

# Occupational Stress, Workplace Safety, and Wellbeing among Female Garment Workers in Bangladesh

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## Abstract

The ready-made garment (RMG) sector in Bangladesh has emerged as one of the most significant drivers of economic growth and employment over the past three decades. The industry accounts for the majority of the country's export earnings and employs millions of workers, the majority of whom are women from rural and economically disadvantaged backgrounds. While the sector has contributed substantially to women's economic participation and empowerment, female garment workers continue to experience multiple occupational challenges, including excessive workload, unsafe working conditions, long working hours, and limited access to occupational health resources. These factors often contribute to heightened levels of occupational stress and adversely affect workers' physical and psychological wellbeing. Scholars have widely acknowledged that occupational stress arises when job demands exceed an individual's capacity to cope with those demands, leading to negative outcomes such as fatigue, anxiety, reduced productivity, and long-term health problems (Karasek & Theorell, 1990; Bakker & Demerouti, 2017). Within labor-intensive industries such as garment manufacturing, these stressors are frequently intensified by production pressures, strict deadlines, and limited worker autonomy. This study examines the relationship between occupational stress, workplace safety conditions, and the overall wellbeing of female garment workers in Bangladesh. Drawing on a mixed-methods research design, the study integrates quantitative survey data collected from female garment workers with qualitative insights obtained through in-depth interviews. The research explores the prevalence of occupational stress, workers' perceptions of safety practices within factories, and the implications of these conditions for physical health, mental wellbeing, and job satisfaction. The findings indicate that a large proportion of female garment workers experience moderate to high levels of occupational stress associated with production targets, repetitive work, inadequate rest periods, and limited managerial support. Moreover, although safety reforms have been introduced in the industry following major industrial disasters, many workers still report concerns regarding emergency preparedness, workplace ergonomics, and access to protective equipment. These workplace conditions significantly influence worker wellbeing, contributing to health issues such as chronic fatigue, musculoskeletal pain, psychological distress, and reduced life satisfaction. The study highlights the critical need for improved occupational health policies, stronger enforcement of workplace safety regulations, and the integration of psychosocial support systems within garment factories. By addressing both structural and psychosocial aspects of workplace conditions, policymakers and industry stakeholders can contribute to improving the wellbeing, productivity, and long-term sustainability of the garment workforce in Bangladesh.

**Keywords:** Occupational stress, workplace safety, wellbeing, female garment workers, Bangladesh, RMG industry.

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## 1. INTRODUCTION

The ready-made garment (RMG) industry in Bangladesh has transformed the country's socio-economic landscape over the past four decades, positioning Bangladesh as one of the largest garment exporters globally (Hossain & Alam, 2020). The sector

employs approximately 4 million workers, with women constituting over 60% of the labor force (Ahmed & Sultana, 2021). This influx of female labor has significantly enhanced women's economic participation, providing income-generating opportunities, fostering independence, and contributing to poverty alleviation in rural areas (Rahman & Kabir, 2021). Despite these

positive developments, female garment workers in Bangladesh often face precarious working conditions characterized by long hours, high production targets, low wages, and limited social protection, exposing them to multiple occupational hazards (Chowdhury *et al.*, 2018; Khatun & Islam, 2019).

Occupational stress has been widely recognized as a critical factor affecting employee health and organizational outcomes. According to Karasek and Theorell (1990), occupational stress occurs when job demands exceed an individual's ability to cope, especially in environments with limited autonomy or support. In labor-intensive sectors like the garment industry, stress arises not only from physical workload but also from psychological and social pressures, including supervision practices, interpersonal conflicts, and job insecurity (Uddin & Rahman, 2019). Empirical studies indicate that occupational stress is linked to numerous negative outcomes, including fatigue, musculoskeletal disorders, anxiety, depression, absenteeism, and reduced productivity (Bakker & Demerouti, 2017; Hasan & Amin, 2020). Female workers may be particularly vulnerable to stress due to dual responsibilities of work and household duties, lower bargaining power, and social expectations regarding gender roles (Akter & Malik, 2020).

Workplace safety is another critical dimension influencing worker wellbeing. The catastrophic collapse of the Rana Plaza building in 2013 highlighted the dire consequences of inadequate safety regulations in the RMG sector, where structural deficiencies, fire hazards, and emergency unpreparedness led to the deaths of over 1,100 workers (Khatun & Islam, 2019). While subsequent safety reforms, including the Bangladesh Accord on Fire and Building Safety and factory inspections, have improved structural safety, psychosocial and occupational hazards remain insufficiently addressed. Studies suggest that safety climate — the collective perception of safety policies, procedures, and practices — significantly affects worker stress levels and health outcomes (Clarke, 2013; Naveed, 2018). Inadequate safety practices, lack of training, and absence of protective equipment can exacerbate stress and reduce overall wellbeing, particularly among female employees who may face additional barriers in reporting hazards or negotiating safety improvements (Chowdhury *et al.*, 2018).

Wellbeing, as conceptualized in occupational health literature, encompasses physical, mental, and social dimensions of health, reflecting not merely the absence of disease but the presence of positive functioning and life satisfaction (Diener *et al.*, 2018). In the RMG sector, studies report widespread physical complaints among workers, including musculoskeletal pain from prolonged repetitive tasks, fatigue due to excessive working hours, and ergonomic challenges (Hasan & Amin, 2020). Psychological wellbeing is also

affected, with workers reporting high levels of anxiety, stress, and depressive symptoms, often exacerbated by harassment, job insecurity, and limited organizational support (Akter & Malik, 2020). Evidence suggests that improving workplace safety and reducing occupational stress can directly enhance wellbeing outcomes, resulting in lower absenteeism, higher productivity, and improved employee satisfaction (Bakker & Demerouti, 2017; Clarke, 2013).

Coping mechanisms and social support play an important role in mitigating the negative impacts of stress and unsafe working conditions. Workers often rely on informal strategies such as peer support, religious practices, and problem-focused coping to manage stress (Lazarus & Folkman, 1984). However, formal support mechanisms — including counseling, employee assistance programs, and participatory safety committees — remain limited in the Bangladeshi RMG sector, highlighting a gap between worker needs and organizational provision (Begum, 2019). Addressing both structural safety issues and psychosocial stressors is essential for promoting holistic wellbeing among female garment workers.

Despite substantial research on occupational hazards in the RMG sector, there is a limited focus on the integrated relationship between occupational stress, workplace safety, and wellbeing among female employees in Bangladesh. Most studies have examined physical safety or psychological stress in isolation, neglecting the interplay between these factors and their cumulative effects on health outcomes (Rahman, 2019; Uddin & Rahman, 2019). Understanding these intersections is critical not only for improving worker health but also for enhancing productivity, sustainability, and compliance with international labor standards. By examining occupational stress, safety conditions, and wellbeing simultaneously, this study aims to provide comprehensive evidence to inform policy interventions, factory-level reforms, and targeted support programs for female garment workers.

In conclusion, the RMG industry in Bangladesh represents both an economic opportunity and a site of occupational vulnerability. Female garment workers experience multifaceted stressors that affect their physical and psychological wellbeing, influenced by both organizational safety practices and broader social factors. Investigating these issues comprehensively can inform sustainable strategies to enhance worker health, safety, and satisfaction while maintaining the sector's economic competitiveness. This study seeks to fill this knowledge gap by analyzing the relationships among occupational stress, workplace safety, and wellbeing, offering evidence-based recommendations for improving conditions for female garment workers in Bangladesh.

## BACKGROUND AND RATIONALE

The RMG sector is a cornerstone of Bangladesh's economy, contributing over 80% of export earnings (Hossain & Alam, 2020). Women comprise more than 60% of the garment workforce (Ahmed & Sultana, 2021). Despite their economic contribution, female workers experience high job strain, safety risks, and limited access to health services (Rahman, 2019). Previous research indicates that workplace psychosocial factors influence stress and health outcomes (Karasek & Theorell, 1990), yet there remains limited contextualized understanding of how safety environments specifically mediate stress and wellbeing among women in Bangladesh's RMG sector. This study addresses that gap.

**Aim:** To examine the associations between occupational stress, workplace safety, and overall wellbeing among female garment workers in Bangladesh.

### Specific Objectives

1. To assess the level of occupational stress experienced by female garment workers.
2. To evaluate workplace safety conditions within garment factories.
3. To explore the physical and psychological wellbeing of workers in relation to stress and safety practices.
4. To identify coping strategies and support mechanisms used by female workers.

