Original Research Article

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Psychosocial Stress and Its Role in Cardiovascular Disease Risk: A Cross-Sectional Study Among Working Adults

Arpita Howlader Tisa[1], Mustafizur Rahman Mahmud[2], Riyadh Morshed[3], Israt Jahan Retina[4], Farhana Ferdaus[5]*

[1] MPH Student, Premier University, Chittagong
[2] Major at Bangladesh Army, Field Ambulance, Ramu Cantonment, Coxs bazar
[3] Major at Bangladesh Army, Surgical Trainee, CMH Dhaka
[4] Department of Surgery, Army Medical College Bogura
[5] Department of Community Medicine and Public Health, Khulna City Medical College

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ABSTRACT: *Background:* Cardiovascular diseases (CVD) are a leading cause of morbidity and mortality worldwide, and psychosocial stress has emerged as a significant risk factor. In Bangladesh, where many women are employed in the garment sector, understanding the impact of psychosocial stress on CVD risk is crucial for improving public health outcomes. *Objective:* This study aims to assess the relationship between physical and mental stress and cardiovascular disease risk factors among female workers in garment factories in Gazipur, Bangladesh. Methods: A cross-sectional study was conducted from June to December 2024, involving 110 female garment workers aged 30 years and above. Data were collected using structured questionnaires assessing sociodemographic characteristics, cardiovascular risk factors, and levels of physical and mental stress. The association between stress levels and CVD risk factors, including hypertension, diabetes, obesity, and dyslipidemia, was analyzed using statistical methods such as chi-square tests and p-values. *Results:* The study found a high prevalence of CVD risk factors among the participants. Unhealthy nutrition (50%), sedentary lifestyle (59.09%), and dyslipidemia (34.55%) were the most common. Stress, both physical and mental, was significantly associated with an increased prevalence of hypertension, diabetes, and obesity. High physical stress was linked to 50% of participants having hypertension and 37.5% having diabetes, while high mental stress was associated with hypertension (33.33%) and diabetes (33.33%). Additionally, a family history of hypertension and diabetes was found to exacerbate these conditions. *Conclusion:* Psychosocial stress, along with poor lifestyle factors such as physical inactivity and unhealthy eating habits, significantly contributes to cardiovascular disease risk among female garment workers. Addressing these modifiable factors through targeted interventions is essential for reducing the burden of cardiovascular diseases in this population.

Keywords: Cardiovascular Disease, Psychosocial Stress, Female Workers, Hypertension.

INTRODUCTION

Cardiovascular diseases (CVDs) are the leading cause of premature death globally, particularly coronary heart diseases (CHD), which account for a substantial portion of these deaths. In 2008, approximately 17.3 million people died from CVDs, representing 30% of all global deaths. This number is projected to increase, with an estimated 23.6 million deaths from CVD, primarily from heart disease and stroke, by 2030 [1, 2]. Along with this rise in mortality, disability-adjusted life years (DALYs) due to CVDs are expected to grow significantly, making CVDs a major contributor to productivity loss worldwide. The burden of

cardiovascular diseases, therefore, presents a critical challenge to global public health [3, 4]. The etiology of CVD is multifactorial, involving a combination of genetic, biological, and psychosocial factors. It is well-established that work-related psychosocial stress plays a significant role in the development of cardiovascular disease, contributing to elevated blood pressure and other risk factors. Epidemiological data consistently highlight that exposure to work-related stress is an independent and significant predictor of heart disease. Additionally, psychosocial stress may have different effects depending on the occupation, with varying levels of stress experienced in different work environments, such as between blue-collar and white-collar workers [5, 6]. Long-term and chronic exposure to stress has been consistently linked to increased cardiovascular morbidity and mortality. Studies show a dose-response relationship between the frequency of stress and the severity of cardiovascular outcomes [7, 8]. Acute stress, while transient, can also contribute to cardiovascular events, particularly in individuals who already have advanced atherosclerosis [9]. For individuals with coronary heart disease, short-term psychological stress can induce myocardial ischemia, and long-term stress at the workplace has been shown to increase the risk of recurrent cardiovascular events. The ongoing experience of stress, especially in work environments, exacerbates the risk of cardiovascular diseases, making stress a critical factor in the prevention and management of CVDs [10-12]. Given the growing burden of cardiovascular diseases and the role of psychosocial stress as a key risk factor, it is crucial to understand the specific impact of work-related stress on cardiovascular health, particularly among vulnerable populations such as female workers in industrial settings [13,14]. This study focuses on the psychosocial stress experienced by female workers in the garment industry, examining its association with cardiovascular risk factors, to contribute to a better understanding of how work-related stress impacts cardiovascular health.

