.167	-10.373	-8.971
4	293.898	37.127	0.000	-11.295	-10.257	-8.424
5	315.235	42.674	0.000	-11.562	-10.279	-8.015
6	339.791	49.114*	0.000	-11.989*	-10.463	-7.767

Table 3.4. Johansen test of cointegration

Unrestricted co-integration rank test (Trace)			
Hypothesized No. of CE(s)	Eigenvalue	Trace statistic	Critical value (0.05)
None *	0.8237	105.7482	47.21
At most 1 *	0.3919	27.6428*	29.68
At most 2	0.1100	5.2525	15.41
At most 3	0.0002	0.0069	3.76

Trace test indicates 1 co-integrating eqn at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

as dependent variables here and it is therefore plausible to consider the one co-integrating relation of variables explaining remittance inflow. I estimated the short-run dynamics by vector error correction model, where the lag length 1

is selected based on the SIC criterion applied to the unrestricted VAR model (Table 3.3).

Result and discussion

This study estimates the regression models to explore the relationship between remittance and

macroeconomic variables. To know the influence of macroeconomic variables on remittance this study uses remittance, per capita GDP of the home country, per capita GDP of the host country, and domestic exchange rate for the robustness of the model. A good number of literature support that these are commonly used to estimate the macroeconomic determinants of remittance. The estimated regression models using VECM (long run and short run model) are explained below (Table 4.1).

Long run

$$lrem_t = 16.24 - 0.61 ler_t - 0.66 lgdp_{home_t} + 2.44 lgdp_{host_t}$$

$t - stat$ (-2.04) (-3.43) (7.65)

Exchange rate

A migrant tends to pay more for foreign goods and services than domestic goods and services because when the domestic currency depreciates, the price of goods and services in the foreign currency falls. An increase in the value of the domestic currency increases the propensity of migrants to purchase more domestic goods and services. Bouhga-Hagbe (2004) reports

that currency devaluation temporarily increases the interest of migrants to send remittances to their home country, but in the long run reduces their confidence in the country's economy. For example, the massive devaluation of the local currency in Morocco also led to an increase in workers' remittances.

The estimated long-run equation shows that the exchange rate depreciation, that is, a one percent increase in Bangladeshi taka per US dollar reduces remittances by 61 percent in the long run. The short-run impact of depreciation is positive and statistically significant. This can also be observed from the impulse response graph in Figure 7.1, where an impulse in the exchange rate has an increasing effect on remittances during the first couple of years of shock after which it starts to decline. This finding supports Bouhga-Hagbe (2004). A study conducted by Islam (2003) shows that the fixed exchange rate regime has played a good role in the economy of Bangladesh and remittances sent by expatriates act as a driving force in maintaining the trade deficit of Bangladesh. The remittance sent by the migrants through dollars

Table 4.1. Cointegrating relation short run

	(1)	(2)	(3)	(4)
Variables	<i>lrem</i>	<i>ler</i>	<i>lgdp_{home}</i>	<i>lgdp_{host}</i>
Error correction term	-0.148** (0.0705)	-0.0495** (0.0196)	-0.0235 (0.0278)	0.0199 (0.0485)
	-0.0562 (0.136)	-0.0892** (0.0378)	0.0735 (0.0537)	0.0107 (0.0938)
	1.418** (0.616)	0.401** (0.171)	-1.309*** (0.242)	-0.536 (0.423)
	0.0869 (0.474)	-0.0786 (0.132)	-0.0756 (0.187)	-0.0125 (0.326)
	0.408 (0.257)	0.0438 (0.0711)	-0.209** (0.101)	0.182 (0.176)
Constant	-0.0249 (0.0625)	0.0342** (0.0173)	0.123*** (0.0246)	0.0453 (0.0430)
Observations	44	44	44	44

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

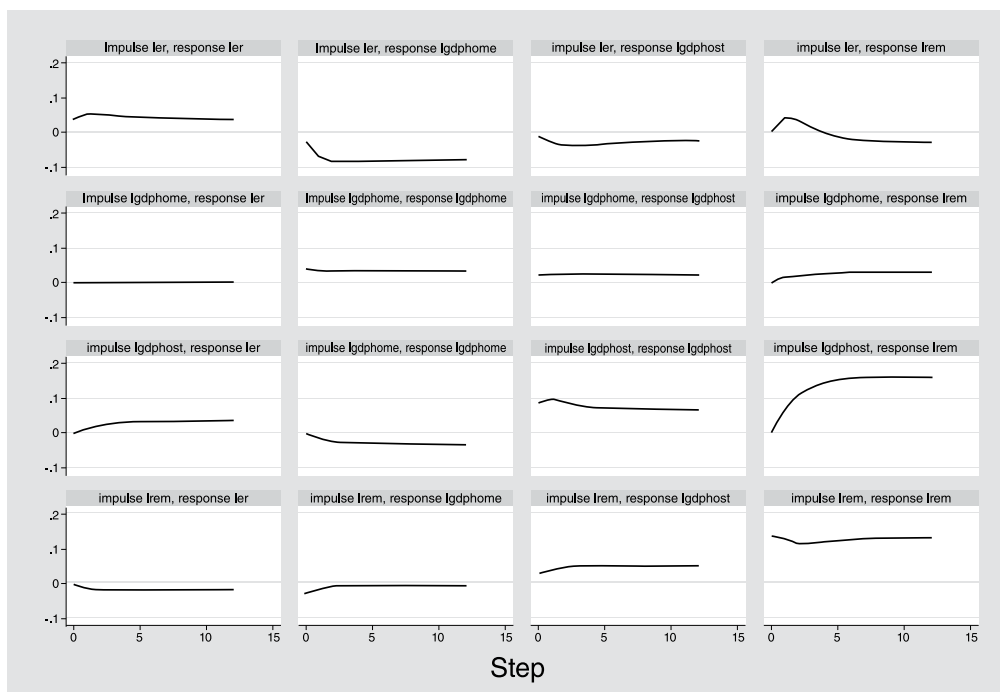


Figure 6. Impulse response functions (all combinations)

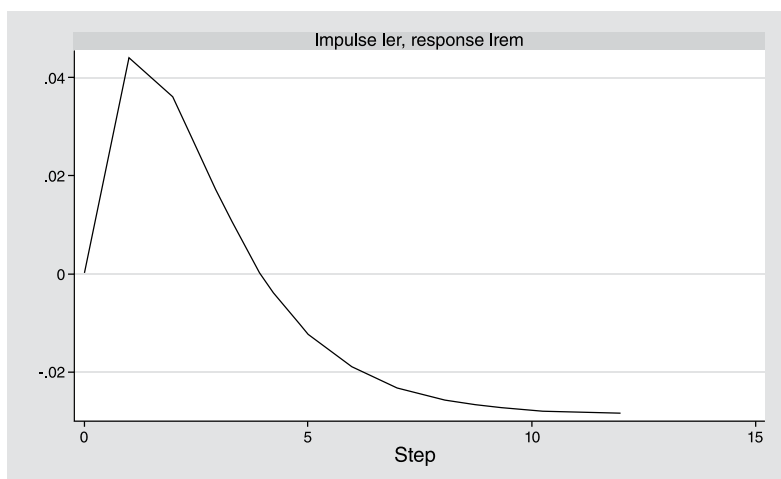


Figure 7.1. Impulse response functions (selected)

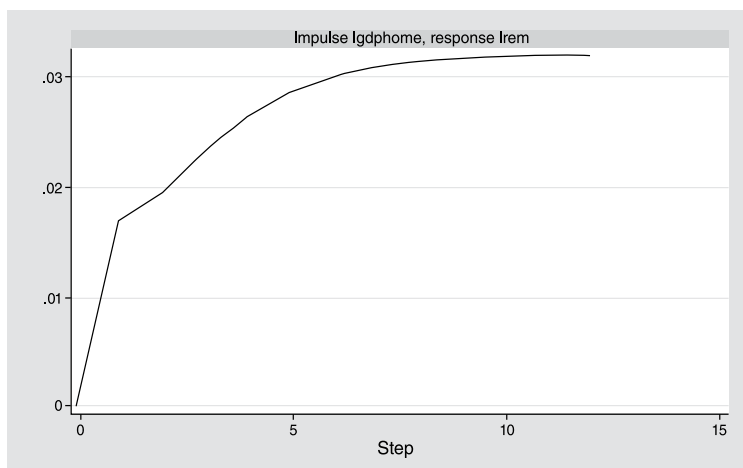


Figure 7.2. Impulse response functions (selected)

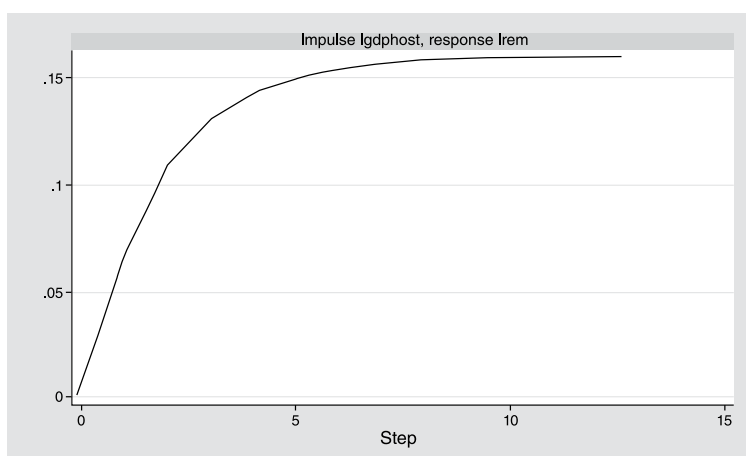


Figure 7.3. Impulse response functions (selected)

Table 4.2. Variance decomposition (proportion of variation in log remittance inflow due to impulse in log remittance, exchange rate, and home and host country per capita GDP)

Step	lrem	ler	lgdphome	lgdphost
1	1	0	0	0
2	0.843	0.046	0.007	0.104
3	0.702	0.047	0.010	0.241
4	0.612	0.034	0.012	0.342
5	0.554	0.025	0.014	0.407
6	0.517	0.020	0.015	0.448
7	0.491	0.018	0.017	0.475
8	0.472	0.017	0.017	0.493
9	0.459	0.017	0.018	0.507
10	0.448	0.017	0.019	0.516

is contributing to increasing the reserves in the country as well as maintaining the upward trend of the performance of the country in terms of remittances. Figure 6 impulse response function shows a negative short-run effect of remittance inflow on the exchange rate, i.e., an increase in remittance inflow makes the domestic currency (Taka) stronger, which supports the exchange rate theory implications. However, Table 4.2 shows the comparative effect of a short-run exchange rate shock on the variations of remittance inflow is quite low compared to that of the other variable effects. This might be due to the managed float nature of the exchange rate system of Bangladesh.

Income of home country and host country

In the present study shows that per capita GDP of Bangladesh effect, the remittances inflow negatively in the long-run and positively in the short run, though the comparative effect is very small compared to the host country's GDP (Table 4.2). This specifies in the other way that remittance inflows mainly smooth the consumption of recipient households to compensate for negative income shocks. On the other hand, it has been observed that the simple average of per capita gross domestic product of eleven Bangladeshi worker-receiving countries significantly influenced the remittance inflow of Bangladesh in the long run. It illustrates that if the per capita GDP of host countries increases by one percent remittance GDP ratio raises by 2.44 percent in the long run. A better economic condition in the host countries has a vital role in the higher remittance inflow of Bangladesh. In the year 2011-2014 Middle East countries experienced a high rate of GDP growth. In the past 11 years, per capita GDP has increased in the UK, Malaysia, Singapore, the USA, and Jordan. In particular, per capita GDP growth rates were significantly higher in KSA from 2011-13 and in Oman and Qatar from 2011-14. This also recommends that migrants send remittances so that those left behind can maintain a certain quality of life and eradication of poverty. In this

case, migrants are altruistically motivated to send remittances.

In 2015, I have interviewed a good number of remitters working in KSA to know their working environment and really surprised to hear from them that they have to send a huge amount of money through informal channels due to the host government ceiling. Many Bangladeshi workers in KSA have become businessmen and industrialists and they are bound to send money through informal channels. They do not believe that there is a downward trend in informal remittance received. If Government of Bangladesh (GoB) takes appropriate initiatives then incremental remittance can be used for productive purposes.

Government initiatives

Over the past few years, the GoB has demonstrated the ability to send large numbers of workers to different countries at low migration costs through strong negotiations. As an outcome of wonderful negotiation recently more than 0.80 million workers have been legalized in KSA producing more remittances because remitters use formal ways to remit. In Malaysia 0.266 million workers are also legalized recently. Because of government's strong initiative, about 1.00 million female migrant workers are able to go to abroad in the last 14 years (2009-2022). The government has enacted the Overseas Employment and Migrants Act 2013 for the protection and welfare of expatriates of Bangladesh and for efficient management of recruiting agencies. Obviously, the Government is getting positive results from these above activities. Saudi Government recently amended its rules and regulations regarding visa trading and passport seized by employers. This amendment will help the migrant to shift from their odd job to better jobs and that will help increase remittance. The VECM estimate expresses that the coefficient of error correction term is negative (-0.148) and significant proving the estimated variables have a co-integrating relationship and a disequilibrium will be adjusted in the long run. This study ultimately expressed that the exchange rate, the economic condition

of host countries, and the home country affect the remittance inflow of Bangladesh.

Conclusion and policy implication

The estimated model shows the existence of a long-run co-integrating relationship among variables. The exchange rate, the economic condition of host countries, and the home country influence the remittance inflow of Bangladesh. But the per capita GDP of the home country has a positive impact on remittance inflow in the short run. On the other hand, increased domestic GDP reduces the need for remittance inflow, and therefore, yields a negative relationship in the long run. The limitation of the study is that oil price, wage rate, stock exchange rate, inflation rate, and political and cultural differences could not use because of data and time constraints. Interest rate is not used here because still, migrants are not concerned about investing in any productive project but with a lower rate of interest, migrants will concentrate to invest in the real state. So the inclusion of interest rates would give more precise results. I use here the current price of variables and constant price may produce better results.

In light of the study I would like to recommend government policies for increasing remittance and these policies include ensuring opportunities at reasonable cost for migration mitigating the middleman interference and adverse effect of visa trading; strengthen the District Employment and Manpower Office (DEMO) for curbing middleman; enhance migration opportunities for skilled and professionals; achieve hassle free recruitment process; encourage remittances through formal channels; reduce tax on gold import for encouraging use of formal channel of remit; tax exemptions for remittance income; improved access to banking services by recipients; incentives to attract investments by the diaspora; conduct a diaspora survey by mission; open scope for investment in public private partnership project like bridge or road etc. especially for expatriate; introducing contributory pension scheme for the expatriates; enactment of new law or amendment of existing

law for compulsory inclusion of job, business and address information of every expatriate in database for upholding confidence of female and male worker; and to open a new wing in the mission on training or giving a scope to establish training centre at abroad on the basis of Public Private Partnership (PPP).