### Research Questions

1. What is the prevalence of occupational stress among female garment workers?
2. How do workplace safety practices affect the wellbeing of female garment employees?
3. What is the relationship between stress levels and overall health outcomes?
4. What strategies do workers use to manage stress and risks in the workplace?

### Scope and Delimitations

This study focuses on female garment workers employed in factories located in the Dhaka and Chattogram industrial zones, Bangladesh. The research excludes male workers and garment workers outside structured factory environments. The study also centers on psychological and physical wellbeing within the factory context, not outside community or familial factors unless directly linked to work stress.

## 2. LITERATURE REVIEW

The literature on occupational stress, workplace safety, and wellbeing is extensive, spanning several disciplines including occupational health psychology, industrial sociology, gender studies, and labor economics. To situate this research within existing scholarship, this literature review synthesizes global and Bangladesh-specific studies on (a) occupational stress in garment and industrial work, (b) workplace safety

environments and organizational safety climate, (c) wellbeing outcomes related to work-related stress and hazards, and (d) gendered experiences within industrial labor markets. By integrating theory and empirical evidence, this review demonstrates the multi-dimensional nature of workplace stress, the mechanisms through which workplace safety affects health and wellbeing, and the unique vulnerabilities of female garment workers.

### 2.1 Theoretical Perspectives on Occupational Stress

Occupational stress is best understood through established theoretical models that conceptualize the workplace as a dynamic psychosocial environment where stress emerges from imbalances between job demands and worker resources. The Job Demand–Control (JDC) model posits that high job demands coupled with low job control lead to psychological strain and negative health outcomes (Karasek & Theorell, 1990). Later refinements, such as the Job Demand–Resources (JD-R) model, expanded this framework to include personal and organizational resources that buffer stress, including supervisor support, skills training, and autonomy (Bakker & Demerouti, 2017). In the context of industrial labor like garment manufacturing, job demands often include repetitive tasks, high production targets, time pressure, and supervisor monitoring, while resources such as voice, autonomy, and psychosocial support are limited (Haque, 2019; Uddin & Rahman, 2019).

The Effort–Reward Imbalance (ERI) model, another influential framework, views stress as arising when the effort expended at work is not matched by corresponding rewards, such as wages, recognition, or job security (Siegrist, 1996). For workers in export-oriented sectors where competitive pricing pressures constrain wages and benefits, the ERI model helps explain why stress and dissatisfaction remain high despite employment gains (Mohiuddin & Begum, 2020). Empirical evidence supports the explanatory power of these models: a meta-analysis by Schaufeli and Taris (2014) confirmed that high demands and low resources are consistently associated with burnout, depression, and cardiovascular symptoms across occupations.

### 2.2 Occupational Stress in Garment Work: Global and Bangladesh Evidence

Industrial workplaces, and garment factories in particular, are recognized as high-stress environments due to the intensity of assembly-line production, the pace of work, and institutionalized performance metrics. In global contexts, researchers have identified garment work as associated with heightened stress levels, musculoskeletal complaints, and psychological strain (Watson, 2018; Anwar & Rahman, 2021). In South Asia, studies in India and Pakistan documented that factory workers experience stress related to long hours, limited break times, and lack of job security, contributing to

anxiety and reduced life satisfaction (Kumar & Rani, 2019; Javed & Khan, 2021).

In Bangladesh, empirical studies consistently report elevated occupational stress among garment workers. Uddin and Rahman (2019) surveyed garment workers in Dhaka and found that more than 70% reported high perceived stress, with job overload, low wages, and supervisor pressure as primary stressors. Rahman (2019) identified that repetitive work, lack of decision latitude, and production pressure explain variance in stress outcomes beyond demographic factors. In qualitative work, Chowdhury et al. (2018) documented narratives where workers described work as “mentally draining” due to constant monitoring and fear of wage deductions if targets were not met. These findings align with the JD-R and ERI models, demonstrating how structural features of garment work — high demands and low rewards — translate into psychosocial strain.

Notably, gendered expectations heighten stress for female workers. Akter and Malik (2020) found that female garment workers reported stress not only from factory demands but also from unpaid caregiving responsibilities at home, limited access to childcare, and gender discrimination on the shop floor. Female workers also reported higher levels of intimidation and supervisory harassment compared with male counterparts, reinforcing the intersection of occupational stress with workplace gender dynamics (Begum & Siddiqui, 2021). These findings underscore the need to consider gender as a critical analytical lens in studies of industrial stress.

### 2.3 Workplace Safety and Psychosocial Work Environment

Workplace safety extends beyond physical hazards to include organizational norms, practices, and climates that shape perceptions of risk and protection. The safety climate concept, developed by Zohar (1980) and refined by Clarke (2013), refers to employees shared perceptions of organizational commitment to safety. A positive safety climate is associated with lower injury rates, increased reporting of hazards, and improved psychological wellbeing (Mearns & Flin, 1999; Hofmann & Stetzer, 1998). Conversely, poor safety climates — where management prioritizes production over safety — have been linked to stress responses, vigilance fatigue, and disengagement (DeJoy, 2005).

In the garment industry, physical risks include fire hazards, structural weaknesses, exposure to dust and chemicals, and ergonomic strain due to repetitive tasks (Khatun & Islam, 2019; Hasan & Amin, 2020). High-profile disasters such as the 2013 Rana Plaza collapse brought global attention to structural and regulatory failures in Bangladesh’s RMG sector (Islam & Uddin, 2018). Post-Rana Plaza reforms, including the Bangladesh Accord and strengthened inspection systems, have led to infrastructural improvements, but

psychosocial safety climates remain underdeveloped (Rahman & Kabir, 2021).

Several studies show that garment workers often perceive safety measures as inadequate or inconsistently enforced. Naveed (2018) found that workers reported a lack of emergency drills, poor signage, and insufficient protective equipment, contributing to anxiety and mistrust in management. Hasan and Amin (2020) documented correlations between perceived safety practices and self-reported stress levels among workers, indicating that safety perceptions influence psychosocial wellbeing in addition to physical risk. In qualitative interviews, workers expressed fear about fire hazards and structural integrity, even when formal safety audits reported compliance, revealing a disconnect between formal safety certification and lived experience (Reza & Chowdhury, 2020).

### 2.4 Wellbeing and Health Outcomes: Psychological and Physical Dimensions

Wellbeing in occupational settings refers to both physical health and psychological functioning, including emotional, social, and cognitive aspects (Diener *et al.*, 2018). Studies in industrial psychology emphasize that chronic occupational stress and poor safety conditions are risk factors for musculoskeletal disorders, sleep disturbances, anxiety, depression, and cardiovascular problems (Ganster & Rosen, 2013; Siegrist & Li, 2016).

Musculoskeletal health is a major concern in garment work due to repetitive motions, prolonged standing, and poor ergonomic design. Hasan and Amin (2020) reported that more than 60% of female garment workers in a Dhaka sample experienced chronic neck or back pain, which was strongly associated with extended working hours and insufficient rest breaks. Jahan and Kabir (2022) similarly found that ergonomic strain was linked to reduced productivity and fatigue, affecting both wellbeing and economic outcomes for workers.

Psychological wellbeing is influenced by job stress, social support at work, and perceptions of control. High job strain is associated with anxiety, depressive symptoms, and burnout (Bakker *et al.*, 2014; Schaufeli *et al.*, 2009). In the RMG sector, several studies document elevated levels of psychological distress among workers. For example, Akter and Malik (2020) found that stress related to job insecurity and performance pressure was significantly correlated with symptoms of anxiety and low life satisfaction. Begum and Siddiqui (2021) also noted that workplace harassment and lack of grievance mechanisms contributed to emotional exhaustion and social withdrawal.

Gender plays a critical role in shaping wellbeing outcomes. Female workers often face role conflict between paid work and unpaid domestic responsibilities,

which can exacerbate stress and sleep disruption (Huq & Stevenson, 2020). Social norms that limit women's mobility and access to health services further constrain coping resources, making women more vulnerable to stress-related health problems (Mahmud & Azad, 2019). These gendered stressors compound the impact of workplace hazards, creating a cumulative burden on wellbeing.

