Job-Related Stress and Lifestyle Issues in Ischemic Heart Disease

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DOI: https://doi.org/10.3329/bafmj.v58i2.87456

ABSTRACT

Background: Non-communicable diseases (NCDs) are the major public health concern all over the world. Ischemic heart disease (IHD) is now the leading cause of premature death in 146 countries for men and 98 countries for women.

Objectives: To explore sociodemographic and lifestyle factors and job-related stress in IHD patients admitted in Combined Military Hospital (CMH) Dhaka.

Methods: This cross-sectional study was conducted in CMH Dhaka from May 2025 to July 2025 among purposively selected 113 IHD patients. Data were collected through pretested semi-structured questionnaire using 23 items Effort-Reward Imbalance Questionnaire (ERIQ).

Results: Among the respondents, 83.2% were male and the average age was around 49years. Nearly 40% of them were qualified with secondary school certificate (SSC), and their average monthly income was about 42000 taka. Majority (62.8%) were government service holder, 89.4% have permanent job. Around one-third of them (33.6%) were third class employee. Almost half (46.0%) of the respondents perform their duties between 8-9 hours. Two-thirds were involved in regular physical activities, 52.21% had the habit of smoking, 54.87% used to take additional salt with food and 67.3% had BMI within normal limit, 77% had essential hypertension, 34.51% with Diabetes Mellitus and 65.49% had dyslipidemia. In regards to ERIQ, more than half (54.87%) had intermediate effort score, 57.52% had low reward and 62.83% intermediate overcommitment score. Eighty eight percent had high effort-reward imbalance ratio score.

Conclusion: Present study assessed the sociodemographic and lifestyle attributes of the IHD patients to elicit the job-related stress by applying ERI questionnaire. The sociodemographic attributes typically represent basic characteristics of armed forces personnel in Bangladesh with almost equal number of high effort and reward score as well as high ERI ratio.

Keywords: Non-communicable diseases, ischemic heart disease, effort-reward imbalance questionnaire, Combined Military Hospital.

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Received: 03 November 2025 **Accepted:** 18 December 2025

INTRODUCTION

Noncommunicable diseases (NCDs) are the major public health concerned globally which killed over 43 million people in 2021. This death toll equivalent to three-quarters of all non-pandemic-related deaths all over the world. It accounts for 18 million NCD deaths among people younger than 70 years of age which is more than all injuries, infections including COVID-19, and maternal and nutritional causes of death combined. Low- and middle-income countries of the world share about 82% of these "premature" deaths.[1]

Communicable disease in a developing country like Bangladesh is burning issue to addressed. But in the recent past, due to the epidemiological transition; non-communicable diseases (NCD) have become the major public health importance then the communicable diseases. In 1986, NCDs represented only 8% of total deaths compared to 52% of deaths due to communicable diseases, whereas in 2021, NCDs are estimated to account for 63.1% of total deaths. [1, 2] Among all the NCD death, cardiovascular diseases (CVDs) have been the leading cause of death globally. In 2021, 20.5 million people died from a cardiovascular condition, a figure that accounted for around one-third of all global deaths and was a significant increase from the 12.1 million CVD deaths recorded in 1990. Ischemic heart disease is now the leading cause of premature death in 146 countries for men and 98 countries for women.[3]

Bangladesh has one of the fastest growing economies in Asia, with a gross domestic product growth rate of 7·2% in 2022. Despite attaining notable progress on most health indicators for the Sustainable Development Goals, Bangladesh has a high prevalence of diarrhea, tuberculosis, dengue, and other infectious diseases. Although the risk factors for infectious diseases, such as insufficient sanitation, are still a threat, the increasing pattern of sedentary lifestyles and unhealthy diets among the population of Bangladesh is adding to the burden of non-communicable diseases. IHD is an important contributor for significant mortality and morbidity among the prevalent NCDs in Bangladesh. Of all South Asian countries, Bangladesh probably has the highest rates of IHD and yet is the least studied. Recent trends revealed that a good number of premature deaths occurs in fourth decade of life which seems to be contributed by sedentary lifestyle, smoking, obesity, increase consumption of junk food, dyslipidemia, rapid urbanization and industrialization, increasing trends of mental illness among the population.