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NGO intervention in empowerment of rural women in Bangladesh: A case study on Phultala Upazila

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ABSTRACT

This study aims to explore the intervention of the NGOs for the development of women and intends to find out the impact of those intervention on the empowerment of women in rural areas in Bangladesh. The study was conducted in Phultala Upazila of Khulna district of Bangladesh; followed qualitative research approach. The study finds that rural women have been able to participate in income-generating activities since entering NGOs' microcredit and several training programmes, thereby dramatically making them self-reliant; their intervention leads to social awareness, healthcare development, and reduces the sense of insecurity among women. The findings show that NGOs are empowering women to create their own identity, generating employment, and thus the participation of women in family decision-making in many aspects such as economic management of the family, children education, marriage and autonomy on their daily lives have increased. However, the beneficiaries face challenges to understand the complex procedures of the micro credit system and proper utilization of that credit as most of them are illiterate; there are also some cultural confrontations and the interest rate is pretty high. NGOs should re-organize their work and the government should provide policy supports to address these challenges.

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Introduction

In the previous 20 years, Bangladesh has made significant progress in strengthening women's decision-making capacity (USAID, 2020). The Government of Bangladesh (GoB) has taken steps to improve rural areas and empower women, but it is hard for the government to meet the enormous expectations of such a vast population on its own (UNFPA, 2021). In this context, non-governmental organizations

(NGOs) have shown to be a true partner of the GoB in terms of socio-cultural development and women's empowerment (Bose et al., 2009). In a variety of sectors, NGOs have been engaged in establishing good outcomes with government aid. NGOs are working around the world to empower and enhance the lives of underprivileged women, particularly in rural regions (Begum et al., 2004). Bangladesh currently has around 30,000 NGOs, including BRAC, PROSHIKA, Grameen Bank

(GB), ASA, TMSS, and CARE, among others (Hossain, 2020). The bulk of rural people, particularly women, who account for about half of the population, are poor and vulnerable (Woman Watch, 2021). In this context, NGOs are the catalysts in many aspects for the development of rural poor, and the government has always recognized and associated with them.

For a long time, NGOs have worked to ensure that women have equal rights and opportunities in all sectors. Microfinance programmes boosted women's standing both at home and in the workplace (Eze, 2019). In BRAC's micro-credit programme, 90 percent of credit holders are women, while in Swanirvar Bangladesh, 71 percent of loan holders are women (The Layers and Jurist, 2021). Women's economic, social, and health status were improved as a result of their increased engagement in self-empowerment programmes (Lucy et al., 2008). This helps the government achieve its goal of empowering rural women through a variety of initiatives. Therefore, the goal of this research was to explore the intervention of the NGOs for the development of women and intends to find out the impact of those intervention on the empowerment of women in rural areas in Bangladesh.

Literature review

Empowerment is a loaded term that refers to specific rights and liberty of people to act in accordance with their free will to enhance the current socio-political and economic structure (Hashmi, 2000). In addition, United Nations Development Fund for Women (UNIFEM) denotes women empowerment as the combination of some understandings includes building a personal sense and confidence in one's ability, developing the competence to make decisions, and acquiring the ability to influence and change the development path and societal change (Afrin et al., 2010; cited in Boraian, 2008). Aruna and Jyothirmayi (2011) stated that the economic independence of women boosts the empowerment and decision-making power in the family and society. Gabra (1997) entailed women empowerment by improving their abilities that

help to influence in taking decisions – directly or indirectly influence their lives.

After the birth of the new state of Bangladesh, the government failed to support the underprivileged people and NGOs stepped in to fill the void (Nobusue, 2002; Ahmed, 2001). Hassan (2015) mentioned that the NGOs have taken several programmes to develop the war-torn country's socio-economic condition of rural people including microcredit, health, education, awareness, employment generation, family planning, access to government resources, agricultural development and food security. In addition, to support these programmes, the BRAC, ASA, GB, and CCDB covered above 32 million poor in rural areas of Bangladesh among them 90 percent are women (Islam et al., 2014). In the broader perspective, socio-economic development would be impossible without the inclusion of women in a country (Salooje, 2001). Ahmed (2013) described diversified jobs are performed simultaneously by the rural women in their day to day lives to maintain their family and rural agricultural production (Figure 1). But their contribution is hardly acknowledged in the family.

Haider and Aktar (1999) mentioned that women empowerment is positively influenced by the interventions of NGOs. The core purpose of NGOs is to empower underprivileged women by improving their capacity to think, communicate verbally, and create skills in development

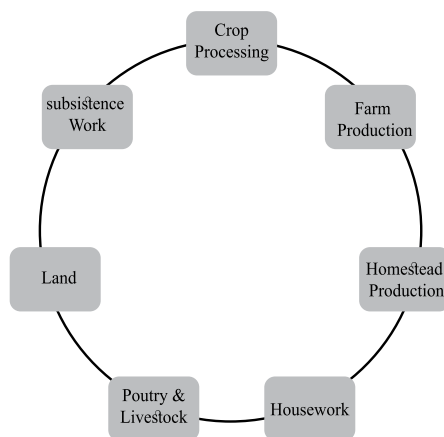


Figure 1. Activities performed by rural women in Bangladesh.

Source: Ahmad, 2013

activities. Begum et al. (2004) enunciated that NGOs contributed profoundly to develop the health at rural areas' women of Bangladesh through sanitary latrines to 1.40 million people, providing tube wells to 15 million people for drinking safe water, 186 sanitation centres in the rural area, vaccinating 85 percent children and training to women on children health. A number of scholars stated that the financial and social programmes of NGOs empower the women to increase women's participation in household decision-making, to learn new skills and allows women to make a significant contribution to their household's developments (Al-Shami et al., 2016; Hashemi et al., 1996; Pitt & Khandker, 1998; Rai & Ravi, 2011).

Hashemi (1996) has found that micro-credits programmes contribute positively to empowering the women's economic status in rural areas of Bangladesh. In addition, Pitt and Khandaker (1996) stated that micro-credit programmes had a considerable impact on rural women in the areas of social empowerment, feeling of decency, education and awareness, leadership and operational abilities in organizations. This positive socioeconomic shift enabled women to become more self-sufficient and economically stable in their households and societies (Pitt & Khandaker, 1996; Debnath et al., 2019). However, rural women of Bangladesh who joined the BRAC programmes firmly believe that their societal and household position has improved (Mahamud et al., 2021).

On the contrary, Islam and Sharmin (2011) found that NGOs provide the services to targeted and specified women who are able to return back their micro-credits, not to the ultra-poor. Chambers (2004) mentioned that the realities of NGOs are different from their myth because the marginalized women are often ignored. Bebbington (2005) stated that the intervention of NGOs grew slanted toward the less poor and urban areas and found the social exclusion of NGOs intervention such as duplication of programmes, short term development approach, lack of accountability, rent-seeking attitude, high-interest rate, monolithic development

approach and cut-off budget from social services (Islam & Sharmin, 2011).

The above literature discussed that NGOs played enormous programmes to empower rural women. They provide the financial facilities, education, training to develop the skills, development activities to lead sound lives and assist to empower the women in rural areas. On the contrary, NGOs' services became slanted toward targeted and specified people who are able to return back micro-credit and they are concentrated on urban areas rather than rural areas resulting in ultra-poor women being excluded from their services. The southern part of Bangladesh is a disaster-prone region where climate induced disasters attack every year especially Sidr destroyed severely this region in 2007. To overcome the situation, many donor agencies and civil societies provided financial and societal supports through different NGOs. But the previous literature creates a dilemma whether NGOs' intervention empowers the rural women or not. However, this study was a great scope to find out how much work NGOs are doing to empower women in the southern part of Bangladesh as this region would be an important economic zone for the next decade.

Figure 2 offers a conceptual framework on how NGOs are transforming rural women towards development, developed by authors after reviewing the model for women empowerment developed by Brajesh and Shekhar (2015). The model signifies a strong relationship among the age of the women, wealth she possesses, media power in the society, age difference between spouses, marriage length, major occupations of the society, and number of children of that woman in the women's empowerment process in the subcontinent. Consequently, the role of NGOs helps a range of potential impacts of rural women including:

Economic: Expanding the level of women's earnings and control over income leading to standard living and higher levels of economic self-reliance.

Health: Strengthening the contribution of women to household income and family welfare

and rising the involvement of women in family decisions on spending and other issues which lead to higher investment in women's welfare

Social: Exposure to networks and markets that provide a broader knowledge of the globe beyond the home and availability of information and opportunities leading to expanded social and political positions.

Education: It enables women to respond to challenges, to take decisions and meet responsibilities at home and outer world and to confront their conventional position and turn their life.

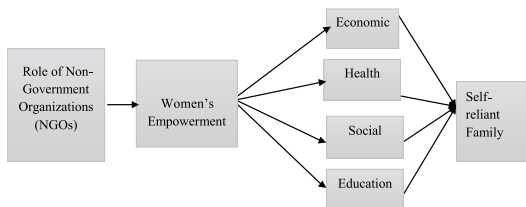


Figure 2. Conceptual framework (developed by the authors)

Objective of the study

The objectives of the study are:

- To explore the intervention of the NGOs for the development of women in rural areas;
- To find out the impact of those intervention on the empowerment of women in rural areas.

Methods and materials

This study was conducted in Phultala Upazila of Khulna district of Bangladesh (Figure 3). This area was selected conveniently because of COVID-19 pandemic situation and the researchers were unable to move due to restrictions.

Cross-sectional study design and qualitative approach were implemented in this study. Case study method was used as a research method in this study. Case study provides in-depth and well-defined understanding on cases or phenomena through using multiple data sources

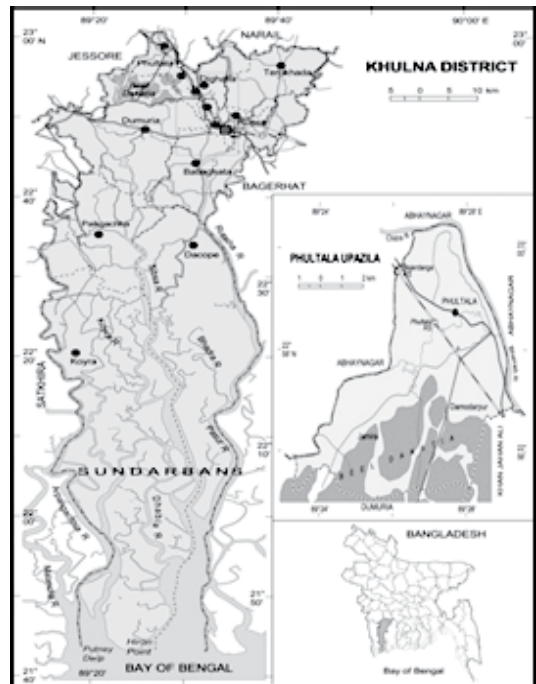


Figure 3. Phultala Upazila map (developed by the authors)

(Creswell, 2014). A total of 20 cases from Phultala Upazila were selected as participants based on their involvement in local NGO offices in Phultala Upazila using a convenient sampling technique. The In-depth Interview (IDI) was followed which allowed the participants to share their views and judgments as well as practical conditions and allowed the researcher to gather data from a broader depth.

A total of 15 key informant interviews (KIIs) were collected, which were selected purposely from the Phultala Upazila. NGO officials, academicians, social workers and local representatives from the study area were chosen as key informant. The open-ended questionnaire was designed which encouraged interviewees to tailor their questions to the nature of the interview

Table 1. Sample size

Sl. No.	Number of respondents	Classification of respondents	Data collection tools
1.	18	Rural people	FGD (3)
2.	15	NGO officials, academicians, social workers, local representatives	KII
3.	20	The beneficiary women group	IDI
Total	53		

Table 2. Triangulation of data

Sl. No.	Areas of triangulation	Ways
1.	By study (literature review)	different books, research papers, journals, thesis, publications, and reports of the NGOs, newsletters
2.	By data source	Primary & secondary
3.	By method	KIIs, IDIs & FGDs, content analysis

(Babbie, 2008).

Three focus group discussion (FGDs) were conducted among the dominant social actors i.e., school teacher, landlord, public representatives in local government avenues etc. This method helped to obtain in-depth information about the beliefs, expectations and opinions of the group. Secondary data and documents were gathered for this research from various books, academic articles, journals, theses, publications, and NGO reports, newsletters. Usually, a small sample and high representative sampling system are seriously pursued by this method (Aminuzzaman, 2011).

The researchers organized data based on information sources for the transcription of interviews, written field notes, explanations from the researcher, and secondary literature overviews. The main themes of the analysis were illustrated and were made readable based on the transcripts of all the interviews. By using deductive analysis, the researchers used the thematic approach, which helped the researchers to define and track the key concept of the data collected (Braun & Clarke, 2006). In the collection of data, different techniques were triangulated by this study. The researchers used triangulation of data to ensure that the limitation of a single process was avoided.

The purpose of the study was clarified to the respondents during data collection. The respondents have been told that their identity in the study will be confidential and the data will be used for research purposes only. Their approval was assured before initiating the collection of data. No humans were negatively affected by the data gathering.

Result and discussion

The involvement of NGOs as a third sector in the development administration of Bangladesh is not a new concept at all. NGOs are doing quite well in raising awareness on social, political and economic rights of individuals at the local level. In Phultala Upazila of Khulna district, it is found that different NGOs are running various projects for women beneficiaries on their socio-economic development. Here is a list of the NGOs that are working in the study area and their activities especially for women (Table 3).

The data table shows that the national NGOs are contributing more in terms of financial contribution than the regional and local NGOs. The regional and local NGOs have a limited scope for work utilizing their limited resources. Still, the contribution of local and regional NGOs cannot be ignored as their target populations' characteristics and innovative programmes'

Table 3. Information of NGOs working in Phultala Upazila for women empowerment

Name of the NGOs	Total number of beneficiaries	Total number of women beneficiaries	Total distributed loan to women in last 5 years.
BRAC	2532	1856	19 crore
ASA	2360	2110	17 crore
BURO Bangladesh	1286	1177	12 crore
DSK	1657	1273	4 crore
Jagoroni Chakra Foundation	1097	750	2.50 crore
Christian Service Society (CSS)	2076	1480	6 crore
Dustho and Mohilla Kollan Foundatioin	1544	1544	50 lakh
Rupantor	350	320	35 lakh
Process	233	233	Educational materials and 25 lakh

framework is praiseworthy.

Most of the beneficiaries fell within the age category of 25 to 45. In terms of offering credit facilities, NGOs prefer housewives over women who are self-dependent. Most of the NGOs target poor women who do not contribute to their family's financial activities. Literacy rate of majority (18 out of 20) of the respondents in this study is under secondary level. In addition, most of participants engaged with NGOs, are married. Their husbands encourage them to take credit from the NGOs when their families face financial difficulties. Interestingly, most of the loan receivers are active in more than one NGO programmes for taking micro-credits. As a result, they are becoming more in debt to different NGOs rather than upgrading their socio-economic status.

Health and nutrition status

Different NGOs have operated several programmes on the health and hygiene sector in Phultala. Here, BRAC conducts health programmes for improving maternal health while Dushtha Shasthya Kendra (DSK), Dustho and Mohila Kallyan Foundation (DMKF), Jagorani Chakra Foundation (JCF), also work for the health and hygiene issues in the rural area. DMKF works for supplying nutritious food among the poor people in the rural areas of Phultala and JCF provides free primary healthcare services by arranging medical camps in some areas in Phultala Upazila. One of the key informants emphasized that,

"NGOs are doing well in our locality to serve the poor people and generating awareness on health and hygiene issues. Their activities have a positive impact on the overall development of the rural community". (Personal communication, November 14, 2020)

Therefore, NGO activities have improved the villager's healthcare condition and consumption of nutritious food in recent times.