## 2.5 Coping, Social Support, and Organizational Resources

Coping strategies refer to cognitive and behavioral efforts used to manage stress. Lazarus and Folkman's (1984) transactional model of stress emphasizes that coping involves both problem-focused and emotion-focused strategies. In garment work contexts, workers employ a range of coping mechanisms, from peer support networks and relaxation techniques to disengagement or withdrawal (Islam & Nur, 2021). Social support from coworkers and family has been shown to buffer the effects of stress and contribute positively to psychological wellbeing (Cohen & Wills, 1985).

However, formal organizational resources — such as counseling services, employee assistance programs, and participatory safety committees — are rare in many factories in Bangladesh (Begum, 2019). The lack of institutionalized support may amplify the negative impacts of stress and unsafe conditions, particularly for female workers who may have fewer external resources due to family responsibilities and social norms restricting mobility.

## 2.6 Synthesis and Identified Gaps

Taken together, the literature clearly demonstrates that occupational stress, workplace safety, and wellbeing are deeply interconnected. Theoretical models like the JD-R and ERI frameworks provide robust explanations for how job demands and resources shape health outcomes (Bakker & Demerouti, 2017; Siegrist, 1996). Empirical evidence shows that high stress and poor safety climates are prevalent in garment work environments globally and in Bangladesh in particular, with significant implications for worker wellbeing (Uddin & Rahman, 2019; Hasan & Amin, 2020).

### Yet, several gaps remain:

1. **Integrated analysis of stress, safety, and wellbeing:** Most studies examine these constructs separately rather than in combination. Research that empirically tests how perceived safety climates moderate the relationship between occupational stress and wellbeing is scarce.
2. **Gender-specific mechanisms:** While several studies acknowledge gender differences, few systematically analyze how gendered work expectations and domestic roles interact with workplace stressors to affect wellbeing.

3. **Longitudinal evidence:** Much of the existing research is cross-sectional, limiting understanding of causal pathways and long-term health effects.
4. **Organizational interventions:** There is limited evaluation of workplace programs or policies designed to reduce stress and improve safety, particularly in Bangladesh's RMG sector.

This literature review establishes the theoretical grounding and empirical basis for the present study, which addresses these gaps by examining the interrelationships among occupational stress, safety perceptions, and wellbeing outcomes among female garment workers in Bangladesh. Through a mixed-methods approach, the current research advances understanding of how workplace environments shape psychological and physical health in one of the world's largest female industrial workforces.

## 3. METHODOLOGY

The methodology adopted for this study is grounded in a mixed-methods research design, integrating quantitative and qualitative approaches to comprehensively investigate the relationship between occupational stress, workplace safety, and wellbeing among female garment workers in Bangladesh. A mixed-methods design allows for both statistical generalization and in-depth understanding of workers' lived experiences, providing richer insights than a single-method approach (Creswell & Creswell, 2018; Johnson & Onwuegbuzie, 2004). This approach is particularly suited to studying complex phenomena such as occupational stress and wellbeing, where psychosocial, physical, and organizational factors interact in intricate ways (Bakker & Demerouti, 2017; Karasek & Theorell, 1990).

### 3.1 Research Design

The study employs an explanatory sequential mixed-methods design, in which quantitative data collection and analysis are followed by qualitative exploration to deepen understanding of the observed trends (Creswell, 2014). Quantitative methods are used to measure the prevalence and intensity of occupational stress, perceptions of workplace safety, and levels of physical and psychological wellbeing among female garment workers. The qualitative component, based on semi-structured interviews, allows for exploration of contextual factors, coping strategies, and individual narratives that quantitative surveys alone cannot capture (Bryman, 2016). By integrating these methods, the research achieves methodological triangulation, enhancing the reliability and validity of the findings (Denzin, 2017).

### 3.2 Population and Sampling

The target population comprises female garment workers employed in ready-made garment factories in the industrial hubs of Dhaka and Chattogram, Bangladesh. These regions host a high concentration of

RMG factories and represent a cross-section of the industry, including export-oriented and local-market factories (Rahman & Kabir, 2021). The inclusion criteria required participants to be:

- Female workers aged 18–50 years
- Employed in production, quality control, or sewing departments
- With a minimum of six months of continuous employment to ensure familiarity with workplace practices

Exclusion criteria included managerial-level staff, contract workers without permanent factory affiliation, and workers on long-term leave during the study period. These criteria ensured focus on frontline female workers who are most directly exposed to occupational stressors and safety risks.

### 3.2.1 Sample Size and Technique

A stratified random sampling method was employed to select participants for the quantitative survey. Stratification was based on department and shift patterns to ensure proportional representation of workers across different roles and work schedules (Taherdoost, 2016). A sample size of 300 participants was calculated using a margin of error of 5%, a confidence level of 95%, and the estimated population size of female workers in the selected factories (Israel, 1992). This sample size is adequate for regression analyses and structural equation modeling to test the relationships among occupational stress, safety, and wellbeing.

For the qualitative component, 30 participants were purposively selected from the survey respondents. The selection prioritized diversity in age, work experience, and reported stress levels to capture a range of perspectives. Purposive sampling allows for in-depth exploration of unique experiences and insights that may not be captured in quantitative measures (Palinkas *et al.*, 2015).

## 3.3 Data Collection Instruments

The study employed validated instruments for measuring key constructs, adapted to the Bangladeshi context and translated into Bengali to ensure comprehension.

### 3.3.1 Occupational Stress

Occupational stress was measured using the Occupational Stress Index (OSI) developed by Srivastava and Singh (1981), a widely used tool in industrial psychology research. The OSI assesses dimensions such as role overload, role ambiguity, role conflict, and psychological strain. It uses a Likert-scale format (1 = strongly disagree to 5 = strongly agree). Previous studies in South Asia have demonstrated the reliability and validity of OSI in industrial populations (Uddin & Rahman, 2019; Haque, 2019).

To ensure cultural relevance, a pilot test was conducted with 20 female garment workers, and minor adaptations were made for language clarity and contextual examples of stressors, such as production targets and wage deductions.

### 3.3.2 Workplace Safety

Workplace safety perceptions were measured using an adapted Safety Climate Questionnaire based on the International Labour Organization (ILO, 2019) guidelines and Zohar's (1980) safety climate framework. The questionnaire included items on:

- Availability of protective equipment
- Emergency preparedness and drills
- Ergonomic arrangements
- Management commitment to safety
- Worker participation in safety decisions

Respondents rated each item on a 5-point Likert scale. Prior studies have established safety climate as a significant predictor of stress and wellbeing in industrial settings (Clarke, 2013; Naveed, 2018).

### 3.3.3 Wellbeing

Wellbeing was measured using the WHO-5 Wellbeing Index (WHO, 2020), a brief and reliable instrument for assessing subjective psychological wellbeing. The index measures positive mood, vitality, and general interests over the past two weeks on a 6-point Likert scale. The WHO-5 has been validated in occupational settings and is sensitive to changes in both physical and mental health.

### 3.3.4 Semi-Structured Interviews

Qualitative data were collected through semi-structured interviews with 30 participants. The interview guide focused on:

- Personal experiences of occupational stress
- Perceptions of workplace safety practices and hazards
- Coping strategies and support systems
- Impact of work conditions on physical and mental health

Interviews were conducted in Bengali, audio-recorded with consent, and later transcribed and translated into English for analysis. This approach allows for capturing nuanced worker perspectives that quantitative instruments may overlook (Bryman, 2016).

## 3.4 Data Collection Procedure

Prior to data collection, the research team obtained ethical approval from the university's review board and permission from factory management. Informed consent was obtained from all participants, ensuring voluntary participation, confidentiality, and the right to withdraw at any time (Israel & Hay, 2006).

### 3.4.1 Quantitative Survey

Survey data were collected through paper-based questionnaires administered during work breaks in designated spaces provided by factories. Research assistants explained the purpose of the study and provided guidance on completing the forms. To minimize bias, participants were assured that responses would not affect employment status.

### 3.4.2 Qualitative Interviews

Qualitative interviews were conducted in quiet rooms within the factory or nearby community centers to ensure privacy. Each interview lasted 30–45 minutes. The interviewer used probing techniques to encourage detailed narratives about stress experiences, safety concerns, and coping practices. Data saturation was reached when no new themes emerged, following guidance from Guest et al. (2020).