Tobacco consumption is quite common in Bangladesh: prevalence is 51.0% for any form, 26.2% for smoking and 31.7% for smokeless tobacco. In regards to the dyslipidemia, one study revealed abnormal fasting total cholesterol (TC), low density lipoprotein-C (LDL-C), high density lipoprotein-C (HDL-C) and Triglyceride (TG) to be 17.3%, 48.5%, 75.6% and 48.5%, respectively among the employees doing secretariate job which may be due to rapid urbanization with less physical activities, environmental pollution, climate change, and changes in dietary habits, and also increasing access to day-to-day modern amenities leading to reduced physical activity and sedentary life styles, especially in younger adults. As a result of socioeconomic transition, lifestyle, as well as, the dietary pattern is changing in Bangladesh. In creasing prevalence of obesity, tobacco use, high intake of processed foods and less physical activity accompany the transition. In general, 21.5% adults (male 21%, female 22%) have body-mass index (BMI) >25 kg/m2; increased waist circumference is alarming, especially in women (33.7%).In a recently published study, 19.5% of older persons in rural Bangladesh 20.8% women, and 18.0% men had

metabolic syndrome. Sedentary life style may have association with IHD.[2]

Work-related stress is an example of a psychosocial risk factor that has become of interest in today's ever demanding, fast-paced, and globalized society, although its link to adverse health and in particular coronary heart disease (CHD) is incompletely understood.[4] Economic globalization and rising competition among the developed and developing countries creates much more attraction of job stress in recent days.[5] Study of association between job and stress as well as psychological hazards and health outcome achieved a remarkable progress during the past 20 years.[6] Evidence of social gradient in ischemic heart disease (IHD) specify that people from more disadvantaged groups and classes have higher risks of IHD. At the same time, adverse work environments have been hypothesized to have detrimental long-term effects on the ischemic heart disease. Furthermore, disadvantaged group of people are the main sufferer from the adverse work environment which may contribute to the explanation of the social gradient in IHD.[7] A country like Bangladesh where people had to live in a low socioeconomic condition and there remain more disadvantaged group who are more prone to develop IHD especially due to poor working condition and job-related stress.

Job-related stress is a growing problem around the world that affects not only the health and well-being of employees, but also the productivity of organizations. Job-related stress arises where job demands of various types and combinations exceed the person's capacity and capability to cope.[8] It is well established that job-related stress accounts for several health outcomes among the employees and its association with the development of adverse health effect e.g., ischemic heart disease, psychological problems etc. had been widely studies in many parts of the world but appropriate emphasis were not taken place in the context of Bangladesh. At the same time Bangladesh is experiencing a transitional shift from communicable diseases to non-communicable diseases and many factors were responsible for the development of IHDs which were established by a wide range of research work at different corner of Bangladesh. But development of IHD among the working populations due to job-related stresses were not emphasized. As such, in the present days' context, research on this aspect is a prime importance.

MATERIALS AND METHODS

From May 2025 to July 2025, a cross-sectional study was carried out at the cardiology department of Combined Military Hospital Dhaka to describe the sociodemographic characteristics and lifestyle issues of patients diagnosed with ischemic heart disease (IHD) who were exposed to work related stress. The respondents were chosen purposively and a total of 113 IHD patients were included who had history of work-related stress. A pretested questionnaire was used in face-to-face interviews to gather data. Before interviewing informed written consent was taken from the respondents. A semi-structured questionnaire was used in this study which included demographic and work-related stress of the respondents. Not only that, lifestyle issues, BMI and comorbidities are there. Respondents work-related stress was elicited by using Siegrist's ERI questionnaire (ERI-Q) which consists of three domains termed as extrinsic effort, reward and overcommitment. Extrinsic effort (6 items) representing job demands imposed on the employee. Reward domain (11 items) consists of income, respect, job security and career opportunities. Overcommitment (6 items) defines a set of attitudes, behaviors, and emotions reflecting

