Chemical Exposure and Occupational Health problems in the Garment Industry of Ballari City-Karnataka

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Abstract - **The garment industry plays an important part in employment generation in Karnataka, particularly for workers. Nevertheless, exposure to chemicals utilized in dyeing, printing, finishing, and cleaning processes presents significant occupational health hazards. This study investigates the degree of chemical exposure and its effects on the health of garment industry employees in Ballari city. The research is founded on Primary data collected from 120 laborers employed in selected garment factories. A systematic interview approach was utilized to collect information concerning workplace conditions, chemical exposure, health issues, and safety protocols Statistical techniques, such as percentage analysis, were utilized to interpret the data. The findings suggest that a substantial number of workers are frequently exposed to chemicals and experience respiratory issues, skin irritation, eye discomfort, and musculoskeletal disorders. The study underscores the lack of awareness and insufficient use of protective gear among workers. It recommends the implementation of enhanced occupational safety measures, improved ventilation systems, and health awareness initiatives to protect the welfare of garment workers.**

Keywords: **Chemical Exposure, Occupational Health, Garment Workers, Ballari.**

I. INTRODUCTION

The garment The sector is among the fastest-growing sectors in India and provides employment to millions of workers, economically weaker sections.. In Karnataka, cities like Ballari have experienced significant growth in garment manufacturing units, primarily as a result of the availability of work and industrial policies that promote textile production. Despite its economic significance, the garment industry is linked to numerous occupational hazards. Employees frequently encounter chemicals utilized in dyeing, bleaching, finishing, and cleaning processes. Extended exposure to these substances can result in respiratory issues, skin allergies, eye irritation, and various other health complications. Furthermore, inadequate ventilation, prolonged working hours, and insufficient protective equipment heighten the risks faced by workers. Thus, it is crucial to comprehend the occupational health conditions of garment workers from both sociological and public health viewpoints. This study aims to examine chemical exposure and related Health issues faced by garment workers in Ballari city.

II. REVIEW OF LITERATURE

Occupational health hazards in the textile and garment the industry has attracted significant attention. From researchers As a consequence of the increasing exposure of workers to chemicals, dust, and hazardous working conditions. Numerous studies have investigated the correlation between workplace exposure and the health conditions of garment workers.

- Hassan Tounsadi (2020): Conducted an epidemiological An inquiry into the impacts of chemical substances utilized in the textile industry on the health of employees. The research revealed that prolonged exposure to textile chemicals, including dyes, solvents, and finishing agents, exerts a considerable influence on workers' health, resulting in respiratory issues, skin irritations, and various occupational diseases.
- Jignesh Salvi (2024): Examined occupational hazards within chemical-related industries and highlighted the necessity of preventive measures to mitigate health risks for workers. The study advocated for the implementation of effective safety policies, routine health examinations, and awareness initiatives to lessen occupational health challenges.
- Ejaz Ahmed Shaikh (2025): Investigated occupational exposure and risk perception Among employees in the textile sector. The findings indicated that employees frequently underestimate

the health risks linked to chemical exposure, thereby heightening their susceptibility to occupational diseases.

• S. Karuppusamy and V. Priyadharsini (2025): Examined the effect of occupational hazards on pulmonary function in textile workers in Tirupur. Their study uncovered that ongoing exposure to textile dust and chemicals negatively affect pulmonary performance and increase the potential for danger respiratory disorders.

• J. O. Priya (2025): Conducted a systematic review and meta-analysis on depression and workplace stress among garment industry workers. The study concluded that stressful working environments, extended working hours, and poor occupational safety significantly contribute to psychological well-being issues among workers.

➢ Objectives of the Study

1 In order to recognize the types of chemicals used in garment factories in Ballari.

2. To analyze the issues related to occupational health. Experienced by garment labourers due to chemical exposure.

3. To propose actions for improving Occupational health and safety within the garment industry.

➢ Study Area:

The research is carried out in Ballari city of Karnataka, which has emerged as an important center for garment manufacturing. The city hosts several garment factories that employ a large quantity of employees. The existence of textile processing activities, including dyeing, washing, and finishing processes, exposes workers to various chemicals and workplace hazards. Therefore, Ballari provides a suitable setting for studying occupational health issues within the clothing industry.

➢ Sources of Data:

The research relies on both main and supplementary data sources.