## 3.5 Data Analysis

### 3.5.1 Quantitative Analysis

Quantitative data were analyzed using SPSS version 26. Descriptive statistics (mean, standard deviation, frequency, and percentage) summarized demographic characteristics, stress levels, safety perceptions, and wellbeing scores. Inferential statistics, including Pearson correlation and multiple regression analysis, examined relationships between occupational stress, workplace safety, and wellbeing outcomes (Field, 2018). Hierarchical regression models tested whether workplace safety moderated the impact of stress on wellbeing, consistent with prior occupational health research (Clarke, 2013; Bakker & Demerouti, 2017).

### 3.5.2 Qualitative Analysis

Qualitative data were analyzed using thematic analysis (Braun & Clarke, 2006) supported by NVivo 12 software. The analysis followed six phases:

1. Familiarization with the data through repeated reading of transcripts
2. Generation of initial codes capturing meaningful data features
3. Searching for patterns to form preliminary themes
4. Reviewing themes in relation to coded data and entire dataset
5. Defining and naming final themes to reflect workers' experiences
6. Producing the report, integrating illustrative quotes with quantitative findings

This process enabled triangulation of survey and interview data, enhancing the depth and validity of interpretations (Denzin, 2017).

## 3.6 Reliability and Validity

### 3.6.1 Reliability

Cronbach's alpha coefficients were calculated to assess internal consistency of survey instruments. OSI, safety climate scale, and WHO-5 demonstrated high reliability ( $\alpha = 0.85\text{--}0.92$ ), consistent with previous

studies in industrial settings (Uddin & Rahman, 2019; Clarke, 2013).

### 3.6.2 Validity

Content validity was ensured by adapting well-established instruments and conducting expert reviews with industrial psychologists and occupational health specialists. Construct validity was evaluated through factor analysis, confirming alignment of items with their intended dimensions. Pilot testing with 20 participants ensured linguistic clarity and contextual appropriateness (Taherdoost, 2016).

## 3.7 Ethical Considerations

Ethical principles were rigorously applied:

- **Informed consent:** Participants received detailed information about study objectives, procedures, and risks. Written consent was obtained.
- **Confidentiality:** Personal identifiers were removed, and data were stored securely in password-protected files.
- **Voluntary participation:** Participants could withdraw without consequence.
- **Minimizing harm:** Emotional distress was mitigated by providing referrals to counseling services when needed (Israel & Hay, 2006).

Ethical adherence ensures credibility and social responsibility in occupational research involving vulnerable populations, such as female garment workers.

## 3.8 Limitations of Methodology

While the mixed-methods design enhances depth and validity, certain limitations exist:

1. **Cross-sectional survey design** limits causal inference between stress, safety, and wellbeing.
2. **Self-reported data** may be influenced by social desirability bias or fear of employer retaliation, although anonymity mitigates this risk.
3. **Geographical focus** on Dhaka and Chattogram may limit generalizability to rural or smaller industrial zones.
4. **Resource constraints** limited the number of qualitative interviews, though data saturation was achieved.

Despite these limitations, the methodology provides a robust framework for understanding occupational stress, workplace safety, and wellbeing among female garment workers.

## 3.9 Justification for Methodological Choices

The mixed-methods, explanatory sequential design is particularly appropriate for this research because:

- Quantitative surveys provide statistical evidence of prevalence and correlations among occupational stress, safety, and wellbeing.

- Qualitative interviews provide rich insights into personal experiences, coping mechanisms, and organizational culture.
- Triangulation of methods enhances credibility, trustworthiness, and practical relevance of findings for policymakers, factory management, and occupational health practitioners (Creswell & Plano Clark, 2018).

By combining these approaches, the study addresses both the breadth and depth of female workers' experiences, offering actionable insights for improving workplace conditions and promoting wellbeing.

## 4. DISCUSSIONS AND FINDINGS

This section presents a comprehensive analysis and interpretation of the study's findings on occupational stress, workplace safety, and wellbeing among female garment workers in Bangladesh. The discussion integrates quantitative and qualitative results, drawing connections with existing literature, theoretical frameworks, and contextual factors unique to the RMG industry. The aim is to highlight key patterns, explain mechanisms, and situate the findings within broader scholarly and policy discourses.

### 4.1 Occupational Stress among Female Garment Workers

The quantitative findings reveal that a substantial majority (72%) of female garment workers reported moderate to high levels of occupational stress. The mean score on the Occupational Stress Index (OSI) was 3.8 on a 5-point scale, indicating considerable strain. Among the stress dimensions, role overload, role ambiguity, and role conflict emerged as the most significant contributors.

#### 4.1.1 Role Overload and Production Pressure

Role overload, characterized by excessive job demands relative to available time and resources, was the primary source of stress. This aligns with Karasek and Theorell's (1990) Job Demand–Control model, which suggests that high demands without adequate autonomy lead to strain and burnout. In this study, participants frequently cited long working hours, rapid production quotas, and pressure to meet daily targets as sources of fatigue and mental exhaustion. A participant noted:

*"We have to finish our target every day. Even if the machine breaks or the line slows down, we are blamed. It makes me anxious all the time."*

These findings corroborate prior research in Bangladesh and South Asia, where similar occupational stressors have been documented in garment factories (Uddin & Rahman, 2019; Haque, 2019). Globally, studies in India and Pakistan reported comparable associations between production pressure and psychological strain among female industrial workers (Kumar & Rani, 2019; Javed & Khan, 2021).

#### 4.1.2 Role Ambiguity and Conflicting Instructions

Role ambiguity was another significant stressor. Many workers reported unclear job responsibilities and conflicting instructions from supervisors, particularly when policies varied between shifts or departments. This ambiguity exacerbated anxiety, as workers feared punishment for failing to meet expectations. These findings are consistent with research by Bakker and Demerouti (2017), which highlights that unclear roles contribute to stress and decrease job satisfaction, especially in high-demand, low-autonomy environments.

#### 4.1.3 Gendered Dimensions of Occupational Stress

Qualitative interviews revealed that female workers experienced additional stress from gendered expectations. Beyond factory responsibilities, many women manage household duties, childcare, and eldercare, creating a dual burden. The combination of workplace demands and domestic responsibilities aligns with the concept of "double shift" stress in gendered labor literature (Akter & Malik, 2020; Huq & Stevenson, 2020). Workers expressed that fatigue from domestic responsibilities compounded workplace stress:

*"After finishing work at the factory, I still have to cook and take care of children. There is no rest. I feel exhausted all the time."*

These findings underscore the importance of considering gendered labor dynamics when evaluating occupational stress. They also highlight that interventions aimed at stress reduction must account for workers' broader social roles, not just workplace factors.

### 4.2 Workplace Safety and Perceptions of Risk

Workplace safety emerged as a critical factor influencing both stress levels and wellbeing. Survey results indicate that only 42% of respondents perceived safety protocols as consistently enforced, while qualitative interviews revealed frequent concerns regarding emergency preparedness, protective equipment, and ergonomic arrangements.

#### 4.2.1 Physical Safety Hazards

Physical hazards, including risk of fire, poor structural integrity, exposure to chemicals, and repetitive motion injuries, were prominent in participant narratives. These risks are consistent with findings from Khatun and Islam (2019), who documented ongoing structural and fire hazards in Bangladeshi factories, even after the implementation of post-Rana Plaza safety reforms. Workers reported that protective equipment, such as gloves and masks, was often unavailable or poorly maintained. One worker stated:

*"Sometimes we get gloves, sometimes not. Machines are fast, and without gloves, our hands hurt or get cut. We are always scared of accidents."*

Ergonomic hazards, particularly prolonged standing and repetitive sewing tasks, contributed to musculoskeletal pain. This aligns with Hasan and Amin (2020), who found that over 60% of female garment workers reported chronic neck, back, and wrist pain, directly related to poor workstation design.

#### 4.2.2 Safety Climate and Organizational Commitment

The concept of safety climate — the shared perception of organizational commitment to safety (Clarke, 2013) — was crucial in shaping stress levels. Regression analyses indicated that positive perceptions of safety climate were negatively correlated with occupational stress ( $\beta = -0.45, p < .01$ ), suggesting that stronger safety climates buffer stress effects. Qualitative interviews reinforced this finding; workers who perceived management as attentive to safety expressed lower anxiety and greater confidence in their work environment:

*"Our supervisor sometimes checks the fire extinguishers and tells us how to respond in emergencies. It gives me some peace of mind."*

However, inconsistencies between formal safety policies and everyday practices were noted. While factories may be certified as compliant, workers reported gaps in enforcement, limited training, and infrequent emergency drills. This finding mirrors Naveed (2018) and Reza and Chowdhury (2020), who documented similar discrepancies between formal compliance and worker perceptions.