MATERIALS AND METHODS

This study employs a cross-sectional design to assess the relationship between psychosocial stress and cardiovascular disease risk among working adults. The research is conducted in two garment factories in Gazipur City, Bangladesh, from June to December 2024. The participants are 110 female workers aged 40 years and above, selected based on inclusion criteria focusing on their age and employment status in the garment sector. Data is collected through a structured questionnaire that is designed to capture key variables associated with psychosocial stress and cardiovascular health. The questionnaire is divided into several sections, including sociodemographic information, workplace stressors, and health-related behavior. It also includes standardized tools to assess psychosocial stress and cardiovascular risk factors. To measure psychosocial stress, the Perceived Stress Scale (PSS-10) is used, which is a widely validated tool for assessing the level of stress perceived by individuals in various situations. Additionally, to evaluate cardiovascular disease risk, blood pressure measurements, body mass index (BMI), and cholesterol levels are recorded using standard medical equipment. Before data collection, informed consent is obtained from all participants. Each participant is thoroughly briefed about the purpose of the study, the voluntary nature of participation, and the confidentiality of their responses. Participants are assured that their identities will remain anonymous and that their data will only be used for the study. Consent forms are signed by each participant, indicating their understanding and agreement to participate in the study. Ethical approval for the study is obtained from the relevant ethical review board. All procedures are carried out by ethical guidelines to ensure the safety, privacy, and well-being of the participants.

RESULT

Table 1: Sociodemographic Characteristics of Participants

Variable	Category	Frequency (n)	Percentage (%)
Age	30-34	34	30.91%
	35-39	28	25.45%
	40-44	22	20.00%
	45-49	26	23.64%

Education	Secondary	45	40.91%
	SSC	32	29.09%
	HSC	18	16.36%
	Graduation	15	13.64%
Economy	Lower	20	18.18%
	Lower Middle	45	40.91%
	Middle	45	40.91%
BMI	Underweight	14	12.73%
	Normal	48	43.64%
	Overweight	32	29.09%
	Obese	16	14.55%
History of Hypertension	Own	24	21.82%
	Family	35	31.82%
History of Diabetes Mellitus	Own	18	16.36%
	Family	42	38.18%

Table 1 presents the sociodemographic characteristics of the study participants. The majority are aged 30-34 years (30.91%), with a significant portion having secondary education (40.91%). Most participants come from lower-middle-class households (40.91%). Over 40% have a normal BMI, while 29.09% are overweight. A notable number have a family history of hypertension and diabetes.

Table 2: Cardiovascular Risk Factors Among Participants

Risk Factor	Frequency (n)	Percentage (%)
Unhealthy Nutrition	55	50.00%
Sedentary Lifestyle	65	59.09%
Dyslipidemia	38	34.55%
Hyperglycemia	22	20.00%
High Blood Pressure	24	21.82%
Obesity	16	14.55%
Tobacco Use	12	10.91%
Kidney Dysfunction	7	6.36%
Genetic Factors/Familial Hypercholesterolemia	10	9.09%

Table 2 outlines the key cardiovascular risk factors among the participants. The majority exhibit unhealthy eating habits (50%), physical inactivity (59.09%), and dyslipidemia (34.55%). Hypertension is prevalent in 21.82%, and 14.55% are obese.

Table 3: Distribution of Physical and Mental Stress and Their Association with CVD Risk Factors

Stress Type	Hypertension (Yes)	Diabetes Mellitus (Yes)	High Cholesterol (Yes)	Obesity (Yes)	Physical Inactivity (Yes)	P-value
Physical Stress						
Low Physical Stress	6 (25%)	3 (12.5%)	4 (16.67%)	1 (4.17%)	4 (16.67%)	0.01
Moderate Physical Stress	12 (50%)	9 (37.5%)	10 (41.67%)	7 (29.17%)	12 (50%)	0.03

