

## Major Health Risk Factors in Textile Printing Units of Bagru (Distt. Jaipur)

Rena Mehta\*

Department of Home Science (Clothing and Textiles)  
The IIS University, Gurukul Marg, SFS, Mansarovar, Jaipur 302020 INDIA

### Abstract

The research is instigated with the objective to study the small-scale printing industries together with the issue of occupational health problems and their causes in printing units as a typical informal small-scale industry in an industrially developing country. The broad area of the study was to review health risk factors and related occupational health and ergonomic problems in the printing industry. To gain a holistic insight into the functioning and occupational risks to the workers of textile printing units of Bagru, purposive random sampling technique was adopted for the present investigation in order to select the respondents. Bagru has got 250 printing units. These industries liberate a variety of chemicals, dyes, acids, alkalis, beside other compounds like heavy metals, which are known for their hazardous properties. The result revealed that chemicals used in the printing process adversely effected the environment and human health.

### Keywords

Occupational Health, Printing, Risk Factors, Textile

### Introduction

Occupation is the one in which person not only earn his daily bread but also spend one third of average adult life (Rogers, 1994). Textile industry is one of the major growth industries for export purpose and which require large number of workers.

Bagru one of the major centers of printing in Rajasthan is famous for its dabu and block printing. Bagru is a village, situated between 5-7 kilometers area. It is situated at a distance of 32 kms east of Jaipur. The total population of the bagru is 15,000 and the total no. of printing units is 250. There is 300-350 families are affianced in the printing business. Occupational health risk can be described as the possibility of suffering health impairments from exposure to a hazard that originates in the working environment (Allbay, 2000). Occupational diseases indicate the pathological process caused by the repetition of a work-related activity, such as prolonged exposure to hazards at work whose effects are only manifest after long periods of time. Exposure to toxic chemicals poses serious health threats, potentially causing cancer, respiratory and skin diseases, as well as adverse effects on reproductive functions (Stellman, 1998). Workers are often exposed to various

types of hazardous chemical agents such as solvents and metal dusts and dyes used in textile industry.

Respiratory problem is one of the major health threats to textile workers. It leads to some systemic symptoms in exposed workers, along with this they suffer from number of other physical problem like hearing loss or noise problem. (Shake, 1996; Chavalitsakulchai, 1989); Respiratory problems and pulmonary dysfunction in a group of women weavers in South Africa (Shamssian and Shamsian, 1996); colourvision dysfunction in long term solvent (Dye) exposure, (Ihrig, 2002, Shamssian and Shamsian, 1996).

A study of textile workers in Vietnam who were exposed to high noise level (92-99 dBA), were suffering from some degree of hearing impairment (Nguyen, *et al*, 1995). Approximately 50% of those with hearing impairment had worked for more than 10 years in the weaving department. A number of other hazards like heavy lifting loads, fire, electrocution, trips and falls, heat stress, machine related accidents, release of toxic gases like chlorine, spills of corrosive acids and caustic materials, chemical scalds and heat burns are associated with textile yarn, manufacturing, cloth weaving, dyeing and processing (ILO, 1998).

\* Email : renamehta@rediffmail.com

The introduction of a more environmentally sound practices of work is however, hampered by many practical obstacles. The main problem lies in the collection and assessment of the environmental data. It becomes difficult to calculate the impact of usually complex processes on the health of the workers. In view of these facts, a survey was conducted to discern the factors responsible for the problems and to assess the health risk caused due to textile printing industry.

### Material and Methods

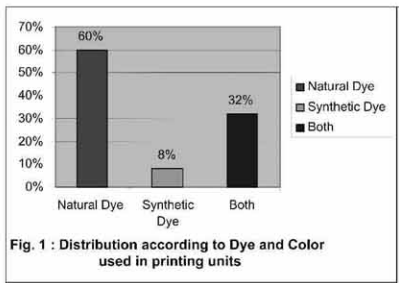
The study was conducted amongst the workers engaged in the printing operations at Bagru. The subjects comprised of 80 workers engaged in 25 printing units in order to procure the information regarding their work profile and health problems faced in the printing units. A descriptive research design was planned using a survey method. Random sampling technique along with snowball technique was adopted to select a sample size of 25 enterprises i.e 10% of the total 250 printing units from Bagru (Rajasthan). Each worker was questioned in detail to find the exact nature of the job, the chemicals and dyes to which the worker was exposed, whether protective clothing and barrier creams were used, and previous occupations (if any), information related to health problems was analyzed by asking the questions related to Chemical (Skin problems), Physical (upper and lower limb problems) and Biological (Cardio vascular) hazards faced by the respondents.