- Primary Data:

Primary data is collected directly from garment workers through structured interview schedule Personal interviews are conducted to understand workers' experiences related to chemical exposure, working conditions, health problems, and safety awareness.

- Secondary Data:

Secondary data is collected from various sources such as: Books and research articles, Government reports, Journals related to labour studies and occupational health Reports of organizations such as the International Labour the Organization and the World Health Organization.

➢ Sampling Method and Sample Size:

The study uses a purposive sampling method to select garment employees who are directly engaged in production processes where chemical exposure is possible. Workers from different garment factories in Ballari are selected to obtain a diverse representation of experiences total of sample respondents 120 workers are selected. For the research study the respondents include both male and female workers, with a majority being men labourers who constitute A considerable segment of the clothing labor force.

Occupational Health Problems

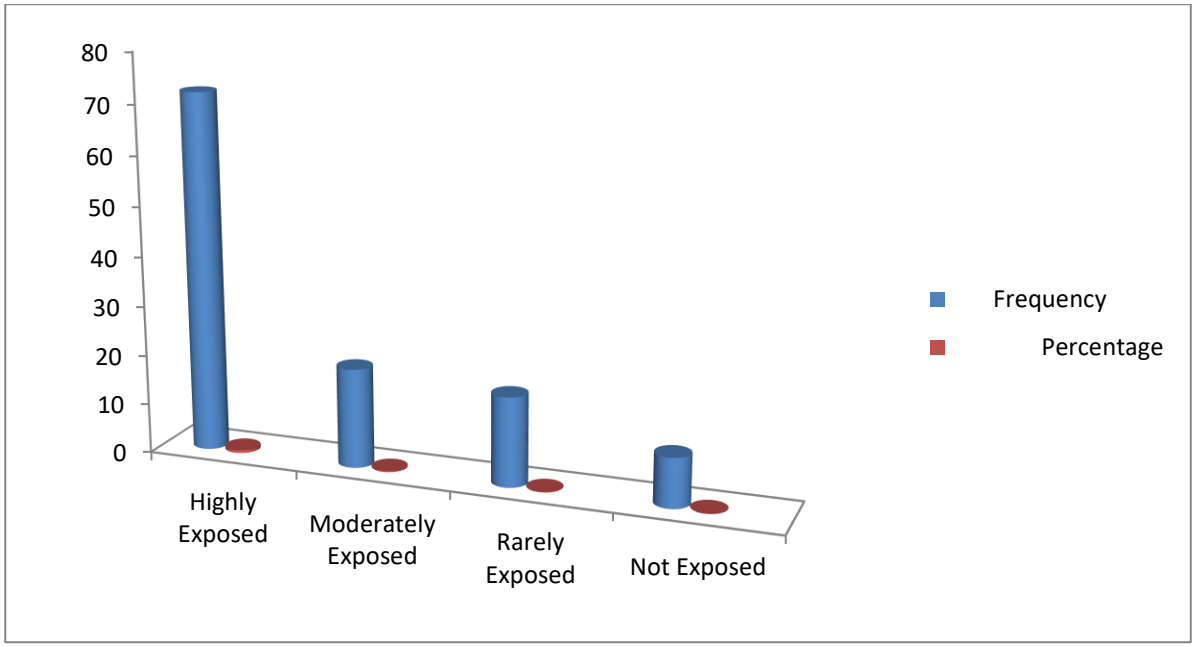
The study Several health issues have been identified among garment workers:

Health Problem	Percentage
Respiratory problems	26.7%
Musculoskeletal pain	21.6%
Skin irritation	20%
Headaches	16.7%
Eye irritation	15%

Respiratory problems were the health issue that is most frequently reported, primarily as a result of exposure to textile dust and chemical vapors.