#### 4.3 Wellbeing Outcomes

Wellbeing, assessed through the WHO-5 index, revealed that 65% of participants reported low to moderate psychological wellbeing. Both physical and psychological health were negatively impacted by stress and unsafe work conditions.

##### 4.3.1 Physical Wellbeing

Musculoskeletal discomfort was pervasive, with neck, back, and hand pain commonly reported. Chronic fatigue was another widespread concern, linked to long working hours, minimal rest breaks, and repetitive tasks. These findings align with prior studies in the region (Hasan & Amin, 2020; Jahan & Kabir, 2022). Furthermore, physical injuries, though often minor, created anxiety due to fear of wage deductions and potential dismissal, highlighting the interplay between physical risk and psychological stress.

##### 4.3.2 Psychological Wellbeing

High occupational stress and poor safety conditions were associated with lower psychological wellbeing. Participants reported anxiety, sleep disturbances, and feelings of helplessness. One interviewee shared:

*"I worry about machines, targets, and even the building's condition. Sometimes I cannot sleep at night because of fear of accidents."*

These findings are consistent with Bakker and Demerouti (2017) and Schaufeli and Taris (2014), who emphasized that high demands, low resources, and unsafe environments are associated with burnout, depressive symptoms, and decreased life satisfaction. Gendered pressures further exacerbated these outcomes, reflecting the cumulative impact of workplace and domestic stressors (Akter & Malik, 2020).

#### 4.4 Interrelationships among Stress, Safety, and Wellbeing

The analysis highlights a complex interplay between occupational stress, workplace safety, and wellbeing. Regression models showed that occupational stress was a significant predictor of lower wellbeing ( $\beta = -0.52, p < .001$ ), while positive perceptions of safety partially mitigated this effect ( $\beta = 0.31, p < .01$ ). This interaction suggests that safety climate acts as a moderator, aligning with Clarke's (2013) model and supporting the JD-R framework (Bakker & Demerouti, 2017). In other words, even in high-stress work environments, perceptions of safety and management support can buffer the negative impact on wellbeing.

Qualitative findings complement these results, showing that workers' coping strategies, social support, and engagement with safety practices influence their perceived control and resilience. For instance, workers who received guidance from supervisors or peer assistance reported lower stress levels despite high workload:

*"My friends help me if the machine jams or the target is high. We support each other; it makes the work less stressful."*

These insights demonstrate that workplace interventions must target both structural safety and psychosocial resources to effectively enhance wellbeing.

#### 4.5 Coping Mechanisms and Social Support

Coping strategies were crucial in mediating the effects of occupational stress. Consistent with Lazarus and Folkman (1984), workers employed problem-focused coping (e.g., seeking help from supervisors, taking short breaks) and emotion-focused coping (e.g., prayer, social support, relaxation techniques). Peer networks emerged as a key support system, providing practical assistance and emotional reassurance. This finding aligns with Cohen and Wills (1985), who emphasized the buffering effect of social support on stress-related outcomes.

However, formal support mechanisms were largely absent. Few factories provided counseling, grievance mechanisms, or structured stress management programs. The lack of organizational resources amplifies

the importance of informal coping and highlights a critical area for intervention (Begum, 2019). These findings support the notion that psychosocial safety climate, in combination with structural safety, is vital for protecting worker wellbeing.

#### 4.6 Gendered Vulnerabilities and Intersectional Considerations

Female garment workers experience unique vulnerabilities due to intersecting workplace and societal pressures. Beyond occupational hazards, cultural and family expectations contribute to stress, reduced sleep, and limited opportunities for rest or recovery (Huq & Stevenson, 2020; Mahmud & Azad, 2019). Harassment and gender-based discrimination on the shop floor exacerbate these stressors (Akteer & Malik, 2020). These intersectional pressures suggest that policies targeting wellbeing must incorporate gender-sensitive interventions, including flexible scheduling, childcare support, and protections against harassment.

#### 4.7 Comparison with Previous Studies

The findings of this study align with previous research in Bangladesh and South Asia. Uddin and Rahman (2019) reported high stress levels among female garment workers due to workload and lack of autonomy. Hasan and Amin (2020) highlighted musculoskeletal disorders and fatigue as prevalent physical outcomes. Clarke (2013) and Naveed (2018) emphasized the moderating role of safety climate in occupational stress. However, the present study extends this literature by providing integrated evidence linking occupational stress, safety perceptions, wellbeing outcomes, and coping strategies within a gendered context. It demonstrates the cumulative impact of workplace hazards, psychosocial stressors, and societal expectations, providing a more holistic understanding than previous studies.

#### 4.8 Implications of Findings

The study has several implications for policy, practice, and future research:

1. **Policy Implications:** Labor regulators and factory inspectors should prioritize both structural safety and psychosocial safety climate. Safety audits should evaluate management commitment, worker participation, and hazard reporting systems. Gender-sensitive policies addressing harassment, overtime, and domestic work pressures are crucial.
2. **Organizational Practice:** Factories should implement stress management programs, ergonomic interventions, and formal support mechanisms. Supervisory training to foster supportive relationships can reduce stress and improve compliance with safety practices.
3. **Research Implications:** Future studies should employ longitudinal designs to examine causal pathways, incorporate male workers for

comparative analysis, and explore intersectional factors such as socioeconomic status, education, and family responsibilities.

#### 4.9 Strengths of the Study

- Mixed-methods design enabled triangulation and enriched insights.
- Validated instruments ensured reliability and comparability with prior studies.
- Focus on female workers addressed a critical knowledge gap in gendered occupational health research.
- Contextual adaptation of tools ensured cultural relevance and comprehension.

#### 4.10 Limitations of the Findings

- Cross-sectional design limits causal inference.
- Self-reported data may be subject to recall bias or social desirability.
- Geographical focus on Dhaka and Chattogram limits generalizability to smaller industrial regions.
- Some qualitative nuances may have been lost in translation from Bengali to English.

Despite these limitations, the findings provide robust evidence of the interconnectedness of occupational stress, workplace safety, and wellbeing among female garment workers.

#### 4.11 Summary of Key Findings

1. Female garment workers experience high levels of occupational stress, driven by workload, role ambiguity, and performance pressure.
2. Workplace safety perceptions are moderate, with gaps in emergency preparedness, protective equipment, and ergonomic support.
3. Physical and psychological wellbeing is negatively affected by stress and unsafe working conditions, including musculoskeletal pain, fatigue, and anxiety.
4. Safety climate moderates the relationship between stress and wellbeing, emphasizing the importance of management commitment and worker participation.
5. Coping mechanisms such as peer support and prayer partially buffer stress, but formal organizational support is largely absent.
6. Gendered pressures exacerbate stress and wellbeing challenges, underscoring the need for intersectional interventions.

In conclusion, this study confirms that occupational stress, workplace safety, and wellbeing are deeply intertwined. Effective interventions require a holistic approach, addressing both structural safety and

psychosocial resources, and incorporating gender-sensitive strategies. The findings provide actionable insights for policymakers, industry stakeholders, and researchers aiming to improve the health and productivity of Bangladesh's female garment workforce.

## 5. RECOMMENDATIONS

The findings of this study highlight the complex interplay between occupational stress, workplace safety, and wellbeing among female garment workers in Bangladesh. High stress levels, inadequate safety practices, and gendered pressures collectively affect both physical and psychological health. Addressing these issues requires multi-level interventions targeting organizational practices, regulatory frameworks, and socio-cultural support systems. The following recommendations are grounded in the study's empirical findings, theoretical frameworks such as the Job Demand–Control (Karasek & Theorell, 1990) and Job Demand–Resources models (Bakker & Demerouti, 2017), and global best practices in occupational health.

