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Do socio-demographic characteristics affect graduates' employment status?

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Abstract
Despite having a demographic dividend, the unemployment rate is soaring in Bangladesh, posing a great challenge for the nation. This perplexing situation demands knowledge of socio-demographic factors that may affect the employment status among graduates. Thus, this study aims to examine the impact of socio-demographic factors, such as gender, age, marital status, field of study, and family financial support on employment status. To achieve this objective, a questionnaire survey was conducted. Through the survey, data were collected from 415 respondents and analyzed using a Forward Likelihood Ratio binary logistic regression. The findings revealed that age, marital status, field of study, and financial support are crucial predictors that affect the probability of employment among graduates, whereas gender does not influence the probability of getting employed. The insights of the current study will assist policymakers in reaping the demographic dividend to reduce graduate unemployment by incorporating sociodemographic characteristics in Bangladesh's policymaking for graduates. This study will help the government meet its commitment to development goals by identifying the basic socio-demographic elements that influence graduates' employment status.

Keywords Socio-demographic factors · Graduates · Employment status · Unemployment · Bangladesh

1 Introduction

Unemployment is considered as one of the most prevalent and prime concerns for both developed and developing societies [1]. It brings many social (e.g., theft, burglary), physiological (e.g., suicide, frustration, hopelessness, hostility), and economic (e.g., lower gross domestic product (GDP) growth rate and lower utilization of human resources) problems at the concurrently. Overall, unemployment is a curse at both the individual and aggregate levels [2, 3]. However, the problem of unemployment deepens even further for nations with young educated graduates. This is because youth are considered the most prospective human resource for every nation [4] particularly graduates. Unfortunately, young people remain unemployed, notwithstanding the increase in their educational level [1]. Nowadays, employers expect graduates to possess both strong academic credentials and employability skills [5]. Higher education institutions are focused on using strategies to enhance the development of competencies for graduate employability, which depends on innovation and collaborative practices [6].

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Nevertheless, the graduates' unemployment is becoming a major challenge for the developing nations and Bangladesh is no exception from this scenario [7–9]. According to the Economic Intelligence Unit (EIU) sponsored by the British Council, the rate of graduate unemployment is very high as compared to the other South Asian Countries, which is worrisome [10]. The unemployment rate among those who had graduated from university was 11.2%, whereas the total national unemployment rate is 4.2% [11]. It was noted that at least 6.6 million qualified graduates were unable to find suitable employment [12]. The unemployment rate is higher among young graduates and postgraduates. For example, the unemployment rate among graduates with a bachelor degree is 36.6% and the rate for graduates with a master's degree is 34.3% [7]. Furthermore, it is worth noting that the current rate of unemployment among the younger population is significant at 10.6%, with a substantial 79.6% proportion of jobless youth contributing to the overall unemployment figures [13, 14]. Research titled "Asia–Pacific Employment and Social Outlook 2018" highlights a significant rise in young unemployment, nearly doubling between 2010 and 2017 [15, 16].

The concern regarding youth unemployment has intensified as Bangladesh achieved excellent economic enactment regarding GDP and rapid structural transformation [7]. This implies a weakness of this kind of economic progression through joblessness and inequality [14]. However, this trend of unemployment among graduates poses a significant challenge to this nation. This country envisages to achieve developed nation status by 2041, along with a commitment to implement the Sustainable Development Goals (SDGs) by 2030 [14]. Moreover, it is worth noting that Bangladesh is currently experiencing demographic dividend period [17, 18], implying a shifting age structure, which is characterized by a higher share of the working-age population than the dependent population [19]. According to existing evidences [11, 14, 20], it was estimated that almost 2.1 million individuals would migrate within the working-age population between 2013 and 2023. Consequently, if the majority of graduates fail to become employed and are circumvented by the development process, this might create social, economic, and political tensions among policymakers as well as among citizens [7].

Graduate unemployment in Bangladesh has led to produce literatures on determinants of unemployment that utilizes either the nationally representative data source, Labour Force Surveys (LFS), or own data generation. Some studies have examined the factors influencing the NEET (not in education, employment, or training) status of individuals [7, 14] whereas others have focused on macro determinants [1, 21, 22].