High Physical Stress	6 (25%)	6 (25%)	8 (33.33%)	8 (33.33%)	8 (33.33%)	0.02
Mental Stress						
Low Mental Stress	7 (29.17%)	4 (16.67%)	5 (20.83%)	3 (12.5%)	5 (20.83%)	0.02
Moderate Mental Stress	9 (37.5%)	7 (29.17%)	9 (37.5%)	5 (20.83%)	11 (45.83%)	0.04
High Mental Stress	8 (33.33%)	8 (33.33%)	7 (29.17%)	10 (41.67%)	5 (20.83%)	0.01
Sleep Quality						
Good Sleep	16 (66.67%)	10 (41.67%)	14 (58.33%)	7 (29.17%)	12 (50%)	0.03
Poor Sleep	8 (33.33%)	14 (58.33%)	10 (41.67%)	17 (70.83%)	8 (33.33%)	0.01

Table 3 illustrates the relationship between physical and mental stress levels and various cardiovascular risk factors such as hypertension, diabetes mellitus, high cholesterol, obesity, and physical inactivity. It highlights the association between high stress (both physical and mental) and an increased prevalence of cardiovascular risk factors, demonstrating that participants reporting higher stress levels are more likely to have conditions like hypertension, diabetes, and obesity. Statistical analysis (P-value) indicates significant associations (with p-values <0.05), suggesting that both physical and mental stress are strong determinants of cardiovascular health.

Table 4: Lifestyle Factors Impacting Cardiovascular Risk

Lifestyle Factor	Category	Frequency (n)	Percentage (%)
Exercise Frequency	Never	65	59.09%
	Occasional	25	22.73%
	Regular	20	18.18%
Food Habits	Unhealthy (Junk Food, Fried)	55	50.00%
	Balanced (Vegetables, Fruits)	45	40.91%
	Poor (Few Healthy Foods)	10	9.09%
Tobacco Usage	Non-smoker	98	89.09%
	Smoker	12	10.91%
Alcohol Usage	Non-drinker	110	100%

Table 4 shows the lifestyle factors that influence cardiovascular risk. Most participants are physically inactive (59.09%) and report poor eating habits (50%). Tobacco use is relatively low, with only 10.91% of participants being smokers. Alcohol consumption is not a significant issue in this sample, as all participants report being non-drinkers.

Table 5: Distribution of CVD Risk Factors Based on Family History

Family History of CVD Risk	Hypertension (Yes)	Diabetes Mellitus (Yes)	High Cholesterol (Yes)	Obesity (Yes)	Kidney Dysfunction (Yes)	P-value
Hypertension	15 (62.50%)	12 (50.00%)	18 (75.00%)	8 (33.33%)	5 (20.83%)	0.04
Diabetes Mellitus	12 (42.86%)	18 (64.29%)	14 (50.00%)	10 (35.71%)	2 (7.14%)	0.05

Table 6 reflects the distribution of cardiovascular risk factors based on a family history of certain conditions. Participants with a family history of hypertension are more likely to have high cholesterol, while those with a family

history of diabetes are significantly more likely to have diabetes themselves.

DISCUSSION

The study aimed to assess the relationship between psychosocial stress and cardiovascular disease (CVD) risk factors among female garment workers in Gazipur, Bangladesh. The sociodemographic characteristics of the participants revealed that most were aged between 30-34 years (30.91%) and had secondary education (40.91%). A significant number of participants came from lower-middle-class households (40.91%). Regarding body mass index (BMI), 43.64% were normal weight, and 29.09% were overweight, indicating a moderate prevalence of obesity in this population. Cardiovascular risk factors were prevalent among the participants, with unhealthy nutrition (50%) and physical inactivity (59.09%) being the most common. Dyslipidemia was present in 34.55%, while 21.82% had high blood pressure and 14.55% were obese. These results are consistent with previous studies, which have shown a high prevalence of physical inactivity and poor dietary habits among working populations, contributing to cardiovascular risk [15-17]. The relationship between stress and CVD risk factors was significant. Participants reporting high physical stress had higher rates of hypertension (50%), diabetes (37.5%), and obesity (33.33%). Similarly, high mental stress was associated with hypertension (33.33%), diabetes (33.33%), and high cholesterol (29.17%). These findings support the growing evidence that both physical and mental stress are strong contributors to cardiovascular health [18-21]. A family history of hypertension and diabetes also influenced the prevalence of these conditions, with those having a family history being more likely to report hypertension (62.5%) and diabetes (64.29%). This aligns with findings from studies indicating that genetic factors play a significant role in CVD risk [22-33].

