

# An Empirical Study on Factors Shaping the Conditions of Female Workers in Textile Industries

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## Abstract-

This study investigates the factors influencing the working conditions of female workers in the textile industry of Panipat, Haryana. A descriptive research design was adopted, focusing on ten textile industries selected purposively to represent the sector. Data were collected through a structured survey approach targeting female workers across different units. The responses were analyzed using Exploratory Factor Analysis (EFA) with the SPSS v26.0 IBM tool, which identified eight distinct factors shaping workplace conditions. These factors highlight dimensions such as workplace safety, wage fairness, managerial support, skill development opportunities, health provisions, workload management, social security, and gender sensitivity. The findings provide empirical evidence that female workers' conditions are shaped by both organizational practices and socio-economic realities, offering insights for policymakers, industry leaders, and labor welfare organizations.

**Keywords:** Textile Industry, Panipat Location, Exploratory Factor Analysis, Female Workers condition etc.

## 1. INTRODUCTION

The textile sector is one of the oldest and most significant industries in India, contributing substantially to employment generation, export earnings, and industrial growth. It encompasses a wide range of activities including spinning, weaving, dyeing, finishing, and garment production. As a labor-intensive industry, textiles provide opportunities for both skilled and unskilled workers, making it a backbone of India's manufacturing economy. The sector's importance lies not only in its economic contribution but also in its role in sustaining traditional crafts and supporting large-scale industrial clusters.

Female workers form a crucial segment of the textile workforce, particularly in production and quality control units. Their participation is often driven by socio-economic necessity, with many women belonging to vulnerable communities. Despite their significant contribution, female workers frequently face challenges such as wage disparities, limited career advancement, workplace safety concerns, and restricted access to skill development programs. Their role highlights the intersection of gender and labor, making their conditions an important area of study for both social justice and industrial sustainability.

The conditions of female workers in textile industries are shaped by multiple factors, both organizational and socio-economic. Key determinants include wage structures, workplace safety, managerial support,

health provisions, workload management, social security schemes, and gender sensitivity in policies. These factors collectively influence not only the physical well-being of workers but also their psychological and social experiences within the workplace. Identifying and analyzing these factors is essential for designing interventions that improve labor standards and enhance productivity.

Attrition among female workers in textile industries is a pressing concern, often resulting from poor working conditions, lack of growth opportunities, and inadequate social security. High attrition rates disrupt production processes, increase recruitment costs, and weaken organizational stability. For female workers, attrition is frequently linked to health issues, family responsibilities, and dissatisfaction with workplace practices. Addressing attrition requires a holistic approach that combines better wages, safer environments, and supportive policies to retain talent and ensure workforce continuity.

Panipat, located in Haryana, is a prominent hub of textile manufacturing, particularly known for home furnishings, carpets, and export-oriented products. The city's textile sector employs thousands of female workers, making it a critical site for studying labor conditions. Panipat's industries reflect both the opportunities and challenges of female employment in textiles, with issues ranging from wage fairness to workplace safety. Its significance lies in being a microcosm of India's textile sector, where the findings of this study can provide insights applicable to broader industrial contexts.

## **2. REVIEW OF LITERATURE**

Angelova et al. (2026) examined the effects of yarn composition and knitted macrostructure on the functional properties of smart textiles with optical functionalities. The study employed experimental knitting with varied yarn blends and macrostructures, followed by functional property testing. Findings revealed that yarn composition and macrostructure significantly influenced optical performance, durability, and flexibility of smart textiles. The authors concluded that careful material selection and structural design were essential for advancing smart textile applications in wearable technology.

Durgadevi and Deva (2025) presented a study on the plight of unorganised women workers in the textile industry of Tirupur district. A descriptive survey methodology was employed to assess wages, working hours, health conditions, and access to welfare measures. Findings indicated wage disparities, poor working environments, and limited social security benefits among female workers. The study concluded that policy interventions and organizational reforms were necessary to improve the condition of unorganized female workers in textile industries.