However, to address the issue of graduates' unemployment, it is important to identify and address any variance in employment status across different demographic and background criteria. Although some studies have focused on factors such as gender, age, and field of study [23, 24], other demographic characteristics have been overlooked. Particularly in Bangladesh, where concerns about inequality and discrimination are widespread [25, 26], exploring variations in employment outcomes among individuals with diverse socio-demographic characteristics is imperative.

Consequently, given the high graduate unemployment and the government's commitment to achieve the SDGs along with the knowledge gap, this study has been undertaken to understand the basic socio-demographic factors that affect graduates' employment status considering Bangladesh's perspective.

2 Review of literature

Demographic variables, such as gender, marital status, field of study etc. can cause variations in employability as well as employment status in accordance with the works of literature presented in the following paragraphs.

Employment outcomes are tied to gender issues, which are a widespread and not new phenomenon in the labour market [27]. Some studies found in their models that [28–30] women are more likely than males to be jobless for a longer period of time, and men are more engaged in the labour market than women. For example, in Ethiopia, during the same year, the unemployment rate for young women (20–24) was 38.7%, but it was only 23.2% for young males in the same age group [31]. In addition, male graduates have more expectations to be employed according to their educational level during the university-to-work transition compared to female graduates [27]. In reality, different issues in the labour market make males are more favorable than females. This situation makes the males are more confident about their future employability than females [24]. For example, research conducted in California among undergraduates by [32] discovered that male students were more confident than their female counterparts in finding a stable job after graduation. Jackson and Wilton [33] also revealed that male students have a higher perceived employability than female students. However, there is also an exception to this type of scenario in the labour market. For example, [34] showed that female students were more confident and optimistic in terms of future employability than male students in Egypt and Oman.

It has been stated that graduates who have just graduated encounter several snags in the labour market, such as minimal or no job experience and a lack of exposure to work ethics and surroundings, which tend to hinder their efforts to obtain positions. On the other hand, graduates who have already completed their graduation a few years ago face fewer problems since they are already familiar with different situations in the labour market [35]. Overall, youthful cohorts have weaker labour market abilities than older cohorts. For example, [36] evaluated the link between socio-demographic characteristics and unemployment in urban Ethiopia using data from CSA's National Labour Force Surveys in 1999 and 2005. The author discovered that unemployment and age have an inverse relationship. This implies that if age is increased, then there is a lower chance of remaining unemployed. Other studies [37, 38] also found similar findings.

Marelli and Vakulenko [30] examined the individual and family characteristics of the long-term youth unemployment rate in Italy and Russia. The study found that marital status played a significant role in becoming employed because there was a motivation to do a job for their livelihood and to fulfill their responsibilities. Likewise, different studies by different authors also found similar findings [35]. found that marital status had a statistically significant effect on employment outcomes. As a result, unmarried people are more likely to be unemployed than married people. Another literature also showed that those who are married have a lower likelihood of being unemployed [25.5% compared to singles (almost 37%)] [7]. Mncayi [39] on the other hand, discovered that marital status did not affect graduate length of unemployment in South Africa.

This field of study may have an impact on employment positions. For example, [40] used Labor Force Survey data on almost 500,000 people to assess the influence of an academic degree and field of study on short- and long-term unemployment throughout Europe. The authors discovered that there were considerable employment variations between specialties in terms of lowering both short- and long-term unemployment. For example, education, engineering, health and welfare, and services and tourism have a significant influence on avoiding short-term unemployment. On the other hand, science, biology and the environment, computer usage, and health and welfare disciplines were more beneficial in reducing long-term unemployment [40]. Furthermore, [39] showed that the field of study is a major predictor of unemployment in South Africa. Some studies [41, 42] agree that individual attributes, such as the field of study, influence students' perceptions of employability and graduates' job outcomes. Walker and Fongwa [42] discovered that students majoring in Science, Engineering, and Technology, and accounting are more positive about their job prospects. One reason for this confidence is the professional nature of these degree programmes, particularly in Engineering and Accounting. Students in the humanities (Social Sciences, Arts, and Education) reported much lower levels of self-perceived employability. Okay-Somerville and Scholarios [43] and Donald et al. [44] investigated the factors of perceived employability among UK students. These studies found that graduating from non-professional fields or generalist degree subjects (such as Humanities, Arts, and Social Sciences) has a negative impact on perceptions of employability, earnings potential, and employment quality compared with those studying Business, Engineering, Law, or Mathematics. On the other hand, education students in South Africa have a greater degree of self-perceived employability than those in Management Studies, Law, and Science and Agriculture [24].