CONCLUSION

This study highlights the significant impact of psychosocial stress, physical inactivity, and poor dietary habits on cardiovascular disease risk among female garment workers in Gazipur, Bangladesh. Interventions focusing on stress reduction, promoting physical activity, and improving nutrition are essential to mitigate cardiovascular

risks in this vulnerable population. Further research and public health efforts are needed to address these modifiable risk factors.

REFERENCES

1. Steptoe A, Kivima¨ki M. Stress and cardiovascular disease. Nat Rev Cardiol 2012;9:360Y70.
2. Yusuf S, Hawken S, Ounpuu S, Dans T, Avezum A, Lanas F, McQueen M, Budaj A, Pais P, Varigos J, Lisheng L. INTERHEART Study Investigators. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. Lancet 2004;364:937Y52.
3. Brotman DJ, Golden SH, Wittstein IS. The cardiovascular toll of stress. Lancet 2007;370:1089Y100.
4. Hamer M, Kivima¨ki M, Stamatakis E, Batty GD. Psychological distress as a risk factor for cerebrovascular disease mortality: a population study in 68,652 adults. CMAJ 2012;184:1461Y6.
5. Chida Y, Steptoe A. Greater cardiovascular responses to laboratory mental stress are associated with poor subsequent cardiovascular risk status: a meta-analysis of prospective evidence. Hypertension 2010;55:1026Y32
6. Chida Y, Hamer M. Chronic psychosocial factors and acute physiological responses to laboratory-induced stress in healthy populations: a quantitative review of 30 years of investigations. Psychol Bull 2008;134:829Y85.
7. Hamer M, Chida Y. Walking and primary prevention: a meta-analysis of prospective cohort studies. Br J Sports Med 2008;42:238Y43.
8. Sattelmair J, Pertman J, Ding EL, Kohl HW 3rd, Haskell W, Lee IM. Dose response between physical activity and risk of coronary heart disease: a meta-analysis. Circulation 2011;124:789Y95.
9. Hamer M, Molloy GJ, Stamatakis E. Psychological distress as a risk factor for CVD events: pathophysiological and behavioural mechanisms. J Am Coll Cardiol 2008;52:2156Y62.

10. Whooley MA, de Jonge P, Vittinghoff E, Otte C, Moos R, Carney RM. Depressive symptoms, health behaviours, and risk of cardiovascular events in patients with coronary heart disease. JAMA 2008;300:2379Y88.

11. Hamer M, Bates CJ, Mishra GD. Depression, physical function, and risk of mortality: National Diet and Nutrition Survey in adults older than 65 years. Am J Geriatr Psychiatry 2011;19:72Y8.

12. Win S, Parakh K, Eze-Nliam CM, Gottdiener JS, Kop WJ, Ziegelstein RC. Depressive symptoms, physical inactivity and risk of cardiovascular mortality in older adults: the Cardiovascular Health Study. Heart 2011;97:500Y5.

13. Janney CA, Richardson CR, Holleman RG, Glasheen C, Strath SJ, Conroy MB, Kriska AM. Gender, mental health service use and objectively measured physical activity: data from the National Health and Nutrition Examination Survey (NHANES 2003Y2004). Ment Health Phys Act 2008;1:9Y16.

14. Hamer M, Stamatakis E. Objectively assessed physical activity, fitness and subjective wellbeing. Ment Health Phys Act 2010;3:67Y71.

15. Poole L, Steptoe A, Wawrzyniak AJ, Bostock S, Mitchell ES, Hamer M. Associations of objectively measured physical activity with daily mood ratings and psychophysiological stress responses in women. Psychophysiology 2011;48:1165Y72.

16. Crews DJ, Landers DM. A meta-analytic review of aerobic fitness and reactivity to psychosocial stressors. Med Sci Sports Exerc 1987;19:S114Y20.

17. Forcier K, Stroud LR, Papandonatos GD, Hitsman B, Reiches M, Krishnamoorthy J, Niaura R. Links between physical fitness and cardiovascular reactivity and recovery to psychological stressors: a meta-analysis. Health Psychol 2006;25:723Y39.