### 5.1 Strengthening Occupational Health and Safety Regulations

A critical recommendation is the enhancement of occupational health and safety (OHS) standards, particularly in the RMG sector. Despite post-Rana Plaza reforms, gaps remain in compliance enforcement, structural safety, and psychosocial risk management (Khatun & Islam, 2019; Rahman & Kabir, 2021). Specific measures include:

1. **Comprehensive Safety Audits:** Regulatory bodies and third-party organizations should conduct frequent and thorough inspections of factory infrastructure, machinery, fire safety, and emergency preparedness. These audits should include worker interviews to assess perceptions of safety climate, aligning with Clarke's (2013) evidence on the importance of perceived organizational commitment to safety.
2. **Integration of Psychosocial Risk Management:** Safety regulations should extend beyond physical hazards to include psychosocial risks such as work pressure, harassment, and role ambiguity (DeJoy, 2005). Policies should mandate stress assessments and require factories to develop interventions for workload management and mental health support.
3. **Mandatory Reporting Systems:** Factories should establish anonymous channels for workers to report safety violations and stress-related concerns without fear of reprisal. Studies in Bangladesh and other South Asian contexts demonstrate that reporting systems reduce workplace accidents and improve worker wellbeing (Naveed, 2018; Begum, 2019).

4. **Enforcement of Legal Protections for Women:** Labor inspectors should actively ensure compliance with gender-sensitive labor laws, including restrictions on overtime, maternity protections, and prevention of harassment (Akter & Malik, 2020). Strengthened enforcement can mitigate occupational stress unique to female workers.

### 5.2 Enhancing Workplace Safety Practices

At the organizational level, improving workplace safety culture and practices is vital to reducing stress and promoting wellbeing.

1. **Safety Training and Awareness:** Regular safety training programs should be implemented for all workers, emphasizing proper use of equipment, emergency procedures, and ergonomic best practices (Hasan & Amin, 2020). Training should be interactive and contextually adapted, as rote training alone has limited impact (Reza & Chowdhury, 2020).
2. **Ergonomic Interventions:** Factories should invest in ergonomically designed workstations, adjustable chairs, and machinery that reduces repetitive strain injuries. Given that musculoskeletal disorders were prevalent among participants, these interventions directly improve physical health and reduce absenteeism (Jahan & Kabir, 2022).
3. **Regular Drills and Emergency Preparedness:** Factories must conduct routine fire, evacuation, and emergency drills, ensuring workers understand procedures and can act confidently in crises. Evidence shows that perceived preparedness reduces anxiety and enhances the psychological safety of employees (Clarke, 2013).
4. **Provision of Personal Protective Equipment (PPE):** Access to PPE such as gloves, masks, and safety shoes should be consistent and monitored. The absence or inconsistency of protective equipment contributes to both physical risk and psychological stress (Hasan & Amin, 2020).
5. **Safety Committees and Worker Participation:** Establishing worker-led safety committees can promote shared responsibility for occupational safety. Participation in decision-making increases perceived control, reduces role ambiguity, and lowers stress, consistent with the Job Demand–Control model (Karasek & Theorell, 1990; Bakker & Demerouti, 2017).

### 5.3 Addressing Occupational Stress through Organizational Policies

Reducing occupational stress requires both structural and psychosocial interventions within factories.

1. **Workload Management:** Production targets should be realistic, considering task complexity

and worker capacity. Implementing flexible scheduling, task rotation, and additional staffing during peak periods can mitigate role overload (Uddin & Rahman, 2019).

2. **Clear Job Roles and Instructions:** Role ambiguity and conflicting instructions were major sources of stress. Factories should standardize job descriptions, provide clear guidelines, and train supervisors to communicate effectively (Bakker & Demerouti, 2017). Standard operating procedures (SOPs) and visual task boards can enhance clarity.
3. **Supervisor Training for Supportive Leadership:** Supervisory behavior significantly influences stress and wellbeing. Training supervisors in supportive communication, conflict resolution, and stress-sensitive management can reduce anxiety and improve worker satisfaction (Clarke, 2013; Begum & Siddiqui, 2021).
4. **Formal Stress Management Programs:** Factories should introduce counseling services, employee assistance programs (EAPs), and peer-support mechanisms. Evidence from industrial settings demonstrates that structured stress reduction programs improve mental health and productivity (Ganster & Rosen, 2013).
5. **Monitoring and Evaluation:** Periodic assessment of occupational stress levels using validated instruments (e.g., OSI) allows factories to identify high-risk departments and evaluate intervention effectiveness (Uddin & Rahman, 2019).

#### 5.4 Promoting Wellbeing through Holistic Interventions

Wellbeing interventions should integrate physical, psychological, and social dimensions.

1. **Health and Wellness Programs:** Factories should provide on-site health check-ups, physiotherapy services, and workshops on nutrition and exercise. Addressing musculoskeletal health and general fitness can reduce fatigue and absenteeism (Hasan & Amin, 2020; Jahan & Kabir, 2022).
2. **Mental Health Support:** Given the prevalence of anxiety and psychological strain, factories should provide access to trained counselors and psychosocial support. Stress resilience programs, mindfulness, and relaxation sessions have proven effective in similar industrial contexts (Schaufeli & Taris, 2014).
3. **Work-Life Balance Initiatives:** Flexible working hours, shift rotation, and childcare support can alleviate the dual burden of work and domestic responsibilities for female workers (Huq & Stevenson, 2020). Evidence suggests that flexible arrangements improve

psychological wellbeing and job retention (Akter & Malik, 2020).

4. **Social Support Networks:** Encouraging peer support groups within factories can provide practical and emotional assistance. Social support has a well-documented buffering effect against occupational stress (Cohen & Wills, 1985).

#### 5.5 Gender-Sensitive Interventions

Recognizing the unique vulnerabilities of female garment workers is essential.

1. **Harassment Prevention Policies:** Factories should enforce zero-tolerance policies for sexual harassment and discrimination, establishing confidential complaint mechanisms and rapid response protocols (Akter & Malik, 2020; Begum & Siddiqui, 2021).
2. **Maternity and Childcare Support:** Providing on-site childcare, paid maternity leave, and flexible scheduling reduces stress and absenteeism, supporting wellbeing and retention (Mahmud & Azad, 2019).
3. **Training for Women's Empowerment:** Programs that enhance negotiation skills, financial literacy, and leadership opportunities can strengthen female workers' agency and resilience, mitigating stress and improving life satisfaction (Rahman & Kabir, 2021).
4. **Health Education:** Educating female workers on reproductive health, nutrition, and stress management can improve physical and mental wellbeing, particularly in contexts where access to external healthcare is limited (Akter & Malik, 2020).

#### 5.6 Community and Policy-Level Interventions

Addressing occupational stress and wellbeing requires multi-level collaboration beyond the factory floor.

1. **Government and Regulatory Support:** The Bangladesh Ministry of Labour and Employment should enforce safety and labor laws, including occupational health standards and gender protections, while incentivizing factories that demonstrate exemplary practices (Khatun & Islam, 2019).
2. **Non-Governmental Organizations (NGOs):** NGOs can play a vital role in providing health, legal, and social support for female workers. Programs offering counseling, education, and advocacy empower workers to navigate stress and safety challenges (Begum, 2019).
3. **Industry-Wide Best Practices:** Industry associations should facilitate knowledge sharing, training, and certification programs that integrate physical safety, psychosocial support, and gender-sensitive policies. Lessons from international standards, such as SA8000

and ISO 45001, can guide improvements (ILO, 2019).

4. **Public Awareness Campaigns:** Awareness programs highlighting the importance of worker wellbeing and occupational safety can create societal pressure for better practices, encouraging factories to comply with ethical standards.

### 5.7 Recommendations for Research and Monitoring

Ongoing research and monitoring are essential for sustaining improvements:

1. **Longitudinal Studies:** To understand causal relationships between occupational stress, safety, and wellbeing, longitudinal research is needed. This can inform interventions that target both immediate and long-term outcomes (Schaufeli & Taris, 2014).
2. **Evaluation of Interventions:** Future studies should evaluate the effectiveness of workplace interventions, such as stress management programs, ergonomic improvements, and safety climate initiatives, to provide evidence-based guidance (Ganster & Rosen, 2013).
3. **Worker Feedback Mechanisms:** Periodic surveys and focus groups should be conducted to capture workers' perspectives on safety, stress, and wellbeing, ensuring that interventions remain responsive to evolving needs (Clarke, 2013; Begum, 2019).
4. **Intersectional Analyses:** Future research should examine how socio-economic status, education, family structure, and cultural norms intersect with occupational stress and wellbeing, providing a nuanced understanding of vulnerabilities (Huq & Stevenson, 2020).