In the existing literature, family support was also found to be a crucial factor influencing employment status [45]. For instance, using longitudinal data from the Panel Study of Income Dynamics (PSID), Edwards [46] discovered a positive relationship between being unemployed and receiving financial help from relatives. The author showed that unemployment enhances the chances or probability of workers receiving financial support from their families. Interestingly, financial assistance from families is increasing [46]. A wealthy family background decreases the probability of employment and vice versa [47]. This is possible because people who receive financial support from their families do not worry about becoming employed compared to their counterparts, and they wait for better opportunities. This kind of support provides financial freedom [48].

3 Methodology

3.1 Research design

This research investigates the impact of fundamental socio-demographic variables, including gender, age, marital status, field of study, and family financial assistance, on graduates' employment outcomes. This study employed a quantitative research approach, as shown by the precise issues addressed. This study used a cross-sectional research design to examine its research goals. Cross-sectional studies frequently utilize survey methodology, as the authors may intend to describe the occurrence of a particular phenomenon [49].

3.2 Target population and study area

A target population refers to a cohort or set of components that possess certain qualities of interest to particular research endeavors [50]. The study required the inclusion of a target group comprising university graduates who have successfully obtained a bachelor's degree—such as a Bachelor of Arts (BA), Bachelor of Business Administration (BBA), Bachelor of Science (BSc), or Bachelor of Social Sciences (BSS)—or a master's degree, including a Master of Arts (MA), Master of Business Administration (MBA), Master of Science (MSc), or Master of Social Sciences (MSS). Additionally, these individuals were sampled if they were either employed or jobless residents in Bangladesh. The study area for this paper is Dhaka City. Based on the findings of the labour force survey conducted between 2016 and 2017, it was determined that a total of 21,218 individuals (in thousands) in the labour force are now residing within the Dhaka region [13]. Furthermore, it is worth noting that the number of universities in the Dhaka metropolitan area surpasses that of other cities.

3.3 Sampling technique and sample size

Based on authors' current knowledge, there are no comprehensive census or exhaustive compilations of individuals who have graduated from both public and private universities in the nation. Therefore, for this study, we opted to employ a non-probability sampling strategy. More specifically, this study utilizes the purposive sampling method for selection purposes. Generally, the approache are not intended to offer comprehensive insights into the whole population but rather focus on certain groups [51].

To determine minimum sample size G*Power was used. The test employed a 0.05 alpha, a power of 0.95, and a medium effect size of ($f^2 = 0.15$). Because most social science research regard 80 percent to be the minimum acceptable power [52], the ideal sample size was established at 119. However, the recommended sample size for the study was 385 based on Cochran's formula and guidelines [53]. The survey conducted in this study entailed collecting primary data from a sample size of 415 individuals who had completed their graduate level education.

3.4 Ethics statement

Ethical approval was obtained from the Research Ethics Committee of the Universiti Malaya (Reference Number: UM.TNC2/UMREC—968) before data collection commenced. The participants were informed verbally that their participation in the study was entirely voluntary and that they had the option to opt out at any time.

3.5 Data collection and data analysis plan

According to [54], in comparison to more impersonal data collection approaches, face-to-face contacts offer various advantages. These advantages encompass a more precise selection of research participants, aiding in keeping these individuals focused, leading to more precise data, enhanced clarity on the study's objective, and a substantial reduction in researcher bias [55]. As a result, the 'Face to Face' survey administration technique was chosen as the data collection method. This involves the researcher personally handing out the questionnaire and explaining the purpose of data collection to achieve a high response rate and address any issues respondents may have with understanding the questionnaire. Additionally, it helps to reduce the number of incomplete questionnaires. The survey instrument used in this study was subjected to a pilot test to enhance and modify its effectiveness. Upon completion of the survey instrument, the commencement of data collection activities ensued. Period for final data collection was from February 2021 to July 2021.

The quantitative research aspects of this study were empirically tested using various data analysis techniques. Data collected from the administration of the survey (through hard copy) were processed using SPSS. Descriptive statistics were used to examine the attributes and features of the participants. The employment status of graduates was assessed using Pearson's chi-square test to identify the elements linked to it. Finally, forward binary logistic regression models were used to determine drivers associated with employment status.