Machado et al. (2025) employed a scientific approach to investigate the cytotoxic impact of textile chemicals on human health. Laboratory-based testing was conducted to analyze the effects of chemical residues from fabrics on biological samples. Findings demonstrated that certain textile chemicals posed significant risks to human health, including cytotoxicity and long-term exposure hazards. The study concluded that stricter regulations and sustainable chemical alternatives were required to safeguard both workers and consumers.

Abhilash and Shaji (2025) examined the physical and mental strain on female employees working in textile showrooms. A survey-based descriptive method was adopted to collect responses from female workers regarding fatigue, stress, and workplace challenges. Findings revealed high levels of physical exhaustion and psychological strain due to long working hours and inadequate support systems. The study concluded that workplace reforms, including better scheduling and mental health support, were essential to reduce fatigue among female employees.

Saif and Islam (2025) presented an analysis of growth, development, and selected social sustainability challenges facing the Bangladesh export garment industry. A mixed-method approach was employed to evaluate economic growth alongside social sustainability indicators. Findings highlighted issues such as labor rights, gender inequality, and environmental concerns within the garment sector. The study concluded that balancing economic growth with social sustainability was critical for the long-term viability of the industry.

Khan et al. (2025) examined precarious work and its impact on health among female textile workers in Lahore and Faisalabad. A survey-based methodology was employed to assess health outcomes linked to insecure employment conditions. Findings revealed that precarious work led to adverse health effects, including stress, fatigue, and vulnerability to occupational hazards. The study concluded that labor policies must address precarious employment to improve health and well-being of female textile workers.

Tejada et al. (2025) presented a data-driven lean manufacturing framework for enhancing productivity in textile micro-enterprises. The study employed quantitative modeling and process optimization techniques to evaluate productivity improvements. Findings demonstrated that lean manufacturing practices significantly enhanced efficiency and reduced waste in textile micro-enterprises. The study concluded that adopting data-driven frameworks was essential for sustaining competitiveness in small-scale textile industries.

Toraskar (2024) examined contemporary issues of women workers in the textile industry in Mumbai. A descriptive analysis was employed to highlight socio-economic challenges faced by female workers. Findings revealed persistent issues such as wage inequality, lack of social security, and workplace discrimination. The study concluded that addressing these issues required both policy-level interventions and organizational reforms to ensure equitable treatment of women workers.

Islam and Kusakabe (2024) presented a qualitative study on ways of spouse support in garment workers' workplace resistance. Interviews and case studies were employed to analyze how family support influenced workplace resistance among female garment workers. Findings indicated that spousal support played a crucial role in empowering women to resist exploitative practices. The study concluded that family dynamics were integral to understanding labor resistance in the garment sector.

Kaur et al. (2024) employed a smart manufacturing process framework to address automation under uncertainties in the textile industry. The study utilized process modeling and simulation to evaluate automation strategies. Findings revealed that smart manufacturing improved efficiency and adaptability in uncertain production environments. The study concluded that integrating automation with uncertainty management was vital for future competitiveness of textile industries.

Vassalo et al. (2024) examined sustainability in the fashion industry in relation to consumption in a digital age. A mixed-method approach was employed to analyze consumer behavior and sustainability practices. Findings highlighted that digital consumption patterns influenced sustainability challenges, including fast fashion and waste generation. The study concluded that promoting sustainable consumption was essential to align fashion industry practices with environmental goals.

Li (2023) presented a study on empowerment and increased exploitation of female workers in the textile industry. A descriptive and analytical approach was employed to assess empowerment initiatives alongside exploitation indicators. Findings revealed that while empowerment programs provided opportunities, they also led to increased workloads and exploitation in certain contexts. The study concluded that empowerment must be balanced with protective measures to ensure genuine improvement in female workers' conditions.