18. Sothmann MS, Buckworth J, Claytor RP, Cox RH, White-Welkley JE, Dishman RK. Exercise training and the cross-stressor adaptation hypothesis. Exerc Sport Sci Rev 1996;24:267Y87.

19. Dishman RK, Jackson EM. Cardiorespiratory fitness and laboratory stress: a meta-regression analysis. Psychophysiol 2006;43:57Y72.

20. Hamer M, Taylor A, Steptoe A. The effect of acute aerobic exercise on stress-related blood pressure responses: a systematic review and meta-analysis. Biol Psychol 2006;71:183Y90.

21. Ferdaus F, Zahan R, Rahman MA, Chowdhury S. A study on health related risk factors and health seeking behavior among elderly population in rural Bangladesh. Mediscope. 2020 Sep 29;7(2):75–81.

22. Hasan, H., Rahman, M. H. ., Haque, M. A., Rahman, M. S. ., Ali, M. S. ., & Sultana, S. . (2024). Nutritional Management in Patients with Chronic Kidney Disease: A Focus on Renal Diet. Asia Pacific Journal of Medical Innovations, 1(1), 34-40.

23. Chowdhury NR, Moname EJ, Al Azad G, Hani U, Nazmin F, Ferdaus F. Interplay Between Malnutrition and Infectious Diseases Insights from a Cross-Sectional Study in Bangladesh. Asia Pacific Journal of Medical Innovations. 2024;1(2):41-7.

24. Azad GA, Moname EJ, Chowdhury NR, Mondal S, Tisa AH, Ferdaus F. Co-Morbidity Landscape in Cancer Patients: Non-Communicable Disease Burden and Trends. Asia Pacific Journal of Medical Innovations. 2024;1(2):48-54.

25. Nazmin F, Roy A, Bushra T, Retina IJ, Arnab KH, Ferdaus F. Exploring the Prevalence and Social Determinants of ADHD and Comorbidities Among Urban School Aged Children in Bangladesh. Asia Pacific Journal of Medical Innovations. 2024;1(2):61-74.

26. Wohid F, Eme FW, Fahim IH, Mim M, Ferdaus F. Work Life Balance and Its Influence on Physical and Mental Health Among Female Teachers of Public University in Bangladesh. Asia Pacific Journal of Medical Innovations. 2024;1(2):68-75.

27. Mondal S, Arnab KH, Retina IJ, Bushra T, Roy A, Tisa AH, Ferdaus F. Mental Health Status and Stress Factors Among Junior Doctors in Public Hospitals in Bangladesh A Cross Sectional Analysis. Asia Pacific Journal of Surgical Advances. 2024;1(2):39-43.

28. Bushra T, Mondal S, Nazmin F, Arnab KH, Tisa AH, Roy A, Ferdaus F. Burden of Peptic Ulcer Disease Among Smoking and Non-Smoking Healthcare Providers A Comparative Cross-Sectional Study in Gazipur, Dhaka. Asia Pacific Journal of Surgical Advances. 2024;1(2):44-50.

29. Rima US, Islam J, Mim SI, Roy A, Dutta T, Dutta B, Ferdaus FF. Co-Infection of Tuberculosis and

Diabetes: Implications for Treatment and Management. Asia Pacific Journal of Surgical Advances. 2024;1(2):51-8.

30. Arnab KH, Nazmin F, Mondal S, Tisa AH, Bushra T. Perceptions and Barriers to Breast Cancer Screening Among Women in Slum Areas: A Cross-Sectional Study. Asia Pacific Journal of Surgical Advances. 2024;1(2):59-65.

31. Karmakar S, Brinta MT. Assessing the Impact of Chronic Hypertension on Renal Function: A Cross-Sectional Study. Asia Pacific Journal of Surgical Advances. 2024;1(2):66-71.

32. Dutta B, Dutta T, Rima US, Islam J, Roy A, Mim SI, Ferdaus F. Burden of Antibiotic-Resistant Urinary Tract Infections in Rural Females: Insights from a Cross-Sectional Study in Bangladesh. Asia Pacific Journal of Surgical Advances. 2024;1(2):72-9.

33. Wohid F, Eme FW, Fahim IH, Mim M, Sultana T, Ferdaus F. Assessment of Nutrition Knowledge and Dietary Practices Among Non-Medical Students: A Cross-Sectional Study. Asia Pacific Journal of Surgical Advances. 2024;1(2):80-6.