"Rubina, a beneficiary of CSS, is a 26 years old woman. She has two daughters aged four and two. During the birth of her younger daughter, she took healthcare support from the "Advocacy on Safe Motherhood Project" of CSS. She took advice from

this programme regularly about the health issues of her child and herself." (Case study-01)

Education and awareness

NGOs' programmes have raised awareness among rural people on their rights and responsibilities as citizens. NGOs have specific programmes on providing technical training for women and youth population, old-age people's education, night schooling for working population and basic health care training for general people. Besides, they also disseminate information about family planning, leadership and entrepreneurship.

"Four years back, when Yasmin was struggling to continue the education of her school-going daughter, she came to know about the "Primary Education Strengthening Program (PESP)" of ASA. The mentor of PESP motivates her to send her daughter to the learning centre of PESP. Her daughter is now studying in class eight in a high school." (Case study-02)

This kind of project gives them confidence that they can do something in life and contribute to their family and society as well. Their latent talents get a chance to bloom again. In this regard, one of the respondents said that,

"I believe my daughter will not have to face the same struggle that I faced in my childhood due to lack of education. She will get a chance to be whatever she wants and make us proud one day for sure. My daughter is a very bright student in the school and I hope she will opt for her higher studies in the top-ranked universities of Bangladesh. The misery of our life will come to an end with the advancement of her life." (Personal communication, November 7, 2020)

Social identity and empowerment

As they are involved in productivity and income with the participation of NGOs, the influence and bargaining capacity of rural women increased significantly. They can take decisions cooperatively with the other members of their family about their family issues. Thus, NGOs are contributing to empower women and create their own identity. One of the key informants said that,

"NGOs in our locality are doing great in empowering the poor women providing them

with an opportunity to involve in different income-generating activities. They get new hope for being self-reliant and their social status is changing positively in last 3-4 years." (Personal Communication, 12 November 2020)

Women's participation in social organizations has increased than before and they are actively involving themselves in crisis management during emergencies. They have built their brand by engaging themselves in entrepreneurial activity. Rural women are becoming more aware of political problems and are willing to connect with local politics.

"Rani Begum took a loan from DSK under their microcredit programme when she was divorced and broke. She was living with her father. She started her journey with a small business. Now, she is a successful entrepreneur and another 5 women work under her. She has established an identity for herself." (Case study-03)

Contribution of NGOs to poverty alleviation of women

The respondents of this study admitted that microcredit by NGOs facilitates poverty reduction through income generation activities. In Phultala Upazila, for generating the income of the women, many NGOs have taken numerous programmes. Among them, microfinance programmes by BRAC and DSK are most significant. Low-interest rate loan facilities by JCF, CSS and BURO are also remarkable. Along with these, different training programmes on several issues are also working here to create income opportunities. In this study, it has been found that almost all the women participant's income has increased after NGO membership that improved their quality of life. The respondents also reported that the compulsory saving system by NGOs particularly ASA and BRAC has increased the average savings of their family.

"The economic condition of Firoza Begum's family was insolvent. She heard about the 'Microcredit Support' of BRAC and took a loan of Tk. 40,000 She started cow farming with that loan. And now she has a monthly income of Tk. 45,000. She also saved Tk. 1,200,000 in the last seven years." (Case study-04)

Data reinforced that the amount of total household expenditure of most NGO members in Phultala Upazila, have increased than the previous. Their daily consumption of food and other items have also changed positively. Studying the household expenditure of the respondents, it has been revealed that a lot of women bought furniture, built new houses and acquired land property. Several participants are spending more on children's education.

"Rozina Begum was a day laborer before NGO membership. She took 60 thousand loans from ASA under the 'Tailoring and House Farming Loan Project' and started a livestock farm and later installed a shop. Now she has a two-storied building, land property, shop, a Mahindra and livestock farm. She is also spending on her son's education and living a solvent life." (Case study-05)

Financial strength and independence

The investment through microcredit programmes of NGOs, in different income generating activities leads to strengthened financial capacity. This enables the clients to repay their installments and support their families. The majority of the women beneficiaries of microfinance intended that they use the loan for income generation. Most of them admitted that they handed over the borrowed money to their husband to develop their businesses including agriculture, poultry and livestock farming and small-scale business activities.

Several NGOs in Phultala Upazila including BRAC, ASA, DMKF are providing training to hundreds of males and females regarding domestic animal and poultry farming, handicrafts, nursery development, agriculture and small business. Along with this, they are providing loan assistance to implement these projects which are contributing to reducing poverty in this area through income generation.

"Rumpa, 35 years old woman took a loan from ASA under the 'Tailoring and House Farming Loan Project' and started a tailoring business. At present, the current income of her family is Tk. 45,000 which brought solvency to her family's economy." (Case study-06)

During the execution of the study, the researchers also received some negative reviews from women, who discussed that the capacity of rural women for using credit is weak. In the absence of sufficient information and instruction, beneficiaries are hardly able to make proper use of their savings. Some statements have also suggested that officials of NGOs seldom provide appropriate training to beneficiaries for the implementation of the distributed loan. The interest-earning intention of NGOs often de-motivates rural women to participate in microfinance programmes. The present study found that the majority of female beneficiaries were illiterate, so they had to rely on their husbands to use their loans. Very few of the female beneficiaries have full autonomy to use the loan at their discretion.

"The outreach of the NGO activities is very impressive in our locality but their impact can be heavily criticized for taking high interest from the clients and poor mentoring & supervision on the project activities. Many of the poor women can't properly utilize the funding and fell into the trap of interest." (FGD, November 15, 2020)

Conclusion

From the above discussion, it is apparent that though there were some negative aspects of NGOs, they have supported the economic growth and increased individual consumption level as well as reduced the insecurity of their beneficiaries. Our study found positive results on borrowers in terms of their health literacy and children's education. In addition, NGOs have a positive effect on their female members, especially regarding the status of women, their increased participation in family decision making, expanding knowledge, consciousness, and an enhanced situation for children. These programmes strengthened their protection by giving them access to assets and privileges, and by giving them choice and freedom, improved their self-respect. The NGO programme has also encouraged beneficiaries by raising their social awareness, which is reflected in their increased involvement in local council elections and community engagement

events, among other items. Engagement also has a positive effect on the health of women as it decreases their other job burdens by increasing their overall employment time. Women's involvement in the micro-credit programme has improved their independence as well. The study indicated that rural women are participating in income-generating activities since entering NGO microcredit programmes. However, the beneficiaries face challenges to understand the complex procedures of the micro credit system and proper utilization of that credit as most of them are illiterate; there are also some cultural confrontations and the interest rate is pretty high. To overcome the difficulties, the authorities of NGOs should be allowed to instruct stakeholders to use their credit, which does not only rely on their family members. Microfinance institutions should rethink with promoting creativity through systemic approaches for successful microcredit management. NGOs need to change their profit-oriented mindset to minimize the vulnerability of rural poor women.

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Declaration of conflict of interests

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Incoherence among the rural local self-government bodies of Bangladesh

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ABSTRACT

There are three tiers of rural local bodies in Bangladesh namely the Union Parishad, the Upazila Parishad and the Zila Parishad. These bodies of Bangladesh have been facing challenges from the very beginning of their functioning. There are a lot of confusions about what type of authority would be provided to them and which authority will lead them. The formation and electoral process of these bodies are different as per their own 'Ordinances'. No one of the bodies can enjoy the full autonomy due to various interferences by different authorities. It is considered that the Union Parishad is comparatively successful in spite of many drawbacks. A partial success of this body cannot do enough to institutionalize democracy and ensure good governance. It was observed, there should be an utmost attempt to make sure the coordination among the rural local bodies under a same unique arrangement. The main objective of this research is to identify the problems of coordination and address the areas of non-coordination as well as to provide some policy suggestions in this regard. This is an empirical study which was conducted by the secondary sources of data. The method of content analysis was applied also. The techniques and strategies for a proper coordination among the bodies was discovered through this work.

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Introduction

Modern societies suffer from various challenges, including environmental protection, fighting poverty or reducing unemployment, which pose many difficulties for a single authority to manage. This is why the concept of "inter organizational coordination" has gained paramount importance (Lund, 2005).

Bangladesh, which emerged as an independent state in 1971, has not yet developed appropriate strategies, policies, and institutional necessity to cope with local self-governance. The

country has typically followed a centralized system of policy making and resource allocation in which inter-governmental transfers are unstable, not well defined, and lacks an adequate system of incentives. In spite of having a legal-institutional framework of a decentralized system of local government, in reality there has been a little decentralized governance at the local level. Besides, given the lack of fiscal resources and limited decision-making power of local governments, the level of decentralized government that exists has been largely ineffective (Panday, 2006).

Apart from an extreme central dependency Bangladesh also suffers for lack of coordination among its local self-governing bodies.

Coordination is a complex and crucial issue that is needed both at the day-to-day operational level and at the policy level. Problems of coordination occur because of the involvement of numerous institutions and the overlapping nature of their jurisdictions (ibid.).

Coordination is a way of bringing together disparate agencies to make their efforts more compatible, in the interests of equity, effectiveness and efficiency (Fayol, 1916). Without coordination, the danger is of lapsing into chaos and inefficiency (Robinson, 2000). Coordination among the rural local self-government tiers is very essential for its proper functioning and effectiveness (Ahmed, 2015). Proper functioning and effectiveness highly depends on empowerment of the system (Panday, 2006). But how to achieve the empowerment is the main question in this regard. Independent decision making, financial capability and administration free of bureaucratic influence are some of the major pre-requisitions for empowerment of respective tiers of local self-government (Ahmed, 2015).

It is popularly said about the three tiers of local self-government i.e. the Union Parishad (UP), the Upazila Parishad (UZP) and the Zila Parishad (ZP) in rural Bangladesh that there is no proper coordination among them. In fact the tiers work differently under the different laws or ordinances. The Upazila and the District are the two administrative units where the government has set up a local government system as per constitutional provision (Ehsan, 2021). The UP is a different local self-government system where there is no administrative unit. UP is a comparatively effective local government organ having autonomy power and implementing capacity than the other two (Siddiqui, 2014). To make the local bodies effective, a chain of command should be set among them under a single law. Because of lack of coordination and having no chain of command the development activities of local areas are being hampered and dependency is being increased on the central government. It

can be said that the coordination may be more important in the question of effectiveness of local bodies. In fact, the mentioned bodies are facing a lot of challenges and drawbacks right from the beginning of their journey. There is no alternative way of local self-government for implementing local development activities in developing countries like Bangladesh. This local self-government system is also needed for democratic practices and principles. As a result, the central government can be able to concentrate more in national issues and international affairs. So, it is the high time to address the basic problems of coordination among the tiers and should take the initiative for proper coordination and cooperation so that the local bodies would be successful in their functions (Chowdhury & Panday, 2018a).

The electoral process and formation of local bodies may be changed also. The public representatives of the UP are elected by a direct vote where the representatives of the UZP are elected both by direct and indirect vote. On the other hand the representatives of the ZP are elected by indirect vote (Ehsan, 2021) like the Basic Democracy of Aiyub Khan Regime of Pakistan era. The formation of local self-government bodies of Bangladesh is almost same except the City Corporations and the Paurashavas. Perhaps the government tries to maintain the uniqueness in terms of formation of local bodies due to establish balance among the system (ibid.).

The study tried to highlight the drawbacks of coordination among the tiers of rural local self-governments of Bangladesh by reviewing the real nature of the rural local self-government in Bangladesh focusing the overlapping functions of the same.

Methodology

This is a qualitative research based on the secondary data. The study tried to illustrate the poor coordination among local governing tiers by reviewing relevant articles and books. This study has also applied own research observations of the present as well.

Incoherence of the local bodies of Bangladesh

Decentralized local governing structure

Figure 1 clarifies the fact that there are two distinct forms of decentralized local government bodies, i.e. devolution and decentralization are coexisting here simultaneously. In other words, field administration at the division, the district, the Upazila and the union level are examples of decentralization that mainly operate with delegated authority, while local government institutions (LGIs) both at urban and rural levels are attempts of devolution. The various tiers of field administration are headed by the appointed officials (bureaucrats) from the government, i.e. the division, the district and the Upazila are headed respectively by the Divisional Commissioner, the Deputy Commissioner (DC) and the Upazila Nirbahi Officer (UNO). These local administrative units are responsible for delivery of various public services like health, education, agriculture, family planning. They are also responsible for undertaking various development works at the local level they have the role in monitoring, reporting and coordination of those development programmes as per direction of the government. In the local government system of Bangladesh, rural local self-government institutions are comprised of the UPs, the UZPs and the ZPs. Table 1 presents these rural local governments in Bangladesh which articulates



Figure 1. An overview of local self-government and local administration of Bangladesh

Developed by the researchers, 2022

their election method, assigned duties, revenue authority and heads of those bodies including the laws by which they are currently operated (ibid.).

Personnel and functions of rural local self-government

From Table 1, it seems that Bangladesh is at least structurally a decentralized country, having well defined local government tiers for rural areas (ibid.). However, responsibilities assigned specially on the rural local government bodies are not well distributed and thus resulted overlapping. On the other hand, there are three laws that work as the provision of three bodies do not offer proper hierarchical order as it appears.

Streams and classifications of LGIs in Bangladesh

The existing four streams and classification of LGIs in Bangladesh may be observed in the above Table. The Statutory and the customary can be the fifth stream. Customary LGIs in

Table 1. Law, personnel, policies and responsibilities of rural local governments of Bangladesh at a glance

Name	Union Parishad	Upazila Parishad	Zila Parishad
Headed by	Elected Chairman	Elected Chairman	Elected Chairman
Election method	Direct election	Direct election	Indirect election
Functional observation	Participatory planning and implementation, small investment, service monitoring in limited capacity	Devolutionary integrated planning and thus implementation, small investment and service monitoring powers	Planning, coordination and oversight
Revenue authority	Limited revenue authority and scope but does not have sub-national borrowing authority	Widespread revenue authority and scope but does not have sub-national borrowing authority	revenue authority and scope without sub-national borrowing authority
Acts in operation	The Local Government (Union Parishad) Act, 2009	The Local Government (Upazila Parishad) Act, 2009	The Local Government (Zila Parishad) Act, 2009

Source: Ehsan, 2021

Table 2. Bangladesh: Reform agenda for local governance

General LGIs	Special purpose LGIs	Territorial LGIs	Traditional rural-urban divide
Zila Parishad (61 in plainland and three in hill districts)	Hills and Plains (both) City Corporation Paurashava Special LGIs for Chittagong Hill Tract Regional Council (1) Three hill district councils (Rangamati, Bandarban, Khagrachhari) Circle Chief (Raja) at three Hill Districts and Headman-Karbari at Mouza levels (customary).	Zila Parishad in plain (61) and three in hill districts (BD info. portal) Upazila Parishad (495) (Banglapedia) Union Parishad (4554) (BD info. portal)	<i>Rural</i> Zila Parishad (61) Upazila Parishad (495) Union Parishad (4554) <i>Urban</i> City Corporation (12) Paurashava (330)

Source: Ahmed, 2015

Bangladesh is only seen in three hill districts which is known as Circle Chief (Raja) and Headman-Karbari system which is shown in location specific LGIs stream as well. Despite the fact of the different streams being separately shown, overlap among the streams can easily be understood.

The discussion on local administration and LGIs shows a parallel institutional presence with identical activity. An environment of unhealthy competition and conflict between the two is created perennially by the parallel presence. (Ahmed, 2015).