### Results and Discussion

Findings of the investigation as obtained on analysis of data using survey and observation method through open and close ended interview schedule are described and discussed under following heads: Technical information of the units; Printing process; Profile and job description of the workers; Occupational health problems of the workers.

#### Technical information of the printing units

Technical information regarding the Bagru cluster revealed that 16 units were small scale units, 7 units medium scale enterprises and 2 units were large scale units.



Data in Fig.1 indicated that fifteen units used natural dyes in printing and two units used synthetic dyes and eight units used both natural and synthetic dyes. Natural dyes are the specialty of Bagru.

All units used cotton fabric for printing and among them 68% units used silk fabric and 92% units used chiffon fabric and eighty percent units used georgette for the printing. Eighty percent units design created on order requested and 5% units design created on both order request and self. The buyer specified the designs for block and there was no designer appointed in any unit.

Generally, all the family members participated in the Printing work. The work was done manually in the courtyard of small residential houses, with poor ventilation, light and working conditions. Wood was used as a fuel. The solution for printing and dyeing was prepared in one corner of the house and washing and rinsing was done in another. The drainage system was open and inadequate. Clothes were dried in the open space in front of the house. The workers who prepared the print paste did not use rubber gloves. Printing of the fabric was carried out in rooms or in the verandah.

#### Printing process

A design is sketched onto the background cloth. This sketched design is covered with clay on which saw dust is sprinkled. The saw dust sticks to the cloth as the clay dries. Thereafter, the entire cloth is dyed in selected colors. The area where clay and sawdust mixture is present does not catch the dye and remains colorless. After dyeing and drying, the cloth is washed to remove the clay and the mixture. For additional color, this cloth is dyed again in a lighter shade to cover the patterned area.

## Profile and job description of the workers

Data indicated that 46% workers belongs to the age group of 18 - 30 years who were working in these units for last 2-10 years, 23% workers belongs to the age group of 40-50 years who were working in these units for 20-25 years and 32% workers belong to the age group of 30-40 years. Out of the total 40% workers were male and 36% workers were female. All the workers were belonging to Hindu chippa community. Education qualification of the workers was very low. 54% workers were qualified upto primary education and 47% workers were qualified upto secondary education. No one was educated more than secondary.

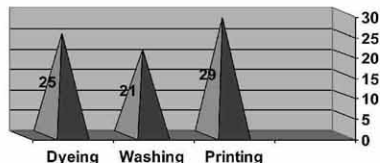


Fig. 2. Job description of the workers

Data regarding the job description of the workers indicated that twenty nine workers were engaged in printing work and Twenty five workers were doing dyeing and twenty one workers performed the task of washing and drying whereas five of the total workers did both dyeing and printing (Fig.2).

## Health Risk factors in the Printing units

The printer has to squat for the printing process with severely deviated and harmful postures of the neck, back and legs, which results in deformity in the back and hip bones and other kinds of musculoskeletal problems. Printing units are mainly home-based were small in size and lacked adequate lighting, ventilation, cooling and heating systems. Working hours were not fixed and depends on the production and work load irrespective of the fatigue caused due to the long working hours.

## Ergonomic Risk factors in printing profession

**Awkward Posture** Due to poor designed tools and work station shoulder problem (Fig.3), elbow pain, weakness, finger pain, leg pain, and joints problems were major problems faced by the respondents. It was observed that 31.25% of the respondents were suffering from shoulder pain, 22.5% workers were suffering from elbow pain and 24% workers were suffering from pain in fingers. In some Cases the printer adjusts with the table height by keeping an extra four pegged stool.



Fig.3 Improper working posture



Fig.4 Exposure of skin to the chemicals

## Repetitive movements and long working hours:

Printing with block comprises of repetitive movements, hence the printer, has to work for long hours at the same pace and moves resulting in tiredness of lower and upper limbs. 70 % of the respondents suffered from the lower limb problem, Leg pain and joints pain were the problems stated by the respondents, 55% workers were suffering from leg pain the reason could be long working hours. Workers performing the task of washing were more prone to this type of pain owing to regular and long hours of standing while washing the fabrics.