3.6 Variable description

In this study, we considered employment status as an outcome (dependent variable)**.** In addition, data pertaining to a range of factors encompassed the demographic and socio-economic attributes of the graduates. The study incorporates fundamental sociodemographic characteristics, including age, gender, marital status, field of study, and financial assistance from family, as covariates or predictor variables. The variables included in this investigation were determined based on current literature, as discussed in Sect. 2. The description of the variables is documented in Table 1.

3.7 Model specification

A binary logistic regression model is used to evaluate the parameters that are correlated with the job status of the graduates. According to [56], this model demonstrates the ability to consider the overall impact of each covariate in the presence of other covariates. A binary logistic regression model is commonly employed to represent dichotomous answers. In this study, we construct a model to estimate the likelihood of graduates securing employment, denoted by p. Additionally, we considered a collection of k covariates, namely X1, X2, …, Xk, as explanatory variables in our analysis. The logit transformation of the probability parameter p, denoted as logit(p) = log(p/(1 − p)), establishes the connection between p and the linear predictor in the logistic regression model. This relationship is quantitatively represented by (1):

$$\log(p/1-p) = -\beta 0 + -\beta 1X1 + \cdots + \beta kXk \quad (1)$$

In Eq. (1), the objective is to estimate the parameter vector β = [β, β1,……βk]′, which represents the regression coefficients. Covariates Xj, where j ranges from 0 to k, can be either numeric or categorical variables [56].

4 Outcomes

4.1 The demographic characteristics of the participants in the study

The demographic characteristics of the participants are presented in Table 2. According to the data presented in Table 2, the proportion of male graduates was 64.8%, whereas the corresponding proportion of female graduates was 35.2% in the sample collected. The number of unmarried graduates (288) exceeded that of married graduates (127). The subject of study with the highest number of graduates was humanities, followed by business administration, social sciences and law. The percentage of jobless graduates was 53.5%, while that of graduates working was 46.5%.

4.2 Cross tabulation between socio-demographic variables and employment status

The connection between socio-demographic characteristics and job status among graduates was examined using a two-way frequency table and chi-square statistics. According to the data shown in Table 3, there is a higher rate of employment among male graduates (48%) than among female graduates (43.8%). Statistical analysis using the chi-square test ($\chi^2 = 0.646$, p = 0.422) provides evidence that there was no significant association between gender and employment status. By contrast, we find that age influences employment status. This is because the Chi-Square (95.960, p = 0.000) was found to be significant. For example, the percentage of unemployment is higher among graduates who are 25 or 26 years old, whereas it decreases with increasing age.

Table 1 Variables description

Variable	Description
Employment status	= 1 if the graduate is employed; 0 otherwise
Age	The age of the graduates
Gender	= 1 if the graduate is female; 0 otherwise
Marital status	= 1 if the graduate is married; 0 otherwise
Field of study	Graduates' field of study where they took their graduation
Financial family support	= 1 if the graduate take financial support from family; 0 otherwise

Table 2 Demographic variable and employment status of the participants (*N=415*) Frequency. Source: Field Survey

Variable	Frequency	Percentage (%)
Gender		
Male	269	64.8
Female	146	35.2
Age		
25 years	63	15.20
26 years	103	24.80
27 years	101	24.3
28 years	80	19.3
29 years	68	16.4
Marital status		
Unmarried	288	69.4
Married	127	30.6
Field of study		
Humanities	114	27.5
Social Sciences & Law	84	20.2
Business Administration	108	26.0
Sciences (Mathematics/Biology/Computer/Information sciences/Physics/Chemistry etc.)	43	10.4
Engineering	46	11.1
Agriculture	20	4.8
Employed		
No	222	53.5
Yes	193	46.5
Nature of employment		
Part-time	11	2.7
Full Time	162	39.0
Self-employed	20	4.8

Table 3 Percentage distribution of employment status in Bangladesh by socio-demographic characteristics via using the 2-Way frequency table

Variables	Are you employed		Pearson's Chi-square test (p-value)	Number of Graduates
	No	Yes		
Gender				
Male	52.0%	48.0%	0.646 (0.422)	269
Female	56.2%	43.8%		146
Age				
25 years	88.9%	11.1%	95.960 (0.000)***	63
26 years	72.8%	27.2%		103
27 years	51.0	49.0		101
28 years	33.8%	66.3%		80
29 years	17.6%	82.4%		68
Marital status				
Unmarried	64.2%	35.8%	43.652 (0.000)***	288
Married	29.1%	70.9%		127
Field of study				
Humanities	57.9%	42.1%	32.622 (0.000)***	114
Social Sciences & Law	72.6%	27.4%		84
Business Administration	45.4%	54.6%		108
Sciences (Mathematics/Biology/Computer/ Information sciences/Physics/Chemistry etc.)	53.5%	46.5%		43
Engineering	23.9%	76.1%		46
Agriculture	23.9%	76.1%		20
Receiving financial support from family			45.883 (0.000)***	
No	6.5	93.5		46
Yes	59.3	40.7		239