Inadequate coordination

Overlapping and non coordination are present among the rural local government bodies. For example, as per the Ordinance, the Zila Parishad can review the development project of the UZP, but there is no instruction mentioned in the ordinance of the UZP in this regard. In the same way the UZP can coordinate the development activities of the UP and can provide necessary assistance as per its ordinance, but no instruction was mentioned in the ordinance of UP. The Local Government Ordinance Union Parishad, 1983; Upazila Parishad 1998; and Zila Parishad 2000. Rather the LGIs are fully dependent on the central government. It can be mentioned as example that a Union Parishad may, and if so required by the government shall, prepare and implement development plans for such periods as may be specified. According to the Local Government Ordinance (Union Parishad),

1983, such plans shall be subject to the approval of the respective Deputy Commissioner. If any conflict arises between Parishad and any other local authority, it will be sent to the government in order to mitigate the conflict and the decision of the government shall be considered to be final. Therefore inadequate coordination seems inevitable.

On the other hand, the UP is a different local government system where there is no administrative unit. The UP is a comparatively effective local government organ having autonomy power and the implementing capacity than the other two. Presence of a strong bureaucracy, interference of the local Member of Parliament (MP) and having no working chain of command between local administration and local self-government, both organs are facing a lot of challenges in the question of effectiveness (Ehsan, 2021; Khan, 2016; Islam, 2018). On the other hand as the UP is the root level local government organ, they can implement all the development activities assigned by the respective authority or accordingly their own plan. An Upazila is organized with some unions and a district is also organized with some Upazilas (Habibullah, 2019). So, if a UP is capable of implementing all development activities and looking after all local matters, the question may raise that what are needed to the UZP and the ZP. Having no coordination, the influences and dependences on the bureaucracy are increasing. This is not a good sign for autonomy and democratic principles. Thus the

development activities of local area are not only hampering but also creating many problems in local areas. The Procrastination and slow pace of development work are the common features of drawback. In this way governmental assets are misused and local level sources of income are being narrowed due to non-cooperation from the both sides (Bhuiyan, 2014).

In fact the local governance of Bangladesh is in a chaotic situation. There are involvement of the government and public sector agencies at the field administration units, LGIs of different streams, booming private sector and the resilient organizations of citizens. But there is no rule for an effective engagement or a strong collaboration framework between and amongst them. Conflict, confusion and contradiction in defining role, jurisdiction, functional assignment and expenditure assignment largely contribute to the chaos in the general governance. The scarce resources are not utilized in a judicious manner, the capacity deficits are not complemented and bridged by recognizing each other's strengths and weaknesses and the central interferences at the local affairs make the situation more chaotic (Shamim et al., 2012). There are legal vacuum, policy confusion, absence of role differentiation and all which contribute to the conflicts and worsening the situation caused by the democratic deficit and lack of local and horizontal accountability (Ahmed, 2015).

LGI in Bangladesh does not appear to be functioning under a uniform and composite governance structure. Rather it works in a scattered manner with similar manifest (Shamim et al., 2012; Bhuiyan, 2014). The UP, the UZP, the Paurashava and the City Corporation (CC) are considered to local self-government altogether and they have different provisions offered by the legislature. Seven different laws and a bunch of rules that paved the fate and destiny of LGIs within the same jurisdiction but clash are seen in functions and territorial jurisdiction with one another (Ahmed, 2014). Ahmed pointed out that in India, the Philippines, Sri Lanka and Indonesia in Asia and South Africa and Uganda in Africa, LGIs are governed under integrated and uniform

legal framework called 'framework law'. He also argued that during Pakistani time,

We also had LGI frame work called Basic Democracy Order 1959; under the single legal instrument Divisional councils, District Councils, Union Councils, Town Committee and municipalities were being organized and governed (ibid.).

The institutional organogram of local government system of Bangladesh is strong in institutional and organizational features, but it is disappointing in terms of role, function and from authoritative perspective. Unlimited central control over the LGIs is the main cause of failure of local self-government in Bangladesh. Such type of control comes from the central authority and the bureaucracy. Financial dependency in this context has made local self-governments obliged to be controlled by central authority. This control must be decreased for effectiveness of local self-government. The interference of local MP on the local self-government bodies is also the causes the failure in this regard. They want to be a catalyst of central allotments or investment. It has been claimed their jurisdiction of power and authority has been provided as per the constitution. But, their desires and interferences on local self-governments are contradictory against the spirit of autonomy of local self-government. The UP is a historically animated tier of local self-government though its effectiveness is being hampered due to miserable condition of its budget. At the same time, a huge number of conflicting elements has been injected in the UZP. This is not being effective. So, if both the local self-governments (the UP and the UZP) are accepted as associating institutions of the ZP, all the local self-governments can be more effective and powerful (Rahman & Habibullah, 2016). The capacity of local-self governments is being strangled by the legal, functional and financial limitations (Ahmed, 2014), where the local self-governments were supposed to do general development activities, public services and good governance. However, LGIs are still contributing immensely in terms of flourishing the democratic governance, maintaining the social order and cohesion as well as contributing in infrastructural and economic development (ibid.).

Above all, LGIs in Bangladesh are day by day transforming into a hollow political institution with a shallow administrative, financial and functional responsibility (Ahmed, 2014, Chowdhury & Panday, 2018b). They are given a long list of functions with inadequate provisions. The functions of central government have been expanded to a great extent over the Upazila administrations. The responsibility of power and authority of central government is everywhere. So, the responsibility, the budget and the manpower should be distributed equitably between central government and local government (Muhith, 2002). The functions as are not according to finance and vice versa. The functions which are allocated for LGIs are very general in nature. For instance, in most of the cases ambiguous and general guidelines, like developing the social, educational and cultural scenario, can be found inside list of functions allowed by the provision for the LGs. The infra-structural development, maintaining the law and order monitoring the child marriage, dowry and other social and criminal offences have gained more priority in the list than the specific target oriented guidelines. A standardized specification needs to be unbundled in order to balance with management strength, financial capability and consideration of recipient or services.

Conclusion

The overlaps of services that exist among the agencies and local government institutions have to be specified and responsibility has to be fixed on the principles of subsidiary. The plurality and the competition can be promoted among the multiple agencies but responsibility has to be located at the identical points. Under the current situation, neither the government nor the local government institutions, civil societies, community based organizations and private sectors can find a clear ground to stand on for cooperation and coordination. There is a long absence of rule of engagement.

The only answer can be ensuring betterment of the local people through development activities and other socio-economic programmes. The

local bodies should be formed based on total number of population. How many public representatives will be in the respective body, would depend on the number of voters. The government system of Bangladesh is 'Parliamentary' but the local self-government system of Bangladesh is of Presidential form where the accountability system is totally different. The chair of the body has got priority than the body under the existing system which is totally against the principles of parliamentary form of government. So, the formation and electoral process should get concentration for reformation as per democratic principles of the local bodies. Lastly reconsideration can be helpful.

- Democratic spirit should be upheld not only among the election process but also among the governing process.
- The allocation of duties and responsibilities among the tiers of local government must be revisited and amendment should be called for if necessary.
- Above all the level of autonomy should be extended by ensuring decentralization not rhetorically but in practice for the elected authority in the local constituency.
- Finally, reformation priorities should be traced out which will make the coordination process among the local government tiers smooth and linear so that the incoherence can be minimized.

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Ambient air quality in Rural Development Academy, Bogura

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ABSTRACT

The study aims at evaluating ambient air quality in RDA campus. The study has conducted air quality assessment on Carbon Monoxide (CO), Carbon Dioxide (CO₂), Sulfur Dioxide (SO₂), Nitrogen Oxides (NOx) fine (PM 2.5) and coarse (PM 10) particulate matters and suspended particulate matters (SPMs). The ambient air quality assessment was performed in 16 places of RDA campus. The result has been interpreted on the basis of national and international ambient air quality guideline. The result shows that the ambient air quality of RDA is broadly under the standard limit of national or international guideline. In overall consideration, the ambient air quality in RDA campus is good enough and is not likely to affect the health of individuals. The study has limitation as well. Ambient air quality measurement in RDA did not follow time differences between 1-hour, 8-hour, and 24-hour evaluation standards for the pollutants. Hence it was not possible to get aggregated measurements and rated respective averages.

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Introduction

Ambient air or outdoor air pollution has been an issue affecting everyone in low, middle, and high income countries. It caused 4.2 million premature deaths worldwide in cities and rural areas per year (WHO, 2021). Air pollution in Bangladesh has reached an alarming level, which wreaks damage to our nature, health and properties. The main reasons of air pollution in Bangladesh is the emission of high levels of particulate matter (PM) (especially two-stroke engines), carbon monoxide (CO), nitrogen oxides (NOx), volatile organic compounds (VOCs) diesel of PM, NOx, VOCs, and sulfur oxides (sulfur in diesel fuel is high) resulting from gasoline and diesel engines. Almost 50 percent of PM (PM 2.2) comes from vehicular emissions (Begum et al., 1995). That is why the institutions close to high way have every

reason to worry. Smart and environment sensitive institutions can by no means overlook the issue and cannot but take preventive measures. The campus of Rural Development Academy (RDA), Bogura itself facilitates learning on environmental friendliness for the visitors. This is all the more reason to check the level of air pollution. The paper is an effort to evaluate only the ambient air quality in RDA campus.

Background

RDA, Bogura has been dedicatedly performing its role in training, research and action research activities since its inception in 1974. The institution is using catchwords “green and clean RDA” encapsulating green, clean and environmentally sound campus with high air quality and its contribution to promoting environment friendly green technology particularly

in agricultural field. The Academy is located at Sherpur, 16 kilometers away from Bogura town. The front side of the Academy faces Bogura-Dhaka Highway. The campus is spread over 120 acres of land. It hosts flats for residence, school & college, play ground, children's park, hostels, guest houses, office buildings and conference rooms, library, mosque, health centre, sports complex, agricultural demonstration farm and other amenities. The demonstration farm consists of farming, horticulture, floriculture, tissue culture, pisciculture, livestock, poultry etc. All the year, RDA remains hectic with arrival and departure of a large number of people for training and research activities. The air quality is assumed to be sound due to sufficient number of trees and being located far away Bogura town. But there is no evidence and air quality inside the RDA campus has never been tested. The air quality should not remain unmeasured as we are using catchphrase 'green and clean RDA' conveying a sense of a pollution free environment. There are two big threats: one is Bogura-Dhaka Highway adjacent to RDA campus; the other one is a poultry feed factory just behind the campus. In every minute about 25-30 vehicles pass the RDA from two opposite directions of the highway. These vehicles and poultry feed factory cause emission of different hazardous substances like particulate matter (PM_{2.5}, PM₁₀), some gases such as ozone (O₃), oxides of sulfur (SO_x), nitrogen (NO_x) and carbon (CO), some heavy metal (lead, cadmium mercury) at elevated level deteriorate the air quality. The study aims to measure the air quality inside RDA campus so as to assess the level of air pollution.

Objective of the study

The study deals with a single objective. The study aims at evaluating ambient air quality within RDA campus.

Research rationale

On the one hand we are assuming air quality inside RDA campus very good and using the catchphrase 'green and clean RDA' conveying a sense of a pollution free environment on the other hand we don't have any evidence for our

claim. Rather we have two big threats - Bogura-Dhaka Highway adjacent to RDA campus and the poultry feed factory just behind the campus which can cause emission of different hazardous substances. An environmental concern is whether the pollution is at warning level. An unhappy work environment and poor performance are direct result of poor workplace air quality. Therefore, the air quality index inside the RDA campus should be tested so as to evaluate the ambient air quality.

Methods and material

This section describes the concepts the study deals with and how the data has been collected and analyzed. The concepts include ambient air quality, ambient air pollution and air quality measurement. Ambient air refers to outdoor air which consists of 78 percent nitrogen and 21 percent oxygen. The extra 1.0 percent is a combination of carbon, helium, methane, argon and hydrogen (Safeopedia, 2018). Ambient air pollution according to World Health Organization means potentially harmful pollutants emitted by industries, households, cars, and trucks. Of all of these pollutants, fine particulate matter has the greatest effect on human health. Most fine particulate matter comes from fuel combustion from vehicles, power plants, industry, households, or biomass burning. WHO estimates fine PM causes 25 percent of lung cancer deaths, 8 percent of chronic obstructive pulmonary disease (COPD) deaths, and 15 percent of ischaemic heart disease and stroke. "The daily air pollution levels are determined by the combined effect of emission and dispersion of pollutants, and the latter, of course, depends on the weather conditions" (Begum et al., 1995).

Air quality measurement

In Bangladesh, dry seasonal (November – April) PM pollution all over the country is found the main concern. Ambient or outdoor air is measured in our surrounding environment. It is typically measured near ground level, away from direct sources of pollution (Rana & Biswas, 2019).

Six pollutants (i.e. PM, sulfur dioxide, nitrogen oxides, ozone, carbon monoxide and lead) are

termed as the criteria air pollutants (CAP) for their abundances as pollutants in the atmosphere and ability to harm human health, plants, and properties. Lead concentrations in ambient air are significantly reduced after the phase-out of lead additives in gasoline in mid 1999 (Begum & Biswas, 2008). This study has conducted air quality assessment on Carbon Monoxide (CO), Carbon Dioxide (CO₂), Sulfur Dioxide (SO₂), Nitrogen Oxides (NO_x) fine and coarse PMs and SPMs.

Airborne PM represents a complex mixture of organic and inorganic substances, covering a wide range of diameters, from <0.1 µm and up to some 100 µm. Mass and composition tend to divide into two principal groups: coarse particles larger than 2.5 µm in aerodynamic diameter, and fine particles smaller than 2.5 µm in aerodynamic diameter (European Environment Agency, 1993). The smaller particles contain the secondarily formed aerosols (gas to particle conversion), combustion particles and recondensed organic and metal vapours. The bulk of fine particulate mass comprise particles of diameter range 0.1-0.5 µm. The larger particles usually contain earth Crystal materials and fugitive dust from roads and industries. The acid component of PM, and most of its mutagenic activity, is generally contained in the fine fraction, although in fog some coarse acid droplets are also present. SPM in air generally is considered to be all airborne solid and low vapour pressure liquid particles, involving a complex, multi-phase system consisting of a spectrum of aerodynamic particle sizes ranging from below 0.01 µm to 100 µm and larger. Major sources of primary particles are industrial processes, road traffic, power plants, domestic burning (coal, wood, etc.), incineration, and resuspension of road and construction dust.

Description of instrument

Nine calibrated direct reading instruments were designed and used to measure CO, CO₂, SO₂, NO_x fine and coarse PMs and SPMs. The parameters and methods are as follows:

Parameter	Method
CO	Electrochemical
CO ₂	Non-dispersive Infrared (NDIR)
SO ₂	Electrochemical
NO _x	Electrochemical
Fine PMs	Laser
Coarse PMs	Laser
SPMs	Laser

Measurement uncertainties

The following measurement uncertainties were assigned to the respected parameters.

Parameter	Uncertainties
CO	±0.2ppm
CO ₂	2% of Rdg ± 10 ppm
SO ₂	±0.5 ppm of Rdg
NO _x	±0.5 ppm of Rdg
Fine PMs	± 0.4%
Coarse PMs	±0.4%
SPMs	± 1.1%

Data collection and analysis

The data was collected and analyzed by 3R Environmental Consulting Limited in two rounds on 12th September 2020 and 8th February 2021 (Table 2 & 3). The ambient air quality assessment was performed in 16 places of RDA campus. The places are: School Gate, Main Gate, Fish Hatchery, middle point of School Campus, middle point of agricultural field of demonstration Farm, Director General's Bungalow, International Guest House, Generator Station Area, Agricultural Advice Centre, Cattle Farm, Residential Area, Residential Building Roof Top, Administration Building, Administration Building Roof Top, IWM Hostel and CIWM Building Roof Top.