### 5.8 Summary of Recommendations

In summary, the study recommends:

1. Strengthening regulatory enforcement and integrating psychosocial risk management.
2. Enhancing safety practices through training, ergonomic interventions, emergency preparedness, PPE provision, and participatory safety committees.
3. Reducing occupational stress via workload management, clear job roles, supportive supervision, and formal stress management programs.
4. Promoting holistic wellbeing through health programs, mental health support, flexible schedules, and social support networks.
5. Implementing gender-sensitive interventions addressing harassment, maternity support, empowerment, and health education.
6. Facilitating community and policy-level interventions, including NGO support, industry best practices, and public awareness campaigns.

7. Conducting ongoing research and monitoring, including longitudinal studies, intervention evaluation, worker feedback, and intersectional analyses.

### 5.9 Implications for Practice

Implementing these recommendations can yield multiple benefits:

- **Improved Worker Health and Wellbeing:** Addressing stressors and safety risks enhances physical and psychological health, reducing absenteeism and turnover (Bakker & Demerouti, 2017).
- **Enhanced Productivity:** Reduced stress and injury rates contribute to higher efficiency and output (Ganster & Rosen, 2013).
- **Sustainability and Ethical Compliance:** Aligning practices with international standards fosters industry credibility and ensures long-term economic sustainability (ILO, 2019).
- **Empowerment of Female Workers:** Gender-sensitive interventions promote social and economic empowerment, contributing to broader societal development (Akter & Malik, 2020).

In conclusion, the recommendations provide a multi-level, integrated framework for improving occupational health, safety, and wellbeing in Bangladesh's RMG sector. By addressing structural, psychosocial, and gendered factors, factories, policymakers, and civil society can collaboratively enhance the lives of female garment workers while sustaining industry competitiveness.

## 6. LIMITATIONS OF THE STUDY

Every empirical study inevitably faces limitations that influence the interpretation, generalizability, and applicability of its findings. Recognizing these limitations is crucial for providing a transparent account of the research process and guiding future investigations. The present study on occupational stress, workplace safety, and wellbeing among female garment workers in Bangladesh, despite its robust mixed-methods design, is subject to several limitations spanning methodological, contextual, and theoretical dimensions. These limitations are critically discussed in light of existing literature.

### 6.1 Methodological Limitations

#### 6.1.1 Cross-Sectional Design

The study employed a cross-sectional research design, which involves collecting data at a single point in time. While cross-sectional studies are efficient and provide valuable descriptive and correlational information, they cannot establish causality between variables (Creswell & Creswell, 2018; Schaufeli & Taris, 2014). For instance, although the study found significant correlations between occupational stress, workplace safety perceptions, and wellbeing outcomes, it is not

possible to definitively conclude that stress causes reductions in wellbeing or that improved safety practices directly mitigate stress. Reverse causation or bidirectional relationships may also exist, consistent with findings in occupational health research (Ganster & Rosen, 2013). Longitudinal studies are recommended to explore temporal dynamics and causal pathways.

### 6.1.2 Self-Reported Data

A primary limitation is the reliance on self-reported survey and interview data. Self-report measures are susceptible to social desirability bias, recall bias, and subjective interpretation (Podsakoff *et al.*, 2003). In the context of this study, female garment workers may have underreported stress, safety concerns, or experiences of harassment due to fear of reprisal from supervisors or social stigma. Even with assurances of confidentiality, power asymmetries in factory settings may influence responses (Begum, 2019). While qualitative interviews partially mitigated this issue by providing narrative depth, some experiences may remain unreported. Future research could incorporate objective measures such as workplace injury records, physiological stress indicators (e.g., cortisol levels), or observational safety audits to complement self-reported data (Siegrist & Li, 2016).

### 6.1.3 Sampling Limitations

The study employed stratified random sampling for the quantitative survey and purposive sampling for qualitative interviews. Although stratified sampling enhanced representativeness across departments and shifts, the sample was drawn only from factories in Dhaka and Chattogram, the two largest industrial hubs in Bangladesh. This introduces geographical bias and limits generalizability to smaller cities, rural factories, or informal production units where work conditions, supervisory practices, and socio-cultural norms may differ (Rahman & Kabir, 2021). Additionally, the qualitative sample (30 participants) was relatively small, limiting the breadth of experiences captured. Despite reaching data saturation, nuances from underrepresented groups, such as older workers, contract laborers, or women with disabilities, may not have been fully explored (Guest *et al.*, 2020).

### 6.1.4 Measurement Constraints

Although validated instruments were used (Occupational Stress Index, Safety Climate Questionnaire, WHO-5 Wellbeing Index), certain measurement limitations exist:

1. **Cultural Adaptation:** Instruments originally developed in Western contexts may not fully capture the specific stressors, safety perceptions, and wellbeing experiences of Bangladeshi female garment workers (Taherdoost, 2016). While pilot testing and translation ensured linguistic and contextual relevance, some subtleties, such as social stress related to domestic expectations or informal

workplace hierarchies, may remain underrepresented.

2. **Construct Coverage:** The Occupational Stress Index (OSI) and safety climate scales emphasize work-related stress and structural safety, but they may not fully capture emotional, social, or family-related stressors. For instance, gendered stress associated with caregiving responsibilities or harassment may require more specialized instruments to measure accurately (Akter & Malik, 2020; Huq & Stevenson, 2020).
3. **Subjectivity of Safety Perceptions:** Perceptions of workplace safety, while important, may not always correspond with objective safety levels. Workers' anxiety or previous experiences with accidents can influence perception, introducing potential response bias (Clarke, 2013; Naveed, 2018).

## 6.2 Contextual and Socio-Cultural Limitations

### 6.2.1 Industry-Specific Context

The study focused exclusively on the ready-made garment (RMG) industry in Bangladesh, a highly export-oriented, competitive, and female-dominated sector. While findings provide rich insights into this context, they may not generalize to other industries, such as textiles, construction, or electronics manufacturing, where workplace stressors, safety practices, and gender dynamics differ (Mohiuddin & Begum, 2020). The highly structured and hierarchical nature of the RMG sector, combined with export-driven production targets, may exacerbate stress and limit autonomy more than in other occupational contexts.

### 6.2.2 Socio-Cultural Factors

Cultural norms and socio-economic conditions in Bangladesh shape women's experiences of stress and wellbeing. Gendered expectations, household responsibilities, and societal perceptions of female labor influence both stress and coping strategies (Huq & Stevenson, 2020; Mahmud & Azad, 2019). These socio-cultural factors may limit the external validity of findings, particularly in regions with different family structures, educational attainment, or socio-economic conditions. Cross-cultural comparisons would require careful adaptation and consideration of these contextual variables.

### 6.2.3 Economic Constraints

Workers' low wages and limited economic security may influence responses to occupational stress and perceptions of workplace safety. For example, economic dependency may reduce the willingness to report harassment or unsafe conditions (Akter & Malik, 2020). Consequently, findings may underrepresent the true extent of workplace hazards and psychological strain, a limitation inherent in research with vulnerable populations.

### 6.3 Theoretical Limitations

While this study drew on established frameworks, including the Job Demand–Control (JDC) model, Job Demand–Resources (JD-R) model, and Effort–Reward Imbalance (ERI) model, certain theoretical limitations exist:

1. **Focus on Individual Perception:** The study emphasizes workers' perceptions of stress and safety, which, while important, may not capture organizational-level factors such as management policies, structural inefficiencies, or systemic labor practices (Bakker & Demerouti, 2017; Clarke, 2013). Incorporating organizational-level variables could provide a more comprehensive understanding of stress dynamics.
2. **Limited Longitudinal Perspective:** The models used are generally compatible with longitudinal designs, which can capture stress accumulation, coping adaptation, and wellbeing trajectories over time (Schaufeli & Taris, 2014). A cross-sectional approach, while informative, cannot fully explore the temporal interactions predicted by these theoretical frameworks.
3. **Cultural Adaptation of Theories:** Most occupational stress models were developed in Western industrial contexts and may not fully account for gendered and cultural nuances in Bangladesh. For instance, the JD-R model assumes the availability of job resources, yet female garment workers often experience minimal autonomy, limited supervisory support, and societal constraints, which may alter model predictions (Akter & Malik, 2020).

### 6.4 Limitations Related to Qualitative Methods

#### 6.4.1 Potential Researcher Bias

Qualitative interviews are inherently interpretive, and the researcher's perspectives, assumptions, or interactions with participants can influence the data collection and analysis process (Creswell & Creswell, 2018). While reflexive practices and multiple coders were used to reduce bias, some subjectivity may persist.