Table 1: Exposure to Chemicals at Workplace

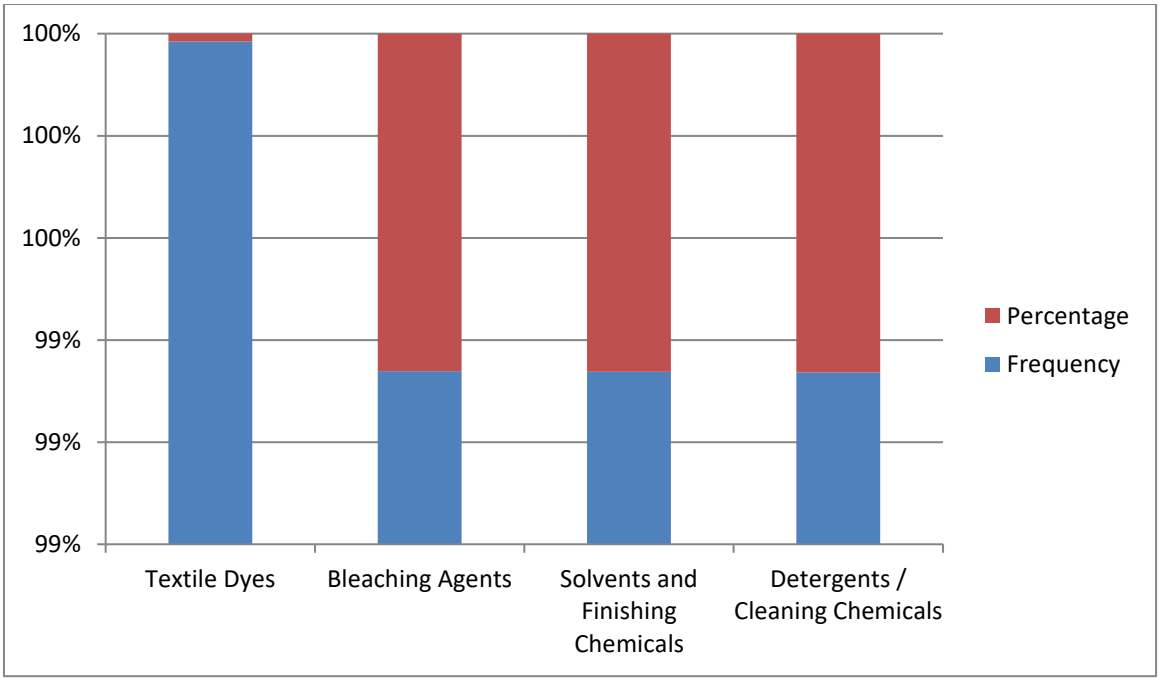
Exposure Level	Frequency	Percentage
Highly Exposed	72	58%
Moderately Exposed	20	23.3%
Rarely Exposed	18	12%
Not Exposed	10	6.7%
Total	120	100



A majority of respondents (58%, 72 out of 120) fall under the "Highly Exposed" category, indicating frequent exposure. The "Moderately Exposed" group includes 20 respondents (23.3%). Together, 92 respondents (76.7%) experience at least moderate exposure, showing that the phenomenon is widespread. In contrast, 18 respondents (12%) are "Rarely Exposed," and only 10 (6.7%) are "Not Exposed." Overall, the results indicate that over seventy-five percent of the participants exhibit considerable levels of exposure.

Table 2: Types of Chemicals Workers Are Exposed To

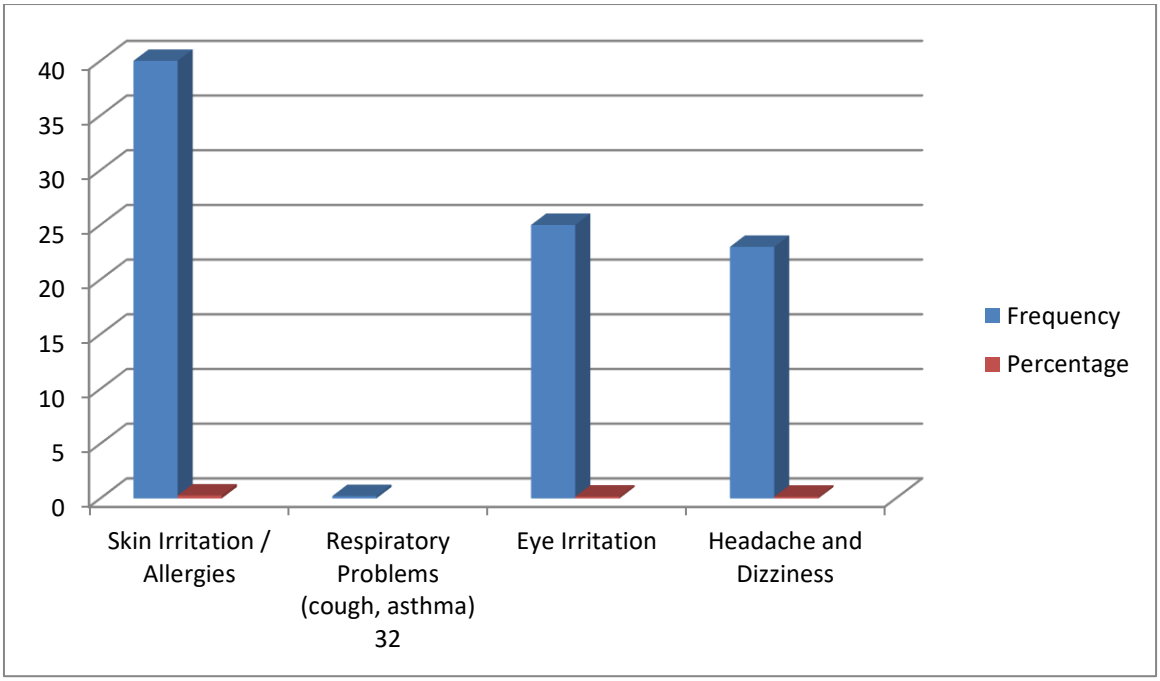
Type of Chemical	Frequency	Percentage
Textile Dyes	46	0.7%
Bleaching Agents	32	21.3%
Solvents and Finishing Chemicals	27	18%
Detergents / Cleaning Chemicals	25	16.7%
Mixed Chemical Exposure	20	13.3%
Total	120	100%