Results and discussion

The result has been interpreted on the basis of the following ambient air quality guideline (Table 1). Results of the continuous monitoring are consistent with the results of the spot testing for AAQ parameters and the following observations can be made:

Table 1. Ambient air quality guideline

Parameters	SPM	PM _{2.5}	PM ₁₀	SO ₂	CO	CO ₂	NO _x
Units	µg/m ³	µg/m ³	µg/m ³	µg/m ³	ppm	ppm	µg/m ³
DoE Standard (National)	200	65	150	365	9	NYS	100
WHO Standard	NYS	25	50	20	10	NYS	200
OSHA Standard	NYS	NYS	NYS	NYS	50	5000	NYS
ASHRAE	NYS	NYS	NYS	NYS	9	1000	NYS
NAAQS	500	65	150	120	9	NYS	120

Table 2. Result of first round data collection

Location	Section	Parameters							
		SPM	PM _{2.5}	PM ₁₀	SO ₂	O ₂	CO	CO ₂	NO _x
		µg/m ³	µg/m ³	µg/m ³	µg/m ³	%	ppm	ppm	µg/m ³
AAQ # 01	School Gate	74	25	37	0	20.9	0.3	403	0
AAQ # 02	Middle Of School	69	17	41	0	20.9	0.4	361	0
AAQ # 03	Fish Farm	65	21	32	0	21.0	0	372	0
AAQ # 04	Agricultural Advice Center	77	24	39	0	20.9	0.2	416	0
AAQ # 05	Cow Farm Area	74	18	45	0	21.0	0.6	507	0
AAQ # 06	Middle Point Of Agricultural Filed	52	19	24	0	21.0	0	362	0
AAQ # 07	Director General Bungalow	51	17	22	0	20.9	0.2	376	0
AAQ # 08	International Guest House	146	55	70	0	20.9	0.4	429	0
AAQ # 09	Sub-Station Area	123	41	68	0	20.9	0.2	421	0
AAQ # 10	Residential Area	129	39	67	0	20.9	0.4	407	0
AAQ # 11	Main Gate	138	40	83	0	20.9	0.2	383	0
AAQ # 12	Administration Building	82	27	39	0	21.0	0.2	419	0
AAQ # 13	IWM Hostel	78	23	40	0	20.9	0.2	40-8	0
AAQ # 14	Administration Building Roof Top	71	22	34	0	20.9	0	367	0
AAQ # 15	Residential Building Roof Top	48	16	23	0	21.0	0	349	0
AAQ # 16	CIWM Building Roof Top	59	19	27	0	20.9	0.1	362	0

Table 3. Result of second round data collection

Location	Section	Parameters							
		SPM	PM2.5	PM10	SO ₂	O ₂	CO	CO ₂	NO _x
		µg/m ³	µg/m ³	µg/m ³	µg/m ³	%	ppm	ppm	µg/m ³
AAQ # 01	School Gate	51	16	28	0	21.0	0	421	0
AAQ # 02	Middle Of School	94	15	68	0	20.9	0.2	397	0
AAQ # 03	Fish Farm	76	19	45	0	20.9	0.4	430	0
AAQ # 04	Agricultural Advice Center	89	22	58	0	20.9	0.5	439	0
AAQ # 05	Cow Farm	94	24	62	0	20.9	0.9	640	0
AAQ # 06	Middle Point Of Agricultural Filed	102	21	73	0	21.0	0	391	0
AAQ # 07	Director General Bungalow	60	16	37	0	21.0	0	401	0
AAQ # 08	International Guest House	94	24	63	0	20.9	0.2	431	0
AAQ # 09	Sub-Station Area	113	25	77	0	20.9	0.1	436	0
AAQ # 10	Residential Area	122	27	81	0	21.0	0.1	426	0
AAQ # 11	Main Gate	152	33	109	0	20.9	0.3	531	0
AAQ # 12	Administration Building	89	23	59	0	21.0	0	429	0
AAQ # 13	IWM Hostel	98	27	62	0	21.0	0	442	0
AAQ # 14	Administration Building Roof Top	81	20	52	0	20.9	0	398	0
AAQ # 15	Residential Building Roof Top	65	19	38	0	21.0	0	378	0
AAQ # 16	CIWM Building Roof Top	98	22	69	0	20.9	0.1	372	0

- Average carbon dioxide (CO₂) concentrations are all below the ASHRAE guideline concentration (950 ppm i.e. 600 ppm (at 14 CFM) above outdoor CO₂ concentration) and show that the rooms are receiving an adequate supply of fresh air.
- Average carbon monoxide (CO) concentrations were all below the ASHRAE guideline for an 8-hour period (9 ppm).
- Average SPMs concentrations are all below the DoE and NAAQS guideline (200 & 500 µg/m³)

The results (Table 1 & 2) show that the ambient air quality of RDA is broadly under the standard limit of national or international guideline. All of the areas count of SPM, PM (PM₁₀ and PM_{2.5}), SO₂, CO, CO₂ and NO_x are within the standard limit of DoE (national) and NAAQS (international).

Limitation of the study

A comprehensive and more accurate measurement could have been evaluated if air quality

index was measured instead. This has not been possible due to time and budget constraint. Ambient air quality measurement in RDA did not follow time differences between 1-hour, 8-hour, and 24-hour evaluation standards for the pollutants. Hence it was not possible to get aggregated measurements and rated respective averages.

Conclusion

The study evaluates the ambient air quality in RDA campus. To measure the air quality, SPM, PM (PM₁₀ and PM_{2.5}), SO₂, CO, CO₂ and NO_x have been tested against the standard limit. The result shows that the ambient air quality of RDA is broadly under the standard limit of national or international guideline. All of the areas count of SPM, PM (PM₁₀ and PM_{2.5}), SO₂, CO, CO₂ and NO_x are within the standard limit of DoE (national) and NAAQS (international). In overall consideration, the ambient air quality in RDA campus is good enough and is not likely to affect the health of individuals. It does not pose risk for the patients with heart or lung disease. The policy to test air quality against 1-hour, 8-hour, and 24-hour evaluation standards for the pollutants should be taken in every 7-9 years so as to be aware of and protect air pollution.

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Examining the ICT skills of local government officials in Bangladesh: A study of selected Union Parishads

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ABSTRACT

Information and communication technology (ICT) skills are among those vital factors that accelerate the rural development of any given developing country at a significantly faster pace. The Government of Bangladesh (GoB) has already addressed the country's ICT needs with a clear focus on the rural region. Union Parishad (UP) are already equipped with a digital centre from where people can receive basic services of their interest. The digital centres are being run by third parties, and UP chairmen and members have no such role in this. To accelerate rural development, adequate ICT skills of the local government institution (LGI) officials is however pivotal, no matter their scope of work in the digital centre at large. This study hence is an attempt to examine the ICT skills of the LGI officials who are linked with public service delivery at the very grassroots level. This study used the primary data analysis method and followed a mixed-method approach. The data collection methods include literature review, survey, focus group discussions (FGDs) and interviews. While the quantitative section explores the magnitude of ICT skills of the respondents, the qualitative section unveils the barriers to acquiring these skills among the respondents. With the data of nine unions across five administrative divisions of the country, this study shows that LGI officials of these constituencies are significantly lower, and the age gap, rural-urban divide, and barriers of technology, language, and culture are the major barriers in this regard.

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Introduction

Development, being a contested concept, is indeed difficult to define. It will not be an overstatement if argued, that development can be analyzed from a wide range of aspects; needless to say, it depends upon a wide range of variables, and technological advancement is one of those. In today's era of globalization and technology, the

possession of ICT skills is non-negotiable. From employment to service delivery, in every sector, ICT skills are very pertinent. The 4th industrial revolution (4IR) is nothing but technological advancement, and amid this, the progress of any kind of country widely depends upon the country's capability of effectively accessing and using relevant information. Harande (2009)

argued that access to information is important to allow citizen to know their rights and to counter multiple social anomalies like social exclusion.

In developing countries particularly, the use of ICT is an important part of development (Shore & McAnany, 1980). The World Bank (2008) and Palvia and Sharma (2007) showed that by providing digital services, the government could directly help the citizens, businesses, and all other sectors. E-government services, on the other hand, empower citizens through increasing access to information, commercial ties, and government management. Misuraca (2006) added that the governance system's present capabilities are proposing and converting an e-governance system to facilitate rapid, efficient, and transparent processes.

With other fundamental requirements, information is a critical component of rural people's growth. Government organizations may be more successful if citizens can utilize e-government systems to fill out paperwork, pay parking tickets, bid on online auctions, and register their cars (James, 2000). E-governance reduces processing costs, shortens cycle times, and increases openness (Rao, 2004) and the underdeveloped countries can benefit from e-government (Heeks, 2001). Since it significantly reduces corruption and improves service delivery (Bertot et al., 2010; Iqbal & Seo, 2008). E-government and e-governance integrated technology into the lives of rural residents, paving the way for a knowledge-based economy (Drljaca & Latinovic, 2012).

The digital divide between urban and rural populations in many developing countries is a common scenario, and Bangladesh is no exception (Yu, 2006). The people of Bangladesh, particularly those living in rural regions, are a long way from meeting their fundamental informational demands (Bangladesh Demographic and Health Survey, 2007). By facilitating the flow of information and knowledge between rural and urban communities, e-governance services can be expanded, and this notably shores up the rural development process in a developing country like ours (Heeks & Bhatnagar, 1999). The Governments of developing countries have

been hastening to implement ICT projects in rural areas (Naik et al., 2012; Bhuiyan, 2011) through direct or indirect supervision of national and international institutions (Misra, 2007; Teicher et al., 2002). Effective implementation of these projects with the expectation that they will promote rural development in developing countries is challenging for many reasons (Mamba & Isabirye, 2014).

Understanding this, the GoB has introduced various ICT interventions covering both urban and rural regions. The GoB provided e-services to increase transparency and accountability. The current government had set up a policy to implement Digital Bangladesh by 2021. The political campaign of 'Digital Bangladesh' led by the Bangladesh Awami League right before the general election of 2009 became instrumental in reaching out to the mass people in rural Bangladesh (Ministry of Information and ICTs, 2009). One of the examples that rural regions in this regard receive even greater importance is the establishment of the Union Information and Service Centre (UISC) and Union Digital Centre (UDC).

UDC has been a significant indication for the GoB to transmit accurate, reliable, and quality information from governmental to organizational to individual levels (Saleheen, 2015). UDC is an ICT-enabled one-stop service store at Union Parishads (ibid.). UDCs help 9002 aspiring entrepreneurs; 50 percent of them are women (Win, 2011; Mohiuddin & Hoque, 2013). UDC offers rural information, environmental education, etc., that helps people live better through community and information.

The government has also built UISC to focus pro-poor ICT advantages on rural populations. The UISC model is based on PPP rather than donation-based approaches. 4,501 UISCs were inaugurated on 11 November 2010 to promote 'Digital Bangladesh' (Asad, 2011). UISC could help rural communities without access to technology (Akther & Georgsen, 2003). UISCs provide a range of services, including online birth registration, census data input, university entrance test results, citizenship certificate, Union

Parishad citizen charter, agriculture, education, health, law and human rights, environment and disaster management, tourism, research and technology, industry and commerce, and employment use information services (A2I, 2013). In addition, it also gives agricultural information, government services information, internet services, ICT training, photocopying, print, telemedicine, and state and business organization information (Habib et al., 2013). All these aimed to make affordable and commercial information delivery services are the key to overcoming the digital divide and increasing rural people's growth.

These centres, which provide basic service to the locals of their interest, are, however, managed by third parties. These centres have enabled the locals to know more, to learn more, to get more. It itself is a form of capacity building and an example of grassroots development. Having said that, due to UDCs, the authors hypothesize that UP chairmen and members are even more reluctant to acquire ICT skills. At this juncture, it is to be understood that UDCs are service-providing centres, not entitled to ensure e-governance. E-governance mostly requires internet-based information sharing by the UP chairmen and members with the locals, and this requires at least primary level ICT skills among the members of the LGIs.

Godse and Garg (2007) have stressed more specifically on the UP officials and recommended that ICT training and skills for UP personnel are critical for the successful operation of public institutions. To find it more elaborately, Monga (2008) analyzed e-governance at the municipal, state, and federal levels and concluded that it had ushered in a revolution while maintaining high levels of service to inhabitants. For him, digital governance aims to improve office and record management, boost transparency, and streamline processes.

The existing LGIs of Bangladesh need to have a certain amount of ICT knowledge to get involved efficiently with government projects. However, it is still unknown how the local government officials receive information and how they tackle facing challenges related to

ICT. Therefore, the present study will attempt to explore the current skills in ICT among the local government functionaries for providing the necessary support to the country's local people.

While discussing ICT-based e-governance, the whole world is going through the wave of 4IR, which has already become a term. Yet, the majority of people are still unaware of how this new digital landscape will significantly affect their everyday lives. In several industries, technologies such as artificial intelligence, robotics, virtual reality, biotechnology, blockchain, 3D printing, and the internet of things (IOT) are replacing people (Park, 2018). 4IR innovations will drive Bangladesh's dynamic growth across all industries ranging from ICT to agriculture. Nonetheless, if 4IR technologies are expected to result in improved public service delivery, capacitating local government representatives with ICT skills should be considered in the very first place. Less, the digital divide will be widen even more and will surely bring no good results. It is hereby a 'must do' job to enhance their ICT capacities to maintain pace with the contemporary world.

As of now, there is hardly any study available that examines the existing ICT knowledge and skills among the very grassroots level LGI officials, i.e., UP members and Chairman. Though Alias et al. (2011) flagged various barriers to delivering easy-to-use, secure, cost-effective, and language-constrained services in rural areas, they don't show the current extent of the skills they possess. Their research found that organizational obstacles affect the execution of local e-government activities in UP Centres (Nuridin et al., 2011). The present study is hereby an attempt to fill the gap by exclusively focusing on the UP officials.

Considering the importance of this examination, this study has been designed to study nine union parishads from five administrative divisions of Bangladesh. The objective of this research is to (a) explore the existing ICT knowledge and skills of the UP chairmen and members; and (b) to unveil the barriers to acquiring ICT skills among them. This study will help in formulating

effective policies for capacitating them with this set of skills.

Methodology

This study is drawn on an explorative research design, which means the research mainly explores the current status of the ICT knowledge among the UP members in Bangladesh, especially in the selected study districts, i.e., Dhaka, Rajshahi, Pabna, Thakurgaon, Jashore, Khulna, Cumilla, Sirajganj, and Noakhali. The districts and unions have been selected in a random manner. Considering the nature of the study, the authors agree that the sampling unions should be more in number but due to a shortage of time and resources, it couldn't be done. Despite this limitation, the authors also think that the selected samples are capable enough to provide a glimpse of the situation in this regard across the country.

The study includes a desk review to identify the policy gaps. By design, the study draws on a mixed method. The data collection methods consist of several components, including desk review, survey, FGD, and interview. For the interview, a set of stakeholder-specific interview checklist was developed and tested prior to the fieldwork.