excessive striving in combination with a strong desire for approval and esteem. Each item of first two domains was scored on 5-points scale (1=full disagreement, 5=full agreement) with statement and that of third domain was scored on a 4-point scale (1=full disagreement, 4=full agreement with statement).[5] Cronbach's alpha coefficient of overall questionnaire found 0.77 with effort, reward and overcommitment was 0.75, 0.78 and 0.83 respectively. Data processing and analyses were done using Statistical Package for Social Sciences (SPSS) version 23. Frequencies, percentage, mean and standard deviation (SD) were used for descriptive statistics. A two-tailed p <0.05 was considered statistically significant.

RESULTS

Among the respondents, 83.2% were male, majority (30.1%) belonged to age group 46-50 with an average age was 49.12 years (±5.90) years and range was 35 to 60 years. Highest (39.8%) number of respondents was found to have educational qualification up to SSC. Near about half (41.6%) of the respondents had monthly income in BDT>40001 with average of BDT 41882.30 (±20928.30). Minimum monthly family income was 9000 and maximum was 140000 Taka. Majority (68.1%) of the respondents belonged to the nuclear family, 54.9% was found to reside in urban area and 67.3% stayed in pucca accommodation [Table-I].

TABLE-I: Sociodemographic Characteristics of the respondents (n=113)

Attributes	Frequency (%)
Gender	
Male	94(83.2)
Female	19 (16.8)
Age group in years	
≤45	33 (29.2)
46-50	34 (30.1)
51-55	24 (21.2)
≥56	22 (19.5)
Mean (±SD)	49.12 (±5.90)
Min – Max	35 – 60
Educational Qualification	
SSC and below	45 (39.8)
HSC	36 (31.9)
Graduate and above	32 (28.3)
Monthly family income in BDT	
≤30000	34 (30.1)
30001-40000	32 (28.3)
≥40001	47 (41.6)
Mean (±SD)	41882.30 (±20928.30)
Minimum – maximum	9000 – 140000

Attributes	Frequency (%)
Type of family	
Nuclear	77 (68.1)
Joint	36 (31.9)
Family member group	
≤4	72 (63.7)
≥5	41 (36.3)
Mean (SD)	4.50 (±1.36)
Min – max	3 – 10
Place of residence	
Urban	62 (54.9)
Rural	16 (14.2)
Sub-urban	35 (31.0)
Type of residence	
Pucca	76 (67.3)
Semi-pucca	37 (32.7)

In regards to the job pattern of the respondents, majority (62.8%) were government service holder, 89.4% had permanent job and 33.6% were mid-level (third class) employee. More than half (58.4%) of the respondents are in the service for > 21 years with mean (±SD) length of service is 22.4 (±6.40)years and having 52.2% is in the current position for <45 months. Almost half (46.0%) of the respondents perform their duties between 8-9 hours with mean (±SD) duration of work is 8.61 (±1.78) hours and 72.6% of the respondents used to perform over time duty. More than half (55.8%) did not provide any transport facility from the employers [Table 2].

TABLE-II: Pattern of Job among the respondents (n=113)

Attributes	Frequency (%)
Types of organization served	
Government	71 (62.8)
Private	33 (29.2)
Autonomous	09 (8.0)
Nature/Types of employment	
Duration of employment in months	
≤45	59 (52.2)
≥46	54 (47.8)
Mean (±SD)	94.08 (±122.9)
Min– max	5 – 840

Attributes	Frequency (%)
Permanent	101 (89.4)
Temporary	12 (10.6)
Job position in current employment	
Executive	06 (5.3)
First class employee	21 (18.6)
Second class employee	24 (21.2)
Third class employee	38 (33.6)
Fourth class employee	24 (21.2)
Total length of service in years	
≤20	47 (41.6)
≥21	66 (58.4)
Mean (±SD)	22.4 (±6.40)
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Attributes	Frequency (%)
Length of work in hours	
≤7	27 (23.9)
8-9	52 (46.0)
≥10	34 (30.1)
Mean (±SD)	8.61 (±1.78)
Min-max	6 – 14
Over time duty	
Yes	86 (72.6)
No	31 (27.4)
Provision of transport facility	
Yes	50 (44.2)
No	63 (55.8)