The information illustrates the allocation of chemical types in textile manufacturing or occupational exposure. A discrepancy is noted in the percentage for "Textile Dyes," which should be corrected to match its frequency. Out of a total sample of 120, the recalculated distribution shows: Textile Dyes (30.7%, 46 cases) as the most prevalent category; Bleaching Agents (21.3%) as the second most common; Solvents and Finishing Chemicals (18%); Detergents/Cleaning Chemicals (16.7%); and Mixed Chemical Exposure (13.3%).Textile dyes and bleaching agents together account for over 52% of total exposure, while the top three categories (dyes, bleaching agents, and solvents) comprise 70%, indicating a high concentration in key chemical groups. These findings reflect standard textile processes: dyes for coloring, bleaching agents for fabric preparation, and finishing chemicals for enhancing fabric quality. Overall, chemical exposure is largely concentrated in dyeing, bleaching, and finishing stages of textile production.

Table 3: Health Problems Due to Chemical Exposure

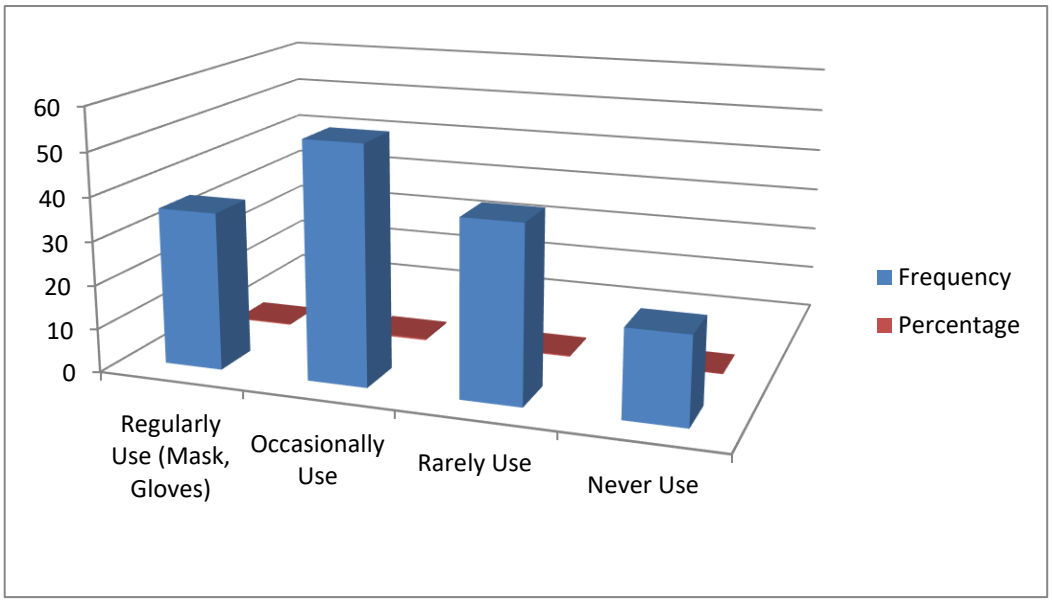
Health Problem	Frequency	Percentage
Skin Irritation / Allergies	40	26.7%
Respiratory Problems (cough, asthma) 32	21.3%	
Eye Irritation	25	16.7%
Headache and Dizziness	23	15.3%
Musculoskeletal Pain	18	12%
No Major Health Problems	12	8%
Total	120	100%