Desk review

In order to understand the importance of ICT knowledge for development in and beyond Bangladesh, different literature and newspaper clippings were reviewed. To understand the overall situation and the stance of government regarding ICT in Bangladesh, different documents like concept notes of concerned ministries, the ICT act, election manifesto of Bangladesh Awami League in 2018 were reviewed.

Field survey

This is the instrumental phase of this research, especially for collecting primary data. This phase includes tasks to be performed in the field sites. The list of surveyed unions are as follows.

Qualitative research

For collecting data, a set of interviews was conducted, which included the Chairman, secretary, one male member, and one female member

Table 1. List of the surveyed unions

Division	District	Upazila	Union
Khulna	Jessore	Jhikorgacha	Navaron
	Khulna	Phultola	4 no Phultola
Dhaka	Dhaka	Savar	Dhamsona
Rajshahi	Pabna	Bera	Puran Bharenga
	Rajshahi	Durgapur	Jaluka
	Sirajganj	Belkuchi	Daulatpur
Rangpur	Thakurgaon	Ranisankail	Lehembra
Chattagram	Cumilla	Muradnagar	Jahapur
	Noakhali	Kabirhat	Bataiya

of each union mentioned above. The research team also carried out FGDs with relevant male and female groups representing both urban and rural backgrounds.

FGD is to collect qualitative data from the relevant stakeholders, especially the service takers, i.e., the mass people of those unions. Altogether, 15 FGDs were conducted in nine study locations with youth and adolescents of both urban and rural backgrounds. In all nine study districts, 150 participants joined the FGDs (Figure 1). FGDs were conducted separately for males and females. It is seen that 54 percent of the FGD participants were female, while 46 percent were male.

FGD participants were chosen among various age groups ranging from 15 to 60. However, there were variations within this age category as well. Analysis of the FGD participants' data presents that majority, 55 percent, of the participants in FGD represents the age group between 20-35 years, where age the youngest group, between age 15 to 19 years, has the lowest participation. The participants of age between 35 and 60 years consist of 28 percent of the total participants. Among the participants, 54 percent were female, and 46 percent were male. For FGDs, specific guidelines were developed after the finalization of the list of groups. For all FGDs, standard methodological and ethical protocols were properly followed.

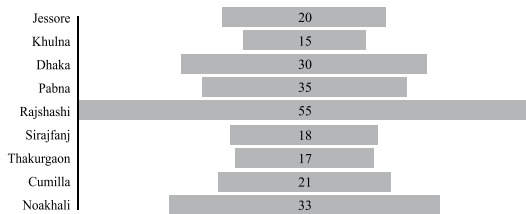


Figure 1. Distribution of fgd participants across study areas

Ethical consideration

The consultant was fully aware of ethical issues related to field research. During data collection, the qualitative research team explained the objective of the research and the purpose of the interviews/survey consultations at the beginning. The respondents were informed that their identity would be anonymous in the report, and the information will be used only for research/evaluation purposes. It was clearly described that they have no financial benefit for providing information, their participation will be voluntary, and that they will not be penalized in any way if they choose not to participate. Before starting the collection of data, their consent was ensured.

Picturing the digital capabilities in the surveyed constituencies

This section displays the findings of the survey in detail. It is important to mention here that, dictated by the nature of constituencies surveyed, all the respondents are found to belong to the age group between 35 and 60. For the same reason, the percentage of male respondents is higher than the female respondents.

This section is designed with three major parts explaining their (a) digital literacy and

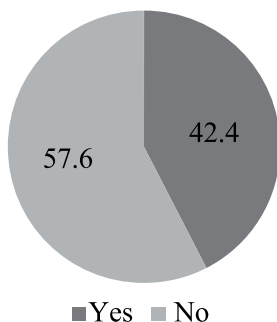


Figure 2. Computer literacy

training, (b) digital access and usage activity, and (c) digital skill. Digital literacy, access, training, use, and activity means here the ability to run a computer or laptop, internet, and emails. Though mobile phone use is not considered a skill here but using a mobile phone for email is considered a digital skill.

Digital literacy and training

This section aims to unveil the existing level of digital literacy and training availed by the elected UP officials.

Minimum computer literacy has become one of the basic life skills in today's digital world. In the studied constituencies, 42.42 percent of UP officials have the minimum computer literacy (Figure 2). Rest 57.58 percent has no literacy in computers. It signifies that digital literacy has to

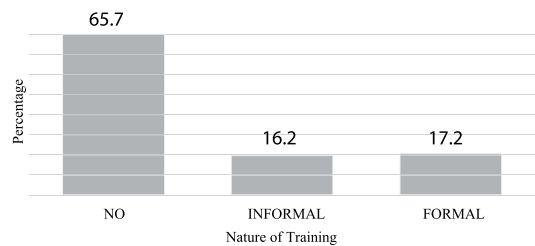


Figure 3. Computer training attended by the up officials

be spread over the grassroots level of the country to avail maximum efficiency.

Despite being UP members who are associated with the government administration, 65.65 percent of the respondents never attended any kind of computer training programme, be it formal or informal (Figure 3). Only 17.17 percent of them have received formal computer

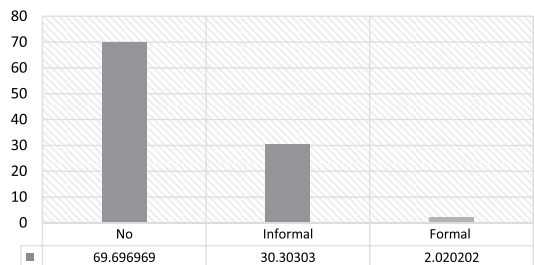


Figure 4. Internet training attended by the up officials

training. The rest of the 16.16 percent has received informal computer training; others do not know how to operate the computer.

Among all the 100 respondents, only 2.02 percent of them have received formal training on internet usage (Figure 4). About 30.30 percent of them have received informal training. A huge portion of them did not receive any kind of internet usage training, which is 69.69 percent.

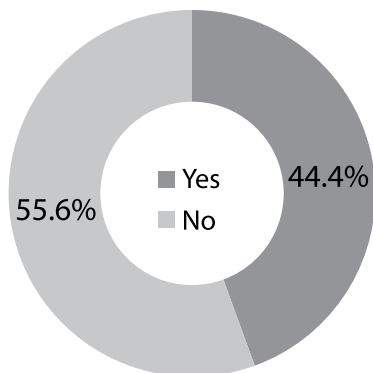


Figure 5. Access to computer

Misinformation about internet usage is very common in rural set up because many of them have no training on it, and they do not know how to use the internet safely.

Digital access and usage activity

This section discusses the accessibility to computers and the internet among the LGI officials. In addition, this also depicts their usage of computers and the internet, which eventually gives us a glimpse of their expertise at length.

It has been observed that respondents with computer literacy mostly have access to computers. From Figure 5, we can see that 44.44 percent have access to computers, and 55.55 percent do not

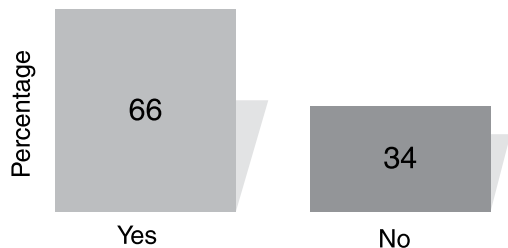


Figure 6. Access to computer

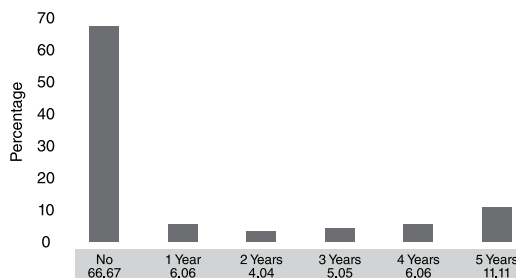


Figure 7. Computer usage timeline

have access. Not having access to a computer is the primary hindrance to their lack of digital literacy.

Most of the respondents (65.65%) have the access to the internet (Figure 6). About 34.34 percent do not have access to the internet in any form. Many respondents have internet access through their cell phone even though they do not have access to a computer or has any computer literacy.

Among all the respondents 66.66 percent of respondents never used a computer or used a computer for less than a year, which is the highest

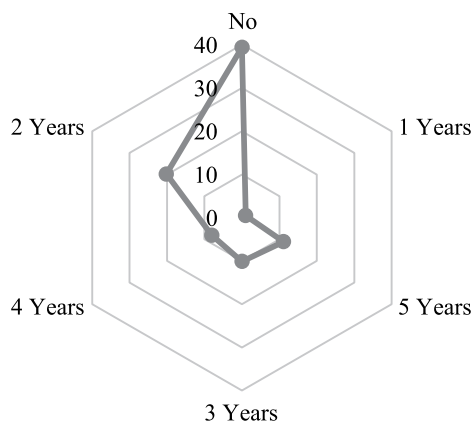


Figure 8. Internet usage timeline

proportion (Figure 7). About 11.11 percent of respondents use computers for five years, 5.05 percent use for three years, and 6.06 percent use for one and four years, respectively. This depicts that even if the respondents who are using computers has started using them in recent years, which means that people's perspective are changing, and they are trying to adopt the new technologies.

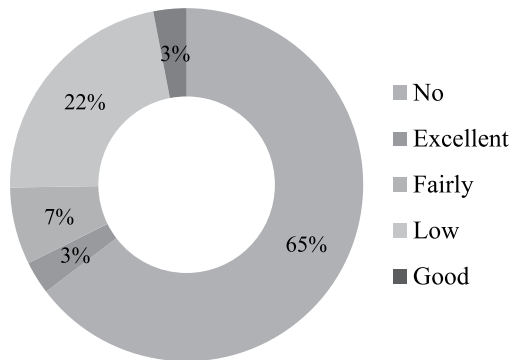


Figure 9. E-filing skill

Around two-fifths of the respondents (39.39%) do not use the internet or use it for less than a year (Figure 8). About 20.20 percent of the respondents have been using the internet for two years. 11.11 percent use the internet for five years, 10.10 percent use it for three years, 8.08 percent for four years and 1.01 percent for one year, respectively. Use of emails, e-filing, and other skills which are necessary for maintaining e-governance will be lacked off if internet usage is missing.

Digital skills

This section discusses about different digital and technological skills that are required for doing day-to-day office activities. The percentages shown here are not results of any definitive test but rather respondents' own perceptions about their capability.

Most of the respondents (64.64%) have zero skills in e-filing of income taxes (Figure 9). 22.22

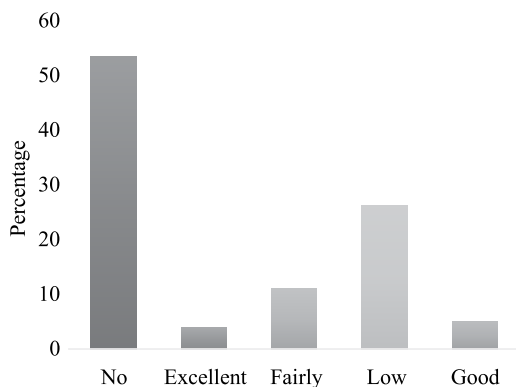


Figure 10. Email skills

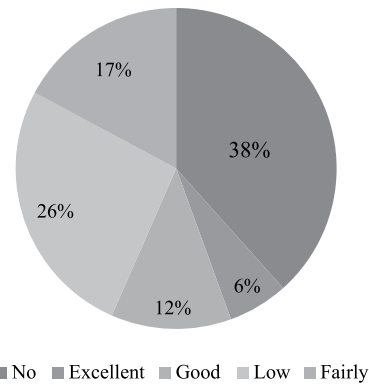


Figure 11. Internet browsing skills

percent have low skills in e-filing. 7.07 percent has a fairly skill of e-filing and 3.03 percent have excellent and good skill respectively. It came out in the survey that many of the respondents do not even know about the existence of e-filing.

About 53.53 percent of the respondents do not have any email skills, which means they do not use email for official affairs by themselves (Figure 10). 26.26 percent have low email skills. 11.11 percent have fairly skills, 5.05 percent and 4.04 percent have good and excellent skills,

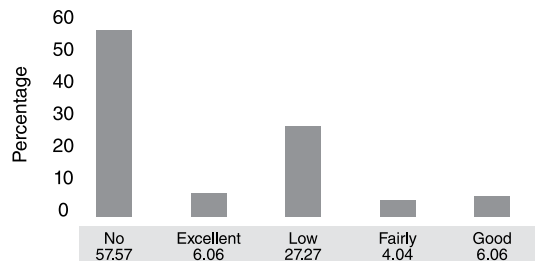


Figure 12. Microsoft Word processing skills

respectively. Email is now one of the main tools for communication. Lack of emailing skills will eventually keep a person behind others in this competitive world. Official and formal communication and documents get exchanged through emails, so this is very important for government administrative workers.

Overall, 38.38 percent of respondents do not know how to browse the internet, which means they cannot access information from internet sources on their own (Figure 11). Only 6.06 percent of the respondents have excellent internet browsing skills. 12.12 percent has good internet

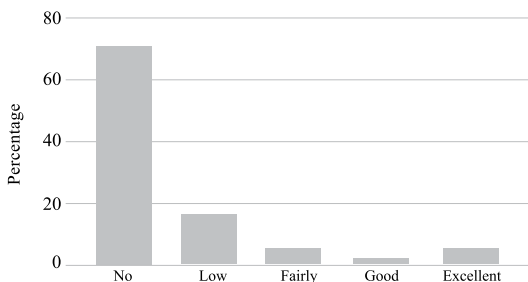


Figure 13. Use of presentation tools

browsing skill, 17.17 percent has fairly skill, and 26.26 percent has low internet browsing skill.

About 57.57 percent of the respondents do not have any word processing skills which represents more than half of the sample (Figure 12). It indicates the poor scenario of the lack of an important skill at the Upazila Parishad level. 27.27 percent has low skill in word processing, and only 6.06 percent has excellent skill.

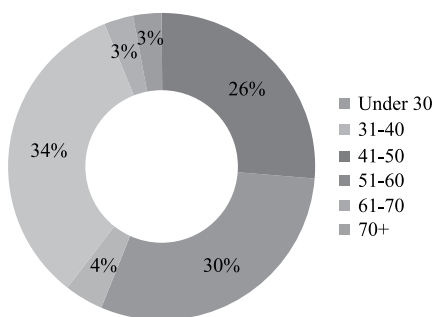


Figure 14. Age group of the respondents

More than two-thirds (71.71%) of the respondents do not know how to use the presentation tools, which represents a big portion of the respondents (Figure 13). 16.16 percent of people have low skills in using presentation tools, and only 5.05 percent has fairly and excellent presentation skill, respectively.

Analysing the surveyed constituencies and the barriers

Age based analysis

The majority of the respondents range from the age group of 30 to 60 years old (Figure 14). Data depicts that the computer literacy rate is higher

among the younger respondents than the older ones.

During the interviews and FGDs, we observed that the respondents who are old in age are not motivated enough to learn and adopt the usage of digital devices. It seems like it is difficult for them to memorize and operate the functionalities of the devices properly, and that's why they get discouraged. Even some respondents let us know that they had tried to understand the operating systems of the computers, but they could not get away with it properly.

Some of the older respondents do not have a proper understanding of the internet concept. Internet is still an absurd entity for them.

Gender based analysis

Only one-fourth of the respondents were female rest of the respondents were male but most of the female respondents have a minimum literacy on digital devices, which is higher than the males (Figure 15). It signifies that when a female is economically independent, she can avail of the technologies more promptly. Though here comes another factor that, as most of the female respondents age around the age group of 30-40 years old, they tend to be younger than the majority of males who ages from 40-60 years old mostly. So, not only the gender perspective but also the generation gap is one of the prime barriers.