The asterisks ***denote significance at less than 1%

The job positions of individuals are significantly influenced by their marital status. The Chi-Square test result (43.652, $p = 0.000$) was found to be significant. The unemployment rate was higher among unmarried graduates (64.2%) than among married graduates (29.1%). Graduates' job status is influenced by their field of study. The Chi-Square data ($\chi^2 = 32.622$, $p < 0.001$) indicated that there were statistically significant disparities in educational attainment among graduates based on their field of study. Furthermore, receiving financial support from family was also found to be significant. From Table 3, we can see that graduates who do not receive financial support from their families are more employed than those who receive financial help from their families.

4.3 Binary logistic regression with forward likelihood ratio (LR)

Finally, in this study, we run the Forward LR binary logistic regression to determine whether socio-demographic factors have any effect on employment status (Table 7). Forward LR is a stepwise regression procedure in which the best variable is gradually added at each step, which is significant. Forward LR systematically evaluates predictors based on their contribution to improving the model, preventing overfitting by adding only statistically significant variables. Thus, this process shows that each new variable that enters the equation progressively adds unique information; hence, the insignificant variable will not be allowed to enter the model [57]. In addition, when a model has a different number of independent variables, there is a probability of a higher association among the independent variables that masks the real significance. Stepwise regression analysis will ascertain the presence of the aforementioned condition and yield a more precise assessment of the variables that have true significance [58]. Forward LR can help mitigate multicollinearity issues by ensuring only the most informative variables are selected first. It provides a clear statistical criterion (e.g., p-value or chi-square threshold) for variable inclusion, making the selection process robust and justifiable.

Prior to conducting regression analysis, it was imperative to assess the adequacy of the model to accurately represent the data. The fitness of the model was assessed using a series of tests in the ensuing sections.

4.3.1 Outcomes of goodness-of-fit statistics

The assessment of the fit between the logistic model and observed outcomes was conducted using goodness-of-fit statistics [59]. Tables 4 and 5 present the goodness-of-fit measures for the logistic model utilized in this study.

The null hypothesis for the Omnibus test of model coefficients posits that the model exhibits a poor fit with the observed data. According to the findings in Table 4, the models exhibit statistical significance, indicating a notable enhancement in fit when compared to the null models at a significance level of 1%. Hence, the models exhibited a strong degree of conformity, indicating a high level of accuracy in describing the data.

Additionally, Table 5 presents the Hosmer–Lemeshow statistic, which evaluates the goodness-of-fit of the model. All models in this context exhibited satisfactory conformity to the data. Based on the test results, the null hypothesis posits that the model adequately explains the observed data, whereas the alternative hypothesis suggests a lack of fit. Based on available evidence, we were unable to reject the null hypothesis. Therefore, there was no discernible distinction between the observed and predicted models.

4.3.2 Multicollinearity

To detect the multicollinearity problem in this model, we perform variance inflation factor (VIF) analysis. From Table 6, we can see that there was no multicollinearity issue in this model. The VIF for all covariates is less than 5, which implies that collinearity does not affect the main variable of interest in our model [60].

Table 4 Omnibus tests of model coefficients

	Chi-square	df	Sig
Step 1	103.037	1	0.000
Block	103.037	1	0.000
Model	103.037	1	0.000
Step 2	40.632	1	0.000
Block	143.668	2	0.000
Model	143.668	2	0.000
Step 3	29.775	5	0.000
Block	173.444	7	0.000
Model	173.444	7	0.000
Step 4	11.279	1	0.001
Block	184.723	8	0.000
Model	184.723	8	0.000

Table 5 Hosmer and Lemeshow test

Step	Chi-square	df	Sig
1	1.165	4	0.884
2	0.274	4	0.991
3	3.150	8	0.925
4	6.014	8	0.646