## **2.1 Research Gap**

Although numerous studies have examined issues related to female workers in the textile industry, ranging from health hazards, workplace fatigue, socio-economic challenges, precarious employment, and sustainability concerns, there remains a significant gap in integrating these diverse dimensions into a unified empirical framework. Prior research has often been location-specific or theme-specific, thereby limiting generalizability across industrial clusters. Furthermore, most studies have emphasized either qualitative narratives or isolated quantitative indicators without systematically identifying and validating the underlying factors shaping female workers' conditions through robust statistical techniques. The absence of comprehensive empirical analysis using tools such as Exploratory Factor Analysis (EFA) in a major textile hub like Panipat highlights the need for a structured investigation that can uncover multidimensional determinants of female workers' conditions. This study addresses that gap by employing a descriptive survey approach across ten textile industries in Panipat, analyzed through SPSS v26.0 IBM, to identify critical factors influencing female workers' workplace realities, thereby contributing new evidence to the discourse on labor welfare and industrial sustainability.

## **3. RESEARCH OBJECTIVE**

The primary objective of this study was to empirically identify and analyze the factors shaping the conditions of female workers in the textile industries of Panipat, Haryana. The research aimed to systematically examine workplace realities through a descriptive survey approach across ten purposively selected textile industries, thereby capturing diverse experiences of female workers. Using Exploratory Factor Analysis (EFA) with the SPSS v26.0 IBM tool, the study sought to uncover latent dimensions influencing female workers' conditions.

## **4. RESEARCH METHODOLOGY**

The research adopts a descriptive method to systematically analyze the conditions of female workers. Data were collected from ten purposively selected textile industries through a structured survey approach, ensuring representation across different units. The use of Exploratory Factor Analysis (EFA) with the SPSS v26.0 IBM tool allowed the identification of eight key factors influencing workplace conditions. These factors provide a multidimensional understanding of the challenges faced by female workers, ranging from tangible aspects like wages and safety to intangible aspects such as managerial support and gender sensitivity.

### **Research Design**

The study adopted a descriptive research design to systematically analyze the conditions of female workers in the textile sector. This design was chosen because it allows for the collection of detailed information on socio-economic, workplace, and organizational factors without manipulating variables. The descriptive approach provided a clear framework for identifying patterns and relationships among the factors shaping female workers' conditions.

### **Population and Sample Size**

The population for the study consisted of female workers employed in textile industries in Panipat, Haryana. A total sample size of 400 respondents was determined to ensure adequate representation and statistical reliability. This sample size was sufficient to capture diverse experiences across different textile units while maintaining methodological rigor.

### Sample Area

Panipat was selected as the sample area due to its prominence as a textile hub, particularly in home furnishings and export-oriented products. The city's textile industries employ a large number of female workers, making it an ideal location to study workplace conditions. The choice of Panipat ensured that the findings would be contextually relevant and reflective of industrial realities in a major textile cluster.

### Sampling Technique

A purposive sampling technique was employed to select the respondents. This technique was chosen to deliberately focus on female workers in textile industries, as they represent the target group for the study. By purposively selecting respondents from different textile units, the study ensured inclusivity and relevance, while minimizing bias in capturing workplace conditions.

### Tool of Analysis

The data collected through surveys were analyzed using SPSS v26.0 IBM software, which provided robust statistical capabilities for factor analysis. SPSS was chosen for its reliability in handling large datasets and its ability to generate meaningful insights through advanced statistical tests.

### Statistical Test

The study employed Exploratory Factor Analysis (EFA) to identify the underlying factors shaping the conditions of female workers. EFA was appropriate because it allowed the reduction of multiple observed variables into a smaller set of latent factors.

## 5. DATA ANALYSIS

Exploratory Factor Analysis (EFA) was employed in this study because it is a robust statistical technique designed to uncover the latent structures underlying a large set of observed variables. In the context of female workers in textile industries, multiple survey statements were collected to measure workplace realities such as safety, wages, inclusivity, health, and skill development. Since these statements may overlap or represent hidden dimensions, EFA was used to reduce data complexity and group correlated items into coherent factors. This allowed the study to move beyond individual responses and identify distinct factors that collectively explain the conditions of female workers.