Rural-urban divide

Most of the urban-centric government official works are getting digitally updated in a rapid move. However, our data is showing that rural-centric government officials who are Union Parishad members are not skilled and updated

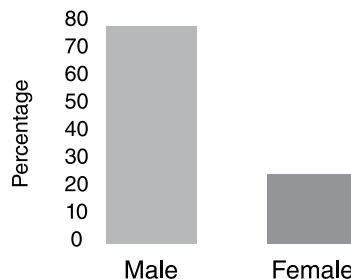


Figure 15. Gender group of the respondents

enough like the urban ones. Here the digital divide plunges more deeply.

Through our interviews, we have also come to know that enough servicing and product display centre is not available in many of the Upazila Parishad. People have to go to the towns to buy or get servicing of the devices, and this also discourages them from using modern devices.

Also, some respondents have a mindset that computers and the internet are essential for urban-centric work only; rural administrative works can be done manually, which is not valid.

Language and technical barriers

Data depicts that near to half of people has literacy in computer or laptop. Of those who have literacy, 40 percent of them have formal training and another 38 percent have informal. Rests have learned computer by themselves. Those who have formal training are found willing more to use devices regularly than the others. Through FGDs and IDIs it was also found that people having informal training are less motivated in this regard. One of the major problems they mentioned is the language barrier. Almost 70 percent of respondents said that language is the primary barrier for using the devices since it is in English.

The same causation is found for internet training also. Only 2.02 percent of respondents received formal training on the internet, and an additional 30 percent had informal. Informally trained people possess a very slight task like searching in google. They face problems in finding necessary information, as they reported, due to language problems. Font size for them also is a big problem they say. Since many of them are middle-aged, they reported that it is a bit harder for them to use devices with such size fonts. When they were asked if they knew that the font sizes could be changed, they answered negatively, especially the untrained and informally trained respondents. Due to such language and technical barriers, they are still demotivated into this.

Cultural barrier

Through our interviews and FGDs, we have found that the respondents, especially from rural areas,

think computers and the internet are unnecessary and bad. For them, these devices cause health problem, causes moral hazards among children, cause different diseases, contributes to killing times of students, and so on. This refrains them from buying devices in their residences, which, in turn, causes the digital divide at its best.

In case of internet usage, some of the respondents think that the internet is a forbidden thing, and they assume that mostly unethical works are done through the internet. Religious sentiment also plays a vital role in refraining the respondents from using digital devices and the internet. Some superstitious people also act as an influence on them.

Conclusion

Bangladesh was awarded the 2014 World Summit on Information Society Award for its Digital Bangladesh Project, which includes UISC and is considered a model for future e-government project deployments. In Bangladesh, this e-government approach plays an important role in rural development, extending from local administration to bio information and agriculture. However, the inadequacy of the local representatives' ICT skills impedes the efficient delivery of public services. Our findings indicate that older people tend to be less enthusiastic to acquire ICT skills, mostly due to language and cultural barriers. Also, urban-centric public delivery representatives have better ICT skills for efficient public service delivery than rural-centric representatives, indicating that rural local government representatives do not frequently encounter accountability concerns with regard to their constituents. It is also evident from our study that UDCs are not adequately assisting UP officials to develop their ICT skills.

Over 60 percent of respondents were older than 40, indicating that the majority of the local government officials are of an older generation. Therefore, most of them confront technology obstacles, followed by language and cultural barriers. Our recommendation is to strengthen their mental fortitude so they can adapt the ICT expertise. UDC may take the lead in assisting

these LGI personnel in overcoming the taboo around technology and ICT through seminars and counseling. In addition, ICT skills acquisition should be facilitated by the development of learning techniques that facilitate the easy retention of the ICT skill training modules. Aside from this, language is a major challenge for them. Before beginning ICT skill trainings, UDCs should thus offer local government officials a required English language course. However, the transparency surrounding the delivery of public services through e-governance will encourage LGI personnel to acquire essential ICT skills.

Bangladesh has already entered the 4IR era; thus, mass digitization, making the internet available and accessible for all, is a must. The digital divide pertains consistently in Bangladesh which has to be encountered. The authors argue this process of elimination will start by capacitating the LGI officials with working ICT skills. If achieved, this will be a milestone for Bangladesh and will greatly empower the local people in terms of getting information, maintaining transparency, and accountability. This study can be used to make a policy intervention for developing ICT skills among the LGI officials prior to looking at the barriers that hinder the process at large. However, a further study of this modality is required to find out more regional-specific barriers. To transform our Bangladesh into as Digital Bangladesh, this is a non-negotiable step to take.

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Assessing the health status, personal habits, and dietary condition of university students

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ABSTRACT

This study was to determine the health status and the dietary condition of the students of Patuakhali Science and Technology University during July-September, 2017. Most of the students (90%) on this campus had to hold a good result in SSC and HSC but a lot of them (45%) were not able to retain their good result in the campus. Otherwise, the students had poor results in SSC and HSC (10%), unfortunately, they have become (7.0%) able to obtain good results. The study also showed that the female students take more calories than male ones. It was revealed that the amount of calorie they take on average was not enough; it lacked a lot commended. The students who did not eat meals just when they feel hungry, most them affected by acidity, headache, and less affected by asthma and dysentery. Those student rooms possessed a dirty substance and the room wall was damaged most of them were affected by asthma, allergy, and dysentery also. The student who went to the gymnasium daily among the majority had no disease, and the students who daily go for jogging and among them student was not having any disease; the study also found that the male students took more fruit than the female ones. Further study may be required to get a more acceptable result because the study is lack biochemical parameters, medical reports, etc.

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Introduction

There are 44 public Universities and 96 private Universities in Bangladesh granted by the UGC in Bangladesh. University students are the wealthiest in a country in the future. After completing their degree, they will go to different

job sectors and obey the important encumbrance for our country. Very often it is seen that the University's dining supplies low-quality food, which is not sufficient for energy and nutrients. Sometimes it is also seen that the food is prepared in an unhygienic environment and at the time

of eating, many undesirable specks of dust are found to add in food. Patuakhali Science and Technology University (PSTU) was the most well-known academy for advanced education in science and technology in the Southern part of Bangladesh. PSTU was only a university situated away from the urban services. Due to its communication facilities, the supplementation of food items from the local markets was not well. Poor nutritional status during adolescence was a vital factor in health outcomes at a later stage of life. Hence, consideration should be given to adolescent health and nutrition. Henceforth the study was considered to be essential for the development of the university. The survey was programmed studies designed to assess the health status, hygienic condition, personal habits, dietary conditions needed for a student, and suggestions layout to skipping chronic disease for the PSTU students. Residential universities where students live-in hostels and student dormitories were unique communities residing and being together at a particular habit. Usually, foods and other living conditions were the almost same with similar hygienic and sanitation systems. In Bangladesh, the quality and quantity of food supplies by the dining systems are inadequate for health. This survey was a unique measurement by which physical interviews and anthropometric measurements are followed. This type of survey was not done in this region or campus before. So I decided to do this work. Bodily differences between men and women do influence some of these variances in health indicators, but the explanatory power of biology is small. Health scientists increasingly believe that modifiable health behaviours, such as diet, exercise, substance use, use of social support, safety practices, and management of stress and anger are the most important contributors to health. Yet, as regards the triad of educational fulfillment, health factors, and educational success, the literature suggests several gaps. First, these three important and related aspects have rarely been simultaneously examined in conjunction with each other. Most studies of health-promoting profiles of students, such as the European Health and Behavior

Survey conducted in 20 countries, did not explore the associations between health and academic achievement (Wardle, 1991).

Narrow examinations of the issues omit the inclusion of many important variables, jeopardizing a study's findings' validity and generalizability. University students signify the upcoming of families, societies, and countries. They also expression the pressures of attaining success in their academic goals despite the financial constraints that many students report.

So further study is suggested to get more acceptable data.

The objectives of the present study were –

1. The benchmark survey of health status among the students of PSTU.
2. To collect and analyze the food supplement (arranged by the authority or personally).
3. To draw a proposal for standard nutritional supplementation for the students of PSTU.

Materials and methods

This chapter includes the materials and methods that were used at the time of conducting the experiment.

Site selection

Geographically, the study was conducted at PSTU which is situated at 22°37' N latitude and 89°10' E longitude. The study was also performed in the Department of Biochemistry and Food Analysis, Faculty of Nutrition and Food Science, PSTU campus at a different category of the students from July to September 2017.

Data collection and analysis

Using the pre-tested questionnaire data were collected from 25 July 2017 for the trial of the study. These data were calculated on Microsoft Office Excel, 2007, and then further categorized, using SPSS 16.0 for windows.

Interview schedule

The study instrument constituted a questionnaire that consisted of name, father's name, mother's name, semester, faculty, home, district, date, age, room member no, sex, cell no, academic achievement, place of educational achievement, amount of the expenditure per month, source of

expenditure, family member, parent's occupation, involvement in organizational activities, awareness about cleanliness, wall condition, dietary condition, living condition, weight, height, left arm circumference, skin thickness, daily fruit, milk (%), water taking amount, physical activity status and recent disease affected condition, etc.

BMI measuring

The weight of the students was taken using an analog weight machine, while heights were measured using commercial tape. The BMI was figured by dividing the weight (kg) by the square of the height (m). BMI (kg/m^2) of the students was classified as follows Underweight (BMI <18.5); normal weight (BMI 18.5-24.9); overweight (BMI 25.0-29.9) and obese (BMI >30.0) (WHO, 1990)

BMI is expressed as the ratio of weight to height squared and can be a good parameter to grade chronic deficiency (CED).

Equipment: Mechanical weight machine (NOVENA ii™ BlackBerry), height measuring scale, measuring ribbon, slide calipers.

Health status survey

In this study, health status measured some physical parameters such as weight, height, BMI, left arm circumference, and skin thickness.

Dietary condition survey

This part of the survey dealt with food taken at breakfast, lunch, and supper and how it prepared, this part also includes types of snacks taken and how it prepared, milk, meat, egg, water, and tea taken by what interval with the amount.

Living standard survey

This part of the survey deals with the observation of room condition about cleaning, decorating, type of the wall painting, the hygienic condition of food vended places.

Disease severity condition

It included the disease severity among the students such as acidity, headache, asthma, allergy, dysentery, hepatitis, UTI, STD, etc.

Physical activity status

These included daily physical activities such as going to the gymnasium, jogging, playing football, playing table tennis, etc.

Personal hygienic condition

The part of this survey includes the praying activity, knowledge about the hand washing process, using toilet slippers, and using toilet soap after the toilet.

Results and discussion

The determination of this survey was to define the finding of the current study. The inquiry investigated the health status, dietary condition, personal habits, room scavenging condition, and intellectual health of PSTU students. This study discusses four categories:

Category 1: Socio-economic views of PSTU students.

Category2: The daily diet has been taken of the University students.

Category3: Health status, and hygienic condition of the PSTU students.

Category 4: Personal habits which indicate the student's daily activities. The study was conducted by collecting 100 students (male 75% and female 25%). Their age was considered in four categories.

Table 1. The socio-economic and demographic outline of the students

Characteristics	Frequency	Percentage (%)			
Sample Size (N)100					
Sex					
Male	75	75			
Female	25	25			
Age (years) (%)					
<=20	45	45			
21-25	55	55			
Marital status (%)		Frequency		Percentage (%)	
		Male	Female	Male	Female
Married	5	4		6.67	16
Unmarried	70	21		93.33	84

The socio-economic and demographic outline of the students

From Table 1 it was found that the first categories were below 20, and the student in this category is 45, aged (21-25) and students were 55.67 percent of the male student was married, 16 percent of the female student was married and 3.93 percent of the male student was unmarried, Undergraduate student was 95 percent and graduate student was 5 percent, etc.

Status of the students

From Figure1 it was found that 10 percent of students acquired a 7.5 - <8.5 GPA in SSC+HSC (out the best category level of the result in SSC+HSC (out of 10) is 8.5 - ≤10 and percent of students was 90 percent but students considered in best category 3.25 - ≤4.00 is 45 percent in the view of the present result. It was also found

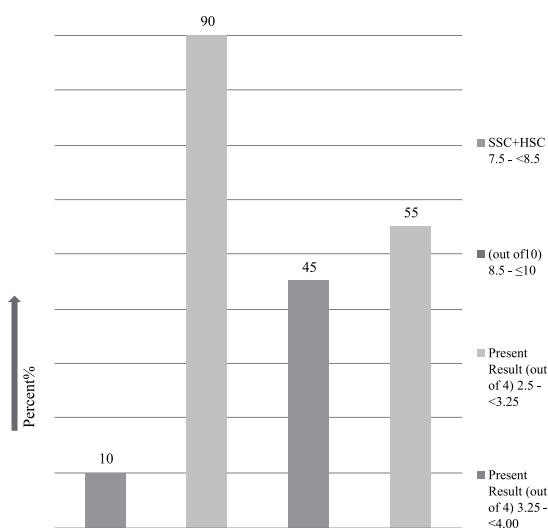


Figure 1. Academic achievement of students

from raw data that 90 percent of students were bear 8.5-10 GPA at SSC+HSC but 42 percent of those students' results decreased of the result below 3.25; in the other way, the student (10%) who bear their previous result(SSC,HSC) below 8.5; among them 7 percent attain a better result (3.25-4).

Table 2. Food items were taken at breakfast

Food items were taken at breakfast	Frequency	Caloric value (approximate)	Mean of caloric consumption at breakfast	SD
Bread & egg	8	315	326.11	±217.08
Bread & fried	16	250		
Bread, egg & fried	10	355		
Bread, banana	1	200		
Banana, cake & tea	6	332		
Paratha & egg	11	477		
Paratha, fried	13	512		
Paratha, egg & fried	3	517		
Rice, egg	4	335		
Rice, vegetable	4	255		
Rice, boiled potato	1	238		
Rice, egg & vegetable	4	375		
Rice, egg & boiled potato	5	358		
Rice, pulse soup& boiled potato	8	247		
Rice, pulse soup& vegetable	1	278		
Rice, boiled potato & fried	2	298		
Rice, fish & boiled potato	1	278		
Noodles & bread	2	250		

Diet taken at breakfast

From Table 2 it was found that students took an average of 326.11calories of the energy from different food items for breakfast. Where it was advised a breakfast of between 350 and 500 calories. However, if a person tries to lose weight, a bigger breakfast may be more beneficial, and healthy breakfast calories for the most effective impact on weight and well-being (A statement of Columbia University's Go Ask Alice).

Table 3. Food items were taken at lunch.

Food items at taken at	Frequency	caloric value (approximate)	Mean of calorie consumption at lunch	SD
Rice, meat	4	298	471.66	±36.81
Rice, fish & vegetable	25	290		
Rice, fish	11	255		
Rice, egg & vegetable	6	375		
Rice, pulse soup & egg	4	344		
Rice & vegetable	8	255		
Rice, pulse soup& fish	24	264		
Rice, pulse soup & meat	2	310		
Rice, meat & vegetable	2	340		
Rice, egg & fish	3	375		
Rice, pulse soup & vegetable	2	264		
Rice, vegetables, boiled brinjal	1	278		
Rice, fish & boiled potato	1	278		
Rice, egg & boiled potato	2	358		
Rice, pulse soup, fish & vegetable	5	287		

Diet taken at lunch

From Table 3, it was found that students take an average of 288.66 calories of energy from different food items at lunch. Where it was suggested students' calorie intake at lunch was up to 850. Its goal is to encourage healthy eating in schools, but it doesn't meet all students' dietary needs, especially athletes (Michelle Obama's school lunch plan).