Among the respondents, 88.49% were involved in regular physical activities with 49% performed mild exercise only, 52.21% had the habit of smoking, 71.68% consume fruits regularly and 54.87% used to take additional salt with food. In regards to the body mass index (BMI) of the respondents, 67.27% were found within normal limit of BMI, more than half (51.32%) had waist-hip ratio between 0.70-0.80 cm, 77% had essential hypertension, 34.51% with Diabetes Mellitus and 65.49% had dyslipidemia (Table 3)

TABLE-III: Distribution of risk factors and comorbidities of ischemic heart diseases among **the respondents (n=113)**

Attributes	Frequency (%)
Physical activity	
Yes	100 (88.49)
No	13 (11.51)
Types of physical activity	
Mild exercise	49 (49.00)
Moderate exercise	46 (46.00)
Vigorous exercise	05 (5.0)
Smoking habit	
Yes	59 (52.21)
No	54 (47.79)
Types of smoke	
Smoke	50 (84.75)
Smokeless	02 (3.39)
Both	07 (11.86)
Fruit consumption	
Yes	81 (71.68)
No	32 (28.32)
Extra salt intake	
Yes	62 (54.87)
No	51 (45.13)

Attributes	Frequency (%)
BMI	
18.5-24.9	76 (67.26)
≥25	37 (32.74)
Waist-Hip Ratio in cm	
0.70-0.80	12 (10.62%)
.81-90	58 (51.32%)
0.91-1.45	43 (38.05%)
Essential hypertension	
Yes	87 (77.00)
No	26 (23.00)
Diabetes Mellitus	
Yes	39 (34.51)
No	74 (65.49)
Dyslipidemia	
Yes	74 (65.49)
No	39 (34.51)

In regards to the distribution of sub scale domain of effort-reward imbalance questionnaire, it was revealed that 28.32% had low effort, 54.87% had intermediate and 16.81% had high effort score. Similarly, 57.52%, 27.43% and 15.04% had low, intermediate and high reward score respectively. On the other hand, 7.96% had low overcommitment score which was followed by 62.83% intermediate and 29.21% high overcommitment score. Eighty eight percent had high effort-reward imbalance ratio score (Table 4).

TABLE-IV: Distribution of Effort-Reward Imbalance sub-scale items

Attributes	Frequency (f)	Percent (%)
Effort scale		
Low effort (≤16)	32	28.32
Intermediate effort (17-19)	62	54.87
High effort (>19)	19	16.81
Reward scale		
Low reward (≤23)	65	57.52
Intermediate reward (24-29)	31	27.43
High reward > 29)	17	15.04
Overcommitment scale		
Low (≤12)	9	7.96

Attributes	Frequency (f)	Percent (%)
Intermediate (13-16)	71	62.83
High (>16)	33	29.21
Effort-Reward Imbalance Ratio Score		
Low ERI Ratio (≤1)	13	11.50
High ERI Ratio (>1)	100	88.50

DISCUSSION

Recently Bangladesh is experiencing the transitional shift from the burden of communicable diseases to non-communicable diseases. Understanding the sociodemographic background of the patients suffering from IHD is essential when such patients had exposure to job-related stress. This condition, which straddles the domains of non-communicable diseases, is increasingly being recognized in various parts of the world. With this context, the study on job-related stress and ischemic heart diseases was one of the pioneer studies as no such study had been taken place in Bangladesh. In this hospital-based case-control study, several key demographics, pattern of job, exposure to job-related stress were explored. The study would provide immense chance of knowledge sharing among the policy maker and planners working in the field of non-communicable diseases. At the same time the study findings would help in preventing the development of IHD among the diverse group of employees in Bangladesh by implementing effective preventive measures.