**Table 1: KMO Analysis**

|                                                  |                    |          |
|--------------------------------------------------|--------------------|----------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. |                    | .744     |
| Bartlett's Test of Sphericity                    | Approx. Chi-Square | 1417.699 |
|                                                  | df                 | 276      |
|                                                  | Sig.               | .000     |

Source: Primary Data by Researcher using SPSS v26.0

The Kaiser-Meyer-Olkin (KMO) value of 0.744 indicates that the dataset had a good level of sampling adequacy for factor analysis. KMO values range from 0 to 1, with values above 0.70 generally considered acceptable for identifying meaningful factors. This result suggested that the correlations among variables were sufficiently strong to justify the application of Exploratory Factor Analysis (EFA). In other words, the dataset was suitable for reducing multiple observed variables into latent constructs, ensuring that factor extraction would yield reliable and interpretable results.

Bartlett's Test of Sphericity further validated the appropriateness of factor analysis, with a chi-square value of 1417.699, degrees of freedom (df) 276, and a significance level of 0.000. The highly significant

result confirmed that the correlation matrix was not an identity matrix, meaning that variables were interrelated rather than independent. This statistical evidence reinforced the suitability of applying EFA, as the dataset contained enough shared variance among items to identify underlying factors. Together, the KMO and Bartlett's test results provided strong justification for proceeding with factor analysis to uncover the eight dimensions shaping the conditions of female textile workers in Panipat.

**Table 2: Factor Analysis**

| SN | Factor Name                                    | Average Mean |
|----|------------------------------------------------|--------------|
| 1  | Organizational Support and Inclusivity (OSI)   | 3.36         |
| 2  | Workload and Compensation Balance (WCB)        | 3.84         |
| 3  | Work–Life Balance (WLB)                        | 3.31         |
| 4  | Workplace Safety and Hygiene (WSH)             | 4.02         |
| 5  | Skill Development and Growth (SDG)             | 3.45         |
| 6  | Health and Welfare Security (HWS)              | 3.56         |
| 7  | Workload Manageability (WM)                    | 4.14         |
| 8  | Workplace Infrastructure and Maintenance (WIM) | 4.04         |

Source: Primary Data by Researcher using SPSS v26.0

The factor loading matrix highlights eight critical dimensions shaping the conditions of female workers in textile industries. Among these, Workload Manageability (4.14), Workplace Infrastructure and Maintenance (4.04), and Workplace Safety and Hygiene (4.02) scored the highest average means, indicating strong agreement among respondents that these aspects are relatively well addressed in their workplaces. These results suggest that physical safety, infrastructure quality, and reasonable workload distribution are comparatively stronger areas within the textile sector.

On the other hand, factors such as Work–Life Balance (3.31), Organizational Support and Inclusivity (3.36), and Skill Development and Growth (3.45) received lower average means, reflecting moderate satisfaction levels. These findings imply that while basic safety and infrastructure are prioritized, female workers still face challenges in balancing personal and professional responsibilities, accessing career growth opportunities, and experiencing inclusive organizational support. Addressing these weaker dimensions could significantly improve overall workplace conditions and reduce attrition among female workers in Panipat's textile industries.

## 6. CONCLUSION

The study concludes that the conditions of female workers in Panipat's textile industries are influenced by a complex interplay of organizational, social, and economic factors. The eight factors identified through EFA demonstrate that service quality in employment is not limited to wages but extends to safety, respect, and opportunities for growth. Corporate governance practices within textile industries must prioritize gender-sensitive policies, transparent wage structures, and improved workplace facilities to enhance the well-being of female workers. By addressing these factors, industries can foster a more equitable and sustainable workforce, which in turn contributes to productivity and long-term competitiveness.

## 7. FUTURE SCOPE

Future research can expand this study by including a larger sample size across multiple textile hubs in India to validate the identified factors. Comparative studies between male and female workers could provide deeper insights into gender-specific challenges. Additionally, integrating qualitative methods such as interviews and focus groups could enrich the understanding of lived experiences, thereby complementing the quantitative findings. This extended scope would strengthen policy recommendations and contribute to the development of inclusive labor practices in the textile sector.

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