Diet taken at supper

Food items taken at supper: from Table 4, it was found that students were taken an average of 304.82 calories of energy from different: food items at supper.

Table 4. food items were taken at supper

Food items were taken at supper	Frequency	Caloric value (Approximate)	Mean of calorie Consumption at supper	Sd
Bread, fried	3	130	415.81	±48.24
Rice, egg	3	335		
Rice & fish	6	255		
Rice , meat	13	299		
Rice, pulse soup & fish	14	344		
Rice, fish & vegetable	15	295		
Rice, egg & boiled potato	2	358		
Rice & vegetable	9	255		
Rice, egg & vegetable	4	375		
Rice, pulse soup & meat	11	310		
Rice, egg & fish	3	375		
Rice, pulse soup & egg	6	344		
Rice, fish & vorta	5	278		
Rice, pulse soup & vegetable	1	264		
Rice, pulse soup, egg & vegetable	1	384		
Rice, egg & meat	1	420		
Rice, pulse soup, fish & vegetable	3	287		

Diet taken as snack

From Table 5, it was found that students were taken an average of 233.8 calories of energy from different food items as snacks.

And lastly, it was found, that for all food items taken by the student of PSTU it was found

Table 5. Food items taken at snacks

Food items taken as snacks	Frequency	Caloric value (approximate)	Mean of calorie consumption as snacks	SD
Burger	1	215	260.75	±155.89
Burger, puri	5	285		
Cotpoti, egg	1	130		
Peaju, puri & singara	9	280		
Noodles	3	200		
Cakes	4	50		
Bread, cake & tea	6	140		
Bread, banana & milk	4	175		
Fast food	2	215		
Toast	4	70		
Peaju, puri & samucha	13	390		
Cotpoti, egg & fуска	2	160		
Jilapi, puri & samucha	1	450		
Noodles, egg & peaju	4	310		
Peaju, samucha & singara	1	300		
Noodles, peaju & puri	7	360		
Puri, samuch & singara	9	450		
Singara, mung bean & peaju	1	140		
Puri, samucha & sweet	5	390		
Nothing	18	0		

that a student takes 1056.25 calories of energy per day. According to the (Dietary Guidelines for Americans 2010), women aged, 19 to 30 require 1800 to 2400 calories each day; sedentary women need 1800 to 2000 calories, moderately vigorous women require 2000 to 2200 calories, and women aged 19 to 30 who lead an energetic lifestyle need about 2400 calories each day to maintain healthy body weight. “Moderately active” is defined as engaging in physical activity equivalent to walking 1.5 to 3 miles per day in accumulation to light everyday activity, and “active” means exercising the like of walking more than 3 miles each day in addition to light daily activity.

Masculine college students need more calories than their female complements, simply because men normally have greater frames and lean muscle mass. The Dietary Guidelines for Americans 2010 report that men ages 19 to 30 need 2400 to 2600 calories if they are inactive, 2600 to 2800 calories, if they are moderately dynamic and about 3000 calories each day, if they are active. These are general calorie necessities, as individualized desires may vary.

Diet taken as fruits

The Survey found that on average 14 percent of students took 135.72 gm of fruit daily, 51 percent of students took 354.90 gm of fruit weekly, and 31 percent of students took 345.16 gm of fruit monthly.

It was also found that among students who took fruit daily 4.0 percent of those were not having the disease. Of students who took fruit weekly 25 percent of them was bearing disease, students who took fruit monthly among them 13 percent of student was represented disease.

Health status according to BMI

Study table, 6 was shown that 15 percent of the PSTU students were underweight, 78 percent of students were normal weight, 5 percent of students were overweight and lastly, and 2 percent of students were obese since the average BMI of this campus students was 20.88.

Table 6. Health status according to BMI

SL. No	BMI category	Range of the BMI	Percentage (%)	Mean of total students "BMI"	Standard Deviation
1	Under weight	Below 18.5	15	20.88	2.50
2	Normal weight	18.5 to 24.99	78		
3	Over weight	25 to 29.99	5		
4	Obese	30 to above 30	2		

Milk taken status

The survey found that students of this university took 1 cup of milk that was 100ml containing 34.27 calories per day and it was considered a snack. About 8 oz. glass of whole milk contains 149 calories needed per day. (How-much-milk-per-day-source-of-calcium).

Egg consumption status

The survey was shown that on average 61 percent of the students took 1-2 eggs per day, 37 percent

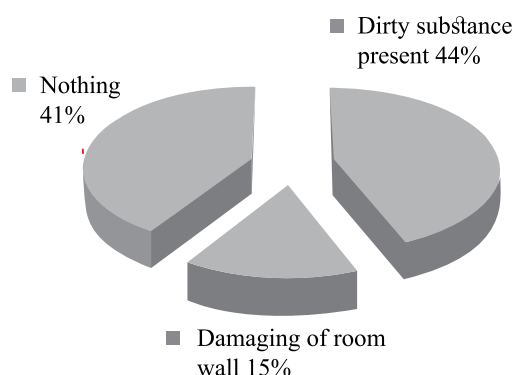
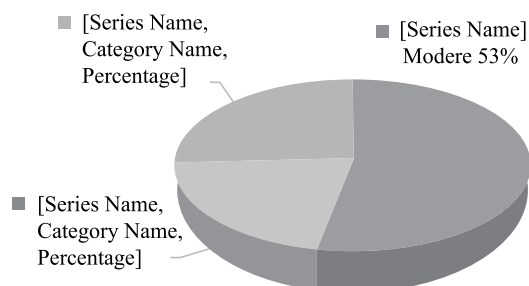
of students took 2-6 eggs per week and 2.0 percent of students took 4-6 eggs per month.

Physical activities

It was found from Table 7 that 10 percent of students go to the gymnasium daily and among them, the student was not having any disease is 3.0 percent, 17 percent student daily go for jogging and among them student was not having any disease is 7.0 percent, 10 percent student play football seasonally and 6.0 percent student play table tennis daily and among them student was not having any disease is 3.0 percent of the students.

Table 7. Physical activity status

Go to gymnasium		The person having no any kind of disease (%)
	Percentage (%)	3
Daily	10	
No	90	
Go for jogging		7
	Percentage (%)	
Daily	17	
No	83	
Play football		
	Percentage (%)	
Daily	10	
No	90	
Play table tennis		3
	Percentage (%)	
Daily	6	
No	94	

**Figure 2.** Room condition**Figure 3.** Regular room scavenging condition

Room hygiene condition

Figure 3 was shown that 44 percent of student's room presented dirty substance, and 15 percent of student's room wall was damaged Figure 3 also found that 26 percent of student room was not scavenged regularly, 53 percent of student's room was scavenged moderately and 21 percent student's room was scavenged well every day.

Table 8. Severity of the disease of students

Having disease	Percentage (%)	Don't take a meal at just time who affected by this disease	Use dirty substance present	Don't know the hand washing process	Don't using toilet soap after toilet.
Acidity	18	6	10	8	0
Headache	14	2	7	4	0
Asthma	5	3	1	2	1
Acidity + headache	6	1	1	1	
Acidity, headache & asthma	2	1	1	0	
Acidity, dysentery	1	0	0	0	1
Hepatitis	5	0	0	0	
Allergy	21	16	7	4	1

Hand washing knowledge

This survey found that 61 percent of students known a little hand washing process, 4.0 percent of students fully knew, and 1.0 percent of students knew the process moderately

Toilet soap using performance

This survey was shown that 98 percent of students use toilet soap regularly and only 2.0 percent of the students use sometimes.

Disease severity status

From Table 8 it was found that 18 percent of the students were invaded with only acidity; among them, 6.0 percent of the students did not take a meal at just a time when feeling hungry, and 10 percent of the student's room possess dirty substances, 8.0 percent of the students did not know how to use hand washing process. 14 percent of students were invaded by headaches among them 2.0 percent of students did not take a meal at just a time when feeling hungry, 7.0 percent of students' rooms possess dirty substances 4.0 percent of students did not know the hand washing process. 5.0 percent of student

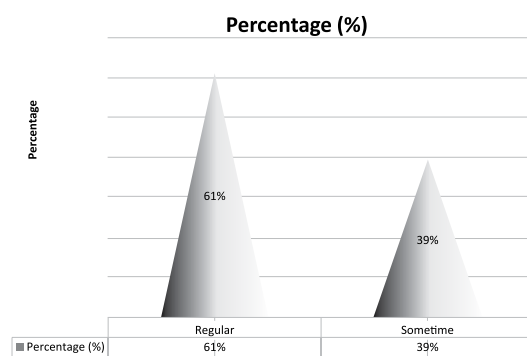
was invaded by asthma among them 3.0 percent of student did not take it just a time when feeling hungry, 1.0 percent of students' room possess dirty substance 2.0 percent of student did not know hand washing process, 1.0 percent of student did not use toilet soap after toilet 21 percent of student was invaded by allergy among them 7.0 percent of students' room possess dirty substances, and 4.0 percent of student did not know how to use the hand washing process.

Taking a meal at the just time when feeling hungry

From Figure 4 it was originated that 61 percent of students take acquired meal at objective time when felt hungry, but 39 percent of students were taken their meal just time for some time. Whereas it was found that a body that reverts to normal eating habits without appropriate safeguards will suffer possible serious health side effects, including congestive heart; failure, stroke, and possibly death (Richard G. Epstein: "just in time" eating may provide key to human longevity).

The survey was conducted for health status, dietary condition, and personal habits, room scavenging condition, daily food intake, and physical exercise, BMI of students, room hygienic condition, and the severity of some diseases infecting condition of PSTU students.

One of the aims of this study was to determine thus that third-level university students meet the suggested intake of fruit and vegetables per day. It was found an average of 14 percent Of students take 135.72 gm of fruit daily. This was just about $\frac{1}{7}^{\text{th}}$ portion of total respondents and was considerably less than the Irish national

**Figure 4.** Students taking meal at just time when feel hungry

average (65%) (Harrington et al., 2008). This may be a result of contributing factors to a student's unhealthful lifestyle, such as financial problems, fad diets, or skipping meals (Brevard & Ricketts, 1996). For students who took fruit regularly the amount (135.72 gm) was also lower than (Jan carlo, 2010) suggestion two cup of fruit which means 150 gm of the fruit. In this study, 86 percent of students failed to meet the recommended intake of daily servings of fruit. Results found a significant difference in the average number of slices of fruit consumed between males (12 slices) and females (2 slices). This was a difference that was observed in the general population and is not specific to college students. Friel et al. (2005), reported gender to be the most significant determining factor for compliance with the commended daily intake of fruit and vegetables. This may be a result of gender norms in society as females are generally perceived as being more health conscious than males, therefore may feel increased pressure to maintain positive health behaviours.

There was found to be no relationship between age and the number of portions of fruit consumed. Based on self-reported data, seventy-eight percent of the participants were deemed to be within a healthy or normal BMI range, (78% healthy; 5.0% overweight; 2.0% obese; 15% underweight). This was in contrast to a report which reported that 48 percent of respondents were classified within the healthy BMI range, 35.5 percent were in the overweight category and 14.5 percent were classified as obese (Harrington et al., 2008). This may suggest that the average BMI for the student population could be within a healthier range than that of the general population. A possible attributing factor could be the greater likelihood of more students being involved in sports or other forms of physical activity which may help control weight. Although it was thought there may be a relationship between the prevalence of overweight and low dietary intake of fruit and vegetables among college students, our results state otherwise as there was found to be no relationship between BMI and the number of

portions of fruit and vegetables consumed daily.

It was also found from raw data that 90 percent of the students were bear an 8.5-10 GPA both at SSC and HSC but 42 percent of the student result had demonstrated the result below 3.25; the other ways the students (10%) bear their previous results (SSC and HSC) below 8.5; among them, 7.0 percent attain a better result (3.25-4.0).

From the study, it was found that students took an average of 292.86 calories of energy from different food items at breakfast. Where it was advised a breakfast of between 350 and 500 calories (Columbia University's Go Ask Alice, 2022). However, if a person trying to lose weight, a bigger breakfast may be more beneficial, and healthy breakfast calories for the most effective impact on weight and well-being.

The study was also attained that students take an average of 388.66 calories of energy from different food items at lunch.

The overall dietary condition of the PSTU students from the study it was found that for all food items taken by the students; the female students had an average of taking 1,530.47 calories of energy per day and male students took 1,510.52 calories of energy per day.

It was also found that the female students took more calories than from males. It is just the opposite of America where male college scholars want more calories than their female counterparts, simply because men generally had larger frames and more lean muscle mass. The United States Department of Agriculture recommends that adult males eat between 2,000 and 2,500 calories per day. The recommendation for women is 1,800 to 2,300 (United States Department of Agriculture, 2022).

From the study, it was found that 18 percent of student was invaded with only an acidity; among them, 6.0 percent of student did not take a meal at just a time when feeling hungry, 10 percent of students' room possess dirty substance, 8.0 percent student did not know how to use hand washing process. 14 percent of the student invaded by headaches among them 2.0 percent students did not take a meal at just a time when

feeling hungry, 7.0 percent of students room possess dirty substances 4.0 percent student did not know hand washing process. 5.00 percent of student was invaded by asthma among them 3.0 percent of students did not take a meal at just a time when feeling hungry, 1.0 percent of students' room possess dirty substances 2.0 percent of students did not know hand washing process, 1.0 percent of student did not use toilet soap after toileting. 21 percent of student's invaded allergies among them 7.00 percent of students' rooms possess dirty substances, and 4.00 percent of students did not know the hand washing process.

From the study, it was also found that the student of PSTU took an average of 3.88 liters of water. It consequently exceeds the guidelines of The British Dietetic Association. 'They state that an average adult should consume 2.5 liters of water per day. "This intake needs to be increased during periods of hot weather or during and after periods of physical activity" (Kellow, 2021).

It was found that about 69 percent of the student took tea daily, and the student of PSTU take 2.14 cup of tea per day. Where it was suggested that three cups of tea is enough for one man's mission to fight terrorism and promote peace (Mortenson & Relin, 2006). Another suggestion says that for the average person, one or two cups a day of tea is great for the body.

Conclusion

The study has significant findings that students are meeting their daily requirement of calories as recommended. Otherwise, they may fail to several chronic diseases and will bear an unhealthy risk in future lifestyles. Students who failed to meet the recommendations of fruit may be at an improved risk of developing many chronic diseases in later life. This information would be invaluable in order to build stronger health promotion campaigns. It was also recommended that student the student must have taken their meal at the time to avoid acidity and other chronic diseases otherwise it will risk future lifestyles. The student should be scavenged in their room regularly to avoid asthma and allergy otherwise it will a great risk for future lifestyles. Students

should do physical exercise regularly; know the hand washing process rightly. It is recommended that future studies investigate possible explanations for the differences between the result of SSC; HSC and present, vegetable consumption between males and females. Further research is needed to investigate a possible link between BMI and fruit and vegetable consumption, daily attain of calories, and other chronic diseases. The study was lack of biochemical research for determining the health status of the student, and the number of participants was not enough. So further study is suggested to get more acceptable data. It is recommended, for increased validity of future research, that weights and heights are scientifically measured.

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