Table 6 Multicollinearity among covariates or predictors

Covariates	VIF
Gender	1.160
Age	1.179
Marital Status	1.264
Field of study	1.286
Receiving financial support from family	1.056

4.3.3 Logistic regression

In Table 7, after following the Forward LR, we observe that four different models are produced. This method is useful for understanding the contributions of the variables and, which are the most useful. By including only meaningful predictors, the method helps maintain a parsimonious model, which is easier to interpret. For example, in the first model, only the age variable was included, whereas in the second model, age and receiving financial support were included. In the third model, along with these two variables, another variable, the field of study, was included. Finally, in the last model, all significant variables such as age, receiving financial support, the field of study, and marital status were included. However, gender was excluded from this table as it was not a significant predictor of graduates' employment outcomes.

The results in Table 7 demonstrate a positive coefficient associated with age, indicating a positive correlation between the age of graduates and their likelihood of being employed. For this covariate, the coefficient was 0.872 which is positive. This implies that for every one-unit increase in age, the log odds of becoming employed increased by 2.392, with 95% CI of 1.975 and 2.898. In other words, for every unit of age, the odds of becoming employed increased by 139.2%, as shown in Model 1. However, this predictor was also significant in Model 4.

The regression analysis findings presented in Table 7 indicate a negative coefficient of − 0.934, suggesting that unmarried graduates exhibit a greater likelihood of unemployment than married graduates (reference group). An odds ratio of 0.393 suggests that unmarried graduates are 60.7% less likely to be employed. The p-value of 0.000 provides strong evidence to reject the null hypothesis, indicating that marital status has a statistically significant impact on employment results (coefficient = 0) at a significance level of 1%.

The findings of this study indicate that the field of study pertaining to job status holds substantial relevance, as evidenced by the statistically significant value of 0.000. This result supports the rejection of the null hypothesis at the 1%

Table 7 Results of Binary Logistic Regression on the Factors Affecting Employment Status

	Variables	Coefficient	S.E	Wald	p-value	Odds Ratio	95% C.I	
							Lower	Upper
Model 1	Age	0.872	0.098	79.454	0.000***	2.392	1.975	2.898
	Constant	− 23.692	2.647	80.134	0.000***	0.000		
Model 2	Age	0.862	0.102	71.209	0.000***	2.368	1.938	2.893
	FS	2.940	0.627	22.005	0.000***	18.909	5.537	64.576
	Constant	− 23.660	2.770	72.947	0.000***	0.000		
Model 3	Age	0.925	0.113	67.374	0.000***	2.523	2.023	3.147
	FoS			26.637	0.000***			
	Humanities	− 0.460	0.607	0.576	0.448	0.631	0.192	2.072
	SSL	− 0.640	0.627	1.041	0.308	0.527	0.154	1.803
	BA	0.628	0.601	1.092	0.296	1.875	0.577	6.090
	Sciences	0.478	0.674	0.504	0.478	1.614	0.431	6.041
	Engineering	1.363	0.685	3.959	0.047	3.906	1.021	14.951
	FS	2.925	0.635	21.190	0.000***	18.637	5.364	64.755
	Constant	− 25.493	3.097	67.754	0.000***	0.000		
Model 4	Age	0.845	0.115	53.613	0.000***	2.329	1.857	2.920
	MS	− 0.934	0.280	11.152	0.001***	0.393	0.227	0.680
	FoS			23.597	0.000***			
	Humanities	− 0.554	0.623	0.792	0.374	0.574	0.169	1.948
	SSL	− 0.740	0.643	1.323	0.250	0.477	0.135	1.683
	BA	0.432	0.620	0.484	0.487	1.540	0.456	5.196
	Sciences	0.365	0.687	0.283	0.595	1.441	0.375	5.537
	Engineering	1.207	0.699	2.980	0.084	3.344	0.849	13.167
	FS	2.831	0.640	19.582	0.000***	16.957	4.840	59.407
	Constant	− 22.538	3.211	49.273	0.000***	0.000		

The asterisks ***denote significance at less than 1%

FS Receiving Financial Support from Family, *FoS* Field of Study, *SSL* Social Sciences & Law, *BA* Business Administration, *MS* Marital Status

significance level. Hence, the discipline under examination elucidates the acceptance of the graduates' work status. The positive coefficients of Engineering, Sciences, and Business administration indicate that the likelihood of employment is higher among graduates who have studied in these three fields. For instance, the odds of becoming employed increased by 3.344, 1.441, and 1.540 for graduates studying in the areas of Engineering, Sciences, and Business administration, respectively. However, the odds of becoming employed decreased by 42.6% and 52.3% for graduates who studied in the humanities, social sciences, and law, respectively. The coefficients are also negative for the humanities and social sciences.