**Contact stress:** Due to continuous exposure to the chemicals, print paste and dyes the dyers and printers are exposed to high risks of skin allergies (Fig.5). The major problem faced by the workers was related to skin. Fifty one percent respondent's were suffering from the skin problems that comprised of itching, dry skin, redness and cracks owing from exposure to the chemicals. (Fig.4) Alum is the main chemical which affected the worker's skin. Alum was used in after treatment to fix the color on fabric so the use of alum is very necessary. In comparison to the printers, dyers were more prone to skin infections.



Fig.5 Redness of the skin

**Forced Exertion:** In order to print design on the fabric the blocks needs to be stuck hard and owing to the repetitive movements it creates severe pain in the palm and wrist (Fig.3). Out of the total 47.5% of the respondents had hand related troubles.

**Inadequate lighting:** The printing task is considered to be the most precision work that requires accuracy, filling, outlining and background colouring needs to be very fine and close together, and colour recognition is of vital importance. Such operations require adequate lighting both qualitatively and quantitatively. In 90% of the printing units lighting was not adequate, which resulted in considerable eyestrain besides eyestrain, insufficient lighting resulted in awkward posture, for printers inclined their heads, necks and backs to be able to look closer at their work

**Improper Climate:** Majority of the respondents (80%) complained about the improper thermal conditions in the printing units. Only the printers who owned their own units were satisfied with the climatic conditions within the units.

### Hygienic Risk Factors in the Printing Profession

**Contaminated ambient air:** Due to improper ventilation and fumes coming out of the chemicals used the workers are exposed to contaminated air.

**Toxic Hazards:** Exposure to chemicals such as chromates, silicates, bleaching agents, alum etc. resulted in skin diseases and dermatitis to fifty five percent of the respondents.

**Table no. 1. Problems faced by the workers owing to the textile industry**

S.No.	Health Problems	Symptoms	No. of respondents	Percentage
1	Physical			
(a)	Shoulder problem	Pain in shoulder Stiffness Tremors	25 - 18	31.25 - 22.5
		Elbow problem		
(b)	Hand problem	Weakness Tingling Finger pain Stiffness	20 - 18 -	25 - 22.5 -
(c)	Lower limb problem	Pain in legs Pain in joints	44 12	55 15
2.	Chemical Hazards			
(a)	Skin problem	Itching Dry skin	17 24	21.25 30
3.	Biological Hazards			
(a)	Cardiovascular	B.P. high/low Chest pain	3 1	4 2

N=80 (Number of Respondents) Multiple responses

In developing countries, the scale of use of human resources in small-scale in labour-intensive industries

is enormous. In this situation, it must be obvious that very small improvements in working conditions, implements, tool design or working methods can lead to large benefits. It is believed that occupational health programs should focus more on the informal sector, which employs a large proportion of workers. Paying attention to occupational health and safety in this sector and improving working conditions will undoubtedly have considerable impact on the national economy and the quality of people's life. The study is an attempt to investigate the problems faced by the workers in the Block printing enterprises due to improper work practices. It is therefore, suggested that government and other organizations should come forward and offer counseling sessions for the workers in order to impart knowledge regarding sound working practices so as to evoke a healthy environment free from occupational hazards.

### References

- Allaby, M. (2000) Basics of Environmental Science 2nd edition. Retledge, London, 286-287.
- Chavalitsabulchai, P. (1989) Noise Expose and Permanent Hering Loss of Textile Workers in Thailand. *Industrial Health* 27:165-173.
- Ihrig, A. (2002) Pilot Survey on Prevalence of Television Dysfunction in Long Term Solvent Exposed Painters. *Industrial Health* 41:39-42.
- ILO Encyclopedia of Occupational safety and Health (1998) 2, 89.
- Nguyen, A.L., Nguyen T.C., Van J.L., Hoang M.H., Jonai H., Sudo A. (1995) Noise Levels and Hearing Ability of Female Workers in a Textile Factory in Vietnam. *Ind Health* 36(1).
- Rogers, B. (1994) Occupational Health and Nursing Concepts and Practices, Philadelphia W.B., Saunders Company, 48-64.
- Stellman, J.M. (1998) Glass B. Encyclopaedia of occupational health and safety; Small enterprises and occupational health and safety. 4th ed. S Geneva, Switzerland.
- Shake, G.H. (1996) Noise Problem in a Polyester Fiber Plant in Pakistan. *Industrial Health* 34(4):427-431..
- Shamssain, M.H., Shamssian, N. (1996) Respiratory symptoms and pulmonary function in a group of women weavers in South Africa. *Ann Hum Biol* 24(4): 299-306.