Our study revealed that majority of the respondents were male (71.68%) which commensurate with the health seeking trend in our country. In one study on "Job stress and coronary heart disease: A case-control Study using a Chinese Population" it was found that 82.9% were male which is not similar to this study.[5] Few other studies conducted by Pais P *et al.*, (95% male),[9] Cretu A *et al.,* (85.2% male)[10], Heslop P *et al.,*(85.5% male)[11], Islam KN *et al.,* (73.3% male)[12] revealed almost similar findings but the study conducted by J. de Jong *et al.,* revealed that 70% were male and 29% were female in their study which is not similar to this study that may be due the study design and selection of sample size.

The study depicted that the mean age of the respondents was 49.12 ± 5.91 years which clearly indicates that the ischemic heart diseases were more marked in the 40-59 years age group in our country. Our findings were similar to the study conducted by Nyberg, A. *et al.,* but dissimilar to the findings of Weixian Xu *et al.*,[5] J. de Jong *et al.*,[13], Mirmohammadi SJ *et al.,*[14] which is may be due to geographical variation and selection of sample for the study.

Educational attainment revealed that highest (29.20%) respondents were SSC qualified which is in line with research suggesting a link between education and health literacy in IHD populations. Weixian Xu *et al.*,[5] reported that 44.5% of their respondents 10-12 years of education. Commensurate with our education system, it can be said that 10-12 years education is at per with the SSC which is similar to this study. Similar findings also noted from the study conducted by Lecca LI *et al*,[15], Li, J. *et al.*,[16], Aboa-Éboulé C *et al.*,[17]. But our study findings were not at per with the study conducted by Nyberg A *et al.,*[18] which may be due to the fact of local educational system and geographical variation. In spite of all dissimilarities, present data supports the national statistics, where literacy rate was shown as 72.8 %[19]. Assessment of household structure and socioeconomic status revealed that most participants (71.2%) lived in nuclear families and rest were joint family. Likewise, average income was 41882.30 ± 20928.30 Tk and minimum income was 9000 Tk and maximum income was 320000 Tk. This findings of minimum income of the respondents is not at per with the minimum wage of Bangladesh which is 8000.00 Tk.[20].

Difference of income in this study might be due to the recent changeover to a lower middle-income country from a lower income country and remarkable economic development of the country in the recent past. In one study conducted by Nyberg A *et al.,*[18] revealed in their study that the per year mean income of the respondents were 253.11 (±137.98) Swedish kronor. After conversion with US Doller, the average monthly income of the respondents was about US$165 (One Swedish kronor = 0.12 US$). In our study the average monthly income of the total participants was Tk. 38808± 26273.54 and after conversion with the US Doller it is about US$ 455 (One Taka = 84.79US$). This dissimilarity may be due to geographical, socioeconomic variation and study design. The study revealed that 60.6% of the respondents belonged to 2-4 family member group with an average was 4.51 ± 1.36. This findings of mean family member group are almost similar to finings of Bangladesh national sample statistics 2023where it was shown that the overall average size was 4.2. According to the place of residence, 51.3% of the respondents resided in urban area, 14.6% in rural area and 34.1% were in sub-urban area which is in line with the study findings conducted by Gupta R. *et al.*,**[21]** Furthermore, rural areas have indicated a lower prevalence of IHD compared to urban areas; however currently an increasing trend is seen among them as well. According to demographic profile, the percentage of urban population is 35.8.[22]

In regards to the job patterns of the respondents, type of organization served, 67.26% served in government organization, 28.32% and 4.42% served in autonomous and private organization respectively. This finding is not similar with the national findings where main service of the peoples of Bangladesh is agriculture (37.82%) followed by clerical and government executive (14.31%), service worker (9.95%) and administrative job (8.57%).[23] This dissimilarity may be due to the selection of sample for the study whom were usually from serving individual from various organizations. A study conducted by Bhagyalakshmi M *et al.*, 2016 revealed that 44% of the respondents were unemployed, private job 15%, government service 13%, labor 21% and business were only 7%.[24] This dissimilarity may be due to geographical variation and selection of sample for the study.