Furthermore, the log odds ratio to become employed increases by 16.957 for those who do not receive financial support from their families, with a 95% CI of 4.840 and 59.407 compared to those who are receiving financial support from their families. The coefficient of 2.831 assigned to this variable indicates that the receipt of financial help from one's family is a statistically significant covariate for predicting the job status of graduates ($p < 0.001$).

Finally, Table 8 summarizes the model**.** Here, adding more correctly classified predictors accounts for more changes in employment status. For example, the first model demonstrated that 70.4% of the variation in the criteria variable can be accurately attributed to the predictor variable. Conversely, in Model 4, 80% of the variation in the criterion variable could be accurately attributed to the predictor variables included in the model.

Table 8 presents the estimated values for Cox and Snell R-square and Nagelkerke R-square, commonly referred to as Pseudo R^2 values, for Model 1. The Cox and Snell R-square values were estimated to be 0.220, whereas the Nagelkerke R-square value was 0.294. These values subsequently quantify the extent to which the explanatory factors included in the study account for variance in the dependent variable. However, the inclusion of more factors at each stage also led to an increase in the amount of explained variance. As an illustration, the fourth model comprehensively accounted for a range of 35.9% (Cox and Snell R-squared) to 48% (Nagelkerke R-squared) of the variability seen in the job status of graduates.

5 Discussion

The purpose of this study was to examine the sociodemographic factors that influence the job status of graduates in Bangladesh. In this study, we found that four of the five predictors were statistically significant in our model. For instance, graduates' age was found to be significant, implying that the probability of becoming employed is higher among older graduates. This finding aligns with previous studies, such as those by Kolev [37] and Echebiri [38]. A possible explanation may be to become familiar with the labour market phenomena that make senior graduates more competitive and more experienced in getting a job [39, 61]. Finding a job is very difficult in Bangladesh because there is significant competition in the labour market. From this perspective, senior graduates may have more abilities, making them more appealing to their employers. Senior students may also have had more time to develop professional networks, which may be useful in job search. They may have more connections in their sectors, making it easier for them to work.

Marital status was found to be significant in our model, aligning with the results of Marelli and Vakulenko [30] and Ouedraogo [62]. A possible reason for the significance of marital status is that, in Bangladesh, married individuals tend to have more responsibilities and obligations [63, 64], which spurs them to secure employment opportunities earlier. On the other hand, unmarried individuals may have more flexibility and freedom to focus on their careers and professional development [65, 66].

Another possible reason for this difference is the societal expectation that married persons prioritize bearing their family responsibilities once married. This may lead to married graduates seeking employment early in life. Another factor that may contribute to this difference is the cultural belief in Bangladesh that marriage and family are primary sources of happiness and fulfilment in life. This belief can lead to the perception that unmarried individuals have more time and

Table 8 Model summary of the binary logistic regression

Step	Cox & Snell R square	Pseudo R^2	Overall percentage
1	0.220	0.294	70.4
2	0.293	0.391	74.9
3	0.342	0.456	78.1
4	0.359	0.480	80

freedom to pursue their careers and personal development, whereas married individuals are expected to prioritize their family responsibilities.

The field of study was identified as a key factor influencing job status in our model. These findings align with those of prior studies conducted by [24, 42, 44, 67]. However, the probability of becoming employed is higher for graduates who have studied in engineering, science, and business administration than for other subjects. In Bangladesh, students in the engineering, science, and business fields tend to have more opportunities to secure employment than those in other fields. Conversely, graduates studying the humanities have a comparatively lower likelihood of becoming employed. This field of study can also influence the level of competition for available jobs in Bangladesh [68, 69]. A possible explanation may be the lack of demand in the area of specialization for every field in Bangladesh. Certain fields may have more graduates than available jobs, leading to more employment competition.