Based on 120 respondents, the analysis shows that skin irritation and allergies The most common health concerns are affecting 26.7% (40 individuals), subsequent to respiratory problems such as cough and asthma at 21.3% (32 individuals). Overall, 92% (108 respondents) reported At least one health issue, while only 8% (12 individuals) reported no major issues. The significant occurrence of skin and respiratory problems, along with eye irritation, indicates exposure to harmful workplace conditions such as chemicals, dust, and poor air quality.

Table 4: Use of Protective Equipment

Safety Equipment Usage	Frequency	Percentage
Regularly Use (Mask, Gloves)	36	24%
Occasionally Use	54	36%
Rarely Use	40	26.7%
Never Use	20	13.3%
Total	120	100%



The data indicates that safety equipment usage is largely inconsistent among respondents. Approximately 60% of individuals utilize it only on an occasional or rare basis, while 30% (36 individuals) engage with it regularly, and 13.3% (16 individuals) do not use it at all. In total, 66% (80 respondents) employ safety equipment at least sometimes, whereas 40% (48 respondents) either rarely or never use it, which places them at a greater risk. The predominant response is "Occasional Use" (36%, 44 individuals), indicating a degree of awareness but a deficiency of consistent practice. The quantity of workers who infrequently use equipment (32) is nearly equivalent to those who use it regularly (36), underscoring a lack of consistency. The existence of 16 respondents who do not use protection at all further illustrates inadequate compliance. Overall, only 30% exhibit consistent safety practices, while 70% show irregular or no usage, highlighting the necessity for enhanced awareness, training, and enforcement. A broader examination of 120 garment workers in Ballari reveals significant exposure to chemicals such as dyes, bleaching agents, and solvents. Numerous workers encounter health issues including skin irritation, respiratory complications, and eye irritation, and the minimal use of protective equipment exacerbates occupational health risks.

III. MAJOR FINDINGS

- A significant number of Garment workers frequently endure to chemical exposure during the manufacturing processes.
- Respiratory issues, skin irritations, and musculoskeletal discomfort are prevalent health concerns.
- The majority of employees lack access to adequate safety gear and protective measures.
- There is an absence of awareness regarding chemical hazards among the workforce.
- A notable correlation exists between exposure to chemicals and health issues related to occupational safety.
- The majority of employees originate from economically disadvantaged backgrounds. Characterized by low income and limited financial stability.
- The majority of participants have low educational attainment. Which hinders their understanding of occupational rights and safety protocols?
- Female workers encounter the dual burden of household responsibilities and workplace demands, resulting in heightened stress levels.
- Access to routine medical examinations and healthcare services is insufficient for the workers.
- Numerous workers are engaged on a temporary or contractual basis, leading to job instability and a lack of employment benefits.
- The awareness and use of government welfare programs are notably low among the respondents.

IV. SUGGESTIONS

- The garment industry ought to supply protective gear, including masks and gloves, to its workforce.
- Adequate ventilation systems must be established in factories to minimize chemical exposure.
- Health awareness initiatives should be organized to inform workers about occupational risks.
- Government bodies are required to enforce stringent occupational health and safety regulations within the garment sector.
- Routine medical examinations should be scheduled for workers to identify health issues at an early stage.

V. CONCLUSION

The garment the sector It is crucial for offering employment opportunities to individuals in Ballari. Nevertheless, The research indicates that that these employees encounter considerable workplace health risks stemming from chemical exposure and inadequate working conditions. Common health concerns encompass respiratory ailments, skin irritations, and musculoskeletal disorders. The

absence of protective equipment and a lack of awareness exacerbate these challenges. Enhancing workplace safety, supplying protective gear, and raising awareness regarding occupational health are critical measures to safeguard the welfare of garment workers. This research seeks to assess the extent of chemical exposure experienced by employees in the garment industry in Ballari.

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