In regards to the nature of employment, 71.2% were in permanent job, 28.8% were in temporary job which is consistent with the findings of De Jonge J *et al.*,[13]. For job position, 33.62% were third class employees which was followed by equal 21.24% second and fourth class. It is evident from the study that among the respondents almost half of the respondents were from military background whose rank structure is as per with the third- and fourth-class employee of the government of Bangladesh. That is why in our study the third- and fourth-class employee was more. At the same time, it was considered previously that IHD is a disease of affluent society but with the advancement of education system as well as increased awareness and availability of appropriate treatment, the IHD incidence in affluent society decreased considerably. A study on "Managerial leadership and ischemic heart disease among employees: the Swedish WOLF study" revealed that 23.3% of the respondents were from higher manager, 26.8% were from lower manager, 18.3% from skilled manual worker and 22.9% were unskilled manual worker. This finding is not consistent with our study which may be due to geographical variation and selection of sample for the study. According to the total length of service, 62.4% were found their service length between 16-25 years with mean was 19.88 ± 6.54 years. It is observed that majority of the respondents developed IHD after having a

considerable length of service as evident from the mean length of service and this finding is in line with the findings of several international studies.[5,13,15,16]

In our study 60.6% respondents worked between 8-10 hours in a day with a mean was 8.97 ± 1.87 hours. As per the government rule of Bangladesh as well as International Labor Organization rule, on an average usual working hour is 8 hours in a day which is similar to this study. similar findings also revealed from several studies conducted by Li J *et al.*,[16] Lecca LI *et al.*,[15], Wang Z *et al.*,[25]

Among the respondents, 72.57% performed over time duty which was not consistent with the findings of the study conducted by Shiozaki M *et al.*, [26]. It may be due to the selection of sample for the study and organizational and administrative pattern of the country.

In regards to the job-related stress, 28.32% had low effort, 54.87% had intermediate effort and 16.81% had high effort. This finding is consistent with the study conducted by Chor D *et al.*,[27] and Li J *et al.*,[16] but dissimilar to the findings of Xu W *et al.*,[28]

At the same time, 57.52% had low reward, 27.43% had intermediate reward and 15.04% had high reward which is dissimilar to the findings of Xu W *et al.*,[28], Chor D *et al.*, [27] and Li J *et al.,*[16]

In regards to the overcommitment score, 7.96% had low overcommitment, 62.83% had intermediate overcommitment and 29.21% had high overcommitment. Our findings were dissimilar to the studies conducted by Xu W *et al.*, [28] Chor D *et al.*,[27] Li J *et al.*,[16]

In regards to the Effort-reward imbalance ratio score, 11.50% had low effort-reward ratio and 88.50% had high effort-reward ratio. Our finding was similar to the findings of Li J *et al.*, 2005 but dissimilar to the study conducted Xu W *et al.*, 2010) which may be due to geographical variation, pattern of job among the respondents and selection of sample for the study.

CONCLUSION

Ischemic heart diseases are the number one causes of death globally and with the development of economic globalization and rising competition, job stress has attracted increasing public concern in both the developed and developing countries. Job-related stress is recognized as an important challenge for the employees at various level and its association is widely studied in the developed world but no such information is available in the Bangladesh context. Present study assessed the sociodemographic characteristics of the IHD patients to elicit the job-related stress by applying ERI questionnaire. The sociodemographic attributes typically represent basic characteristics of armed forces personnel in Bangladesh with almost equal number of high effort and reward score as well as high ERI ratio.

Conflict of Interest

The authors declare no conflict of interest.

Acknowledgement

The authors would like to forward special thanks to Professor (Dr.) Md Ziaul Islam, PhD, Director, National Institute of Preventive and Social Medicine and Head of the department of Community Medicine, NIPSOM for his sincere guidance. We thank the Head of the Department of Cardiology department of CMH Dhaka and all the in charges who support and help during data collection. Finally, we thank all the respondents who kindly contributed to this study.

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