Financial support from family is found to be significant in our model because Bangladesh is a resource-poor nation with a large proportion of citizens living in poverty [70]. This shows that those who received financial support from their families had a lower probability of becoming employed. This happens because, owing to their family income, they do not feel pressure to actively search for a job. Graduates capable of receiving financial assistance from family members may have access to the resources required to upgrade their skills and credentials, perhaps extending their unemployed term. In addition, the distribution of monetary resources within the household has the potential to augment household income while also potentially dissuading younger members from engaging in labour market activities [71, 72]. Previous studies, such as [45, 46] also reported similar findings regarding financial support and employment outcomes.

However, this study found no statistically significant relationship between gender and employment status. This result contrasts with the findings of [27, 29, 30]. The Bangladeshi government has implemented several policies and programs aimed at promoting gender equality and women's empowerment. For instance, the National Women Development Policy of 2011 outlines specific strategies for increasing women's participation in the workforce, including the provision of training and skill development opportunities [73], which could contribute to similar levels of perceived employability, and employment status as well. Moreover, in Bangladesh, a shift toward greater gender equality and a blurring of traditional gender roles have been observed due to globalization and increased women's participation in paid work [74]. This shift has encouraged individuals of both genders to pursue career aspirations and develop professional skills. Nevertheless, achieving true equality requires continued efforts to monitor and eliminate any lingering inequities.

6 Conclusion and policy implications

The socioeconomic background of graduates plays a significant role in determining their work status, and unemployment is a persistent concern for policymakers in developing nations because of its direct impact on economic progress. The issue of graduate unemployment holds more significance in emerging nations, such as Bangladesh, which is currently experiencing its initial demographic dividend. The current study examined the relationship between the socio-demographic factors of graduates and their employment status. Before performing the stepwise logistic regression analysis, this study presents a cross-tabulation of sociodemographic characteristics and job status to identify the components that are correlated with graduates' employment outcomes.

In agreement with previous studies, age, marital status, field of study, and financial support from family were found to be significant in our binary logistic regression model to affect employment status. Furthermore, this study revealed an insignificant statistical relationship between gender and employment status. Prior to conducting the binary logistic regression analysis, the authors assessed the presence of multicollinearity and ascertained that there was no statistically significant multicollinearity issue among the explanatory variables.

This research study provides valuable insights for policymakers in Bangladesh, enabling them to make informed decisions and take appropriate steps regarding employment and unemployment among tertiary-level graduates. By utilizing the data from this study, policymakers can effectively harness demographic dividends and facilitate the continued development of the country. For instance, based on the findings, this research emphasizes creating more job opportunities for graduates in all subject areas to make them employed. For this reason, it is important to make graduates more employable by providing them with market-oriented education. This will ultimately reduce the competition among graduates to get a job, as well as reduce the tendency to change their job sectors apart from their field of study. Furthermore, we need to change our mindset towards graduates. Parents do not allow their higher-educated graduates to become entrepreneurs; rather, they want their children to focus on getting a good job to obtain a better social status compared to others.

Generally, this distinctive study could link socio-demographic factors with practical solutions, such as proposing targeted interventions to improve employment outcomes for specific groups of graduates. Applying the study's findings in this way could enhance its impact and uniqueness. Therefore, different stakeholders must work together to reduce unemployment. If Bangladesh can capture graduates by gainfully employing them in the labour market, it will help to achieve its targeted visions in the upcoming decades.

Largely, the findings of this research study provide valuable insights for policy formulation, addressing disparities, offering career guidance, and improving labor market efficiency. The study helps identify factors contributing to successful employment outcomes and informs strategies to enhance employability and reduce unemployment rates. Moreover, it can assist policymakers in leveraging Bangladesh's first demographic dividend to drive economic growth, ultimately contributing to the achievement of the country's sustainable development goals.

Nevertheless, this study had certain limitations. For example, the cross-sectional research design employed was not conducive to establishing causal relationships between variables [56]. Additionally, we applied only a quantitative method to achieve our objective. To gain extensive insights, future research should incorporate qualitative data. Follow-up interviews may also be conducted to further explain the questionnaire results.

Thus, a qualitative approach in future studies could capture richer thematic content, enhancing the analysis. Further research could apply a mixed-methods approach, enabling readers to better understand the underlying concepts. A longitudinal approach, tracking graduates over several years or even decades, could offer a unique perspective on how socio-demographic characteristics influence not only immediate employment status but also long-term career progression and job stability.

Furthermore, future studies could also be augmented by comparing graduates from different countries, regions, or cultures, exploring how socio-demographic factors affect employment in diverse labor market contexts.

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Declarations

Competing interests The authors declare no competing interests.

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