#### 6.4.2 Translation and Interpretation

Interviews were conducted in Bengali and later transcribed and translated into English for analysis. While care was taken to preserve meaning, subtle linguistic or cultural nuances may have been lost, affecting the richness of thematic interpretation (Hsieh & Shannon, 2005). Certain culturally-specific expressions of stress or coping may not be fully captured in translation.

#### 6.4.3 Sample Representativeness

Although purposive sampling ensured diverse representation of age, experience, and stress levels, qualitative findings cannot be statistically generalized. They provide depth and insight rather than

representativeness, a limitation inherent in qualitative methodology (Palinkas *et al.*, 2015).

### 6.5 Ethical and Practical Constraints

#### 6.5.1 Access and Participation

Gaining access to factories and female workers required permissions from management, which may have constrained candid responses. Some participants may have withheld information about harassment, unsafe practices, or managerial misconduct due to fear of repercussions, leading to potential underreporting (Begum, 2019).

#### 6.5.2 Time and Resource Limitations

Time constraints limited the number of factories and participants included in the study. Expanding the sample or incorporating multiple industrial regions could have enhanced generalizability and robustness. Resource limitations also constrained the use of objective physiological measures of stress or real-time safety observations.

### 6.6 Recommendations for Addressing Limitations in Future Research

To overcome these limitations, future research should consider:

1. **Longitudinal Designs:** Tracking workers over time can establish causal relationships between occupational stress, safety practices, and wellbeing (Schaufeli & Taris, 2014).
2. **Mixed Data Sources:** Combining self-reported measures with objective indicators, such as injury records, cortisol levels, or direct safety audits, can enhance validity (Siegrist & Li, 2016).
3. **Broader Geographic Coverage:** Including factories from rural and small urban centers can improve generalizability and identify regional variations in stress and safety practices (Rahman & Kabir, 2021).
4. **Intersectional Analyses:** Future studies should explore how socio-economic status, education, family responsibilities, and age interact with occupational stress and wellbeing (Huq & Stevenson, 2020).
5. **Culturally Adapted Instruments:** Developing or adapting tools specifically for Bangladeshi female workers can improve measurement accuracy and capture culturally-specific stressors and coping strategies (Taherdoost, 2016).
6. **Organizational-Level Analysis:** Including management perspectives, organizational policies, and structural safety measures can provide a multi-level understanding of stress and wellbeing (Clarke, 2013; Bakker & Demerouti, 2017).

### 6.7 Conclusion of Limitations

While the study provides significant insights into the stress, safety, and wellbeing of female garment workers in Bangladesh, the limitations outlined above indicate the need for cautious interpretation. The reliance on self-reported, cross-sectional data, combined with contextual and theoretical constraints, suggests that the findings represent a snapshot of workers' experiences rather than definitive causal pathways. Nevertheless, by triangulating quantitative and qualitative methods, employing validated instruments, and situating findings within existing theoretical and empirical literature, the study mitigates many common methodological concerns and provides a robust foundation for future research, policy formulation, and organizational interventions.

## 7. CONCLUSION

This study provides a comprehensive examination of occupational stress, workplace safety, and wellbeing among female garment workers in Bangladesh, integrating both quantitative and qualitative evidence to illuminate the complex dynamics of this vulnerable workforce. The findings underscore the multifaceted nature of occupational challenges faced by women in the ready-made garment (RMG) sector, revealing how structural, organizational, and socio-cultural factors converge to influence health outcomes, job satisfaction, and overall wellbeing.

A central conclusion of the study is that occupational stress is highly prevalent among female garment workers, with role overload, role ambiguity, and role conflict identified as primary contributors. These findings align with the Job Demand–Control model (Karasek & Theorell, 1990) and the Job Demand–Resources framework (Bakker & Demerouti, 2017), which posit that high job demands, in combination with low control and insufficient resources, lead to elevated stress and reduced wellbeing. The data indicate that workers face intense production pressures, long working hours, and conflicting instructions from supervisors, all of which create psychological strain. In addition, qualitative evidence highlights the gendered dimensions of stress, where domestic responsibilities, childcare, and social expectations exacerbate workplace stress, confirming findings from Huq and Stevenson (2020) and Akter and Malik (2020). This underscores the necessity of considering intersectional vulnerabilities in occupational health research.

The study also emphasizes the critical role of workplace safety in moderating occupational stress and promoting wellbeing. Although formal safety protocols exist in many factories following post-Rana Plaza reforms, this study demonstrates gaps in their implementation. Workers reported inconsistent access to personal protective equipment, inadequate emergency preparedness, and insufficient ergonomic arrangements. Quantitative analyses revealed that perceived safety climate significantly moderated the relationship between stress and wellbeing, consistent with Clarke (2013) and

Naveed (2018). This finding reinforces the notion that both objective safety measures and workers' perceptions of management commitment are essential for fostering psychological and physical security. Qualitative narratives further illustrate that workers who perceive supportive supervision and accessible safety resources experience lower anxiety, highlighting the importance of organizational culture in shaping wellbeing outcomes.

The research also confirms that wellbeing among female garment workers is compromised, with high levels of musculoskeletal discomfort, fatigue, anxiety, and sleep disturbances. These outcomes reflect the cumulative impact of occupational stressors, unsafe work environments, and socio-cultural pressures (Hasan & Amin, 2020; Jahan & Kabir, 2022). Coping strategies, including social support, peer assistance, and religious or meditative practices, provide some mitigation; however, the absence of formal organizational support and mental health resources leaves many workers vulnerable. These findings support previous evidence on the psychosocial determinants of health in industrial settings (Ganster & Rosen, 2013; Schaufeli & Taris, 2014) and underscore the urgent need for interventions that integrate physical safety, psychosocial resources, and gender-sensitive policies.

An important contribution of this study is its holistic approach, which combines quantitative prevalence data with qualitative insights to provide a nuanced understanding of workers' lived experiences. The mixed-methods design allowed for the triangulation of findings, confirming patterns identified in surveys while also elucidating the contextual and cultural factors that shape stress and wellbeing. For example, the study reveals that social support networks within the workplace, peer assistance, and informal problem-solving strategies play a crucial role in mitigating stress, yet these informal mechanisms are insufficient in the absence of structured organizational policies. This finding emphasizes that effective interventions must target both structural and psychosocial dimensions, in line with Bakker and Demerouti (2017) and DeJoy (2005).

The study also has broader policy and practical implications. At the policy level, there is a need for strengthened enforcement of labor laws, inclusion of psychosocial risk assessments in occupational health regulations, and promotion of gender-sensitive protections, including maternity leave, childcare support, and harassment prevention mechanisms. Organizationally, factories should invest in ergonomic improvements, safety training, clear communication of job roles, supportive supervision, and formal stress management programs. Moreover, holistic wellness programs addressing both physical and mental health, flexible work arrangements, and peer support systems can enhance resilience and job satisfaction. Finally, the research highlights the importance of ongoing

monitoring and evaluation, using both quantitative and qualitative methods, to ensure interventions remain responsive to workers' evolving needs.

Despite methodological limitations, including the cross-sectional design, reliance on self-reported data, and geographical focus on Dhaka and Chattogram, the study offers a robust and contextually grounded evidence base for understanding occupational health challenges in the Bangladeshi RMG sector. By situating findings within established theoretical frameworks and corroborating them with empirical literature, the research provides a credible foundation for both scholarly inquiry and practical intervention.

In conclusion, this study demonstrates that occupational stress, workplace safety, and wellbeing are deeply intertwined, and that female garment workers in Bangladesh face persistent risks to both physical and psychological health. Addressing these challenges requires a multi-level approach that integrates regulatory enforcement, organizational interventions, and gender-sensitive support systems. The evidence presented underscores that improvements in workplace safety, job design, supervisory practices, and psychosocial resources are not merely ethical imperatives but also critical for sustaining productivity, reducing turnover, and promoting the long-term resilience of Bangladesh's garment workforce. Future research should build on these findings, employing longitudinal designs, objective measures, and broader geographic and intersectional samples to further inform evidence-based policies and practices.

Ultimately, enhancing occupational health and wellbeing for female garment workers is both a moral and economic necessity. By prioritizing worker safety, mitigating stress, and fostering supportive and equitable work environments, stakeholders can ensure that the RMG industry remains sustainable, globally competitive, and socially responsible. This study contributes to the growing body of literature advocating for integrated, gender-sensitive, and evidence-informed interventions, providing actionable insights for policymakers, factory management, and occupational health practitioners.

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