

Recommendations

Program for Improving Health of Workers Exposed to Organic Solvents

This study was designed to throw some light on some health hazards of exposure to organic solvents especially effects on the liver and respiratory system. Also, we tried to identify methods for detection of liver affection resulting from exposure to organic solvents at early stage reversible before deterioration of liver functions and permanent damage of liver cells.

In this study, there were effects on the liver and respiratory tract that were not found in controls.

Goal:

Our goal is to outline an appropriate program for prevention of early changes in liver occurring as a result of exposure to mixture of organic solvents and to find out better alternative diagnostic tests for liver enzymes.

The operational objectives include:

1. Implementing of a program for improving environmental conditions.
2. Upgrading preventive measures applied to workers at workplace.
3. Development of strategies to control exposure levels and duration at workplace.
4. Improve workers health through preemployment examination and periodic medical examination.

5. Increase awareness of workers about the nature and hazards of different materials that they are dealing with.

Intermediate targets:

1. Environmental conditions:

Adequate ventilation, substitution of dangerous chemical byproducts into less hazardous ones.

2. Health Care Delivery System:

General practitioners should be encouraged to pick cases with liver or respiratory symptoms or complications and refer them to specialists and they should have the right of upgrading their skills via continuous training courses.

3. Health Insurance:

Proper understanding of the concept of health insurance to ease the financial burden of medical care and to optimize the use of medical services.

4. Increase preventive measures and proper use of protective personal devices.

5. Health Education:

- Educational program should be implemented through different health care facilities.
- This program is directed to special targets which are:
 - a) Workers
 - b) Administration
 - c) Occupational physician.

Strategy:

Promotion and development of the already present implemented programs for workers exposed to chemicals at workplace especially organic solvents:

1. Coop with the administration.
2. Establish an active medical surveillance program to monitor the health of employees at painting manufacturing industry.

The program should include:

a. Preplacement examination which includes at least

- Comprehensive medical and occupational histories
- Physical examination and medical screening of workers (including blood tests to evaluate liver function).

b. Periodic examination

- Should be made on annual basis
- Should include medical and occupational histories and Physical examination.
- During examination, workers or employees having medical conditions which would be directly or indirectly aggravated by exposure to organic solvents shall be counseled on the increased risk of impairment of their health from continuing working with these substances.
- Also, workers should be encouraged to seek medical advice if they have any medical complain.

c. Medical records

They should be kept by the employer for all employees. Those records should be made available to the designated medical representatives of Ministries of Health and Population, Education, Labor and to the employees and former employees.

3. Provide the appropriate personal protective equipment (gloves, respirators, and safety glasses). Also, the company should conduct the appropriate training in the proper selection, use, and maintenance of this equipment.

4. **Hazard Awareness:** Workers should be informed about the potential health effects of materials to which they are exposed.
5. **Engineering Control:**
Consider substitution of a less toxic chemical than solvents for operations conducted in confined spaces or for any situation where there is potential for exposure at high concentrations. If substitution is not possible, use other forms of engineering controls such as ventilation or isolation to reduce exposure.
6. **Health Education** (workers should receive training in):
 - a) The importance of avoiding skin contact with organic solvents.
 - b) the use of appropriate protective equipment (including protective clothing and respiratory protection),
 - c) Specific work practices necessary to work safely with organic solvents.

Resources:

1. Human resources:

***Well trained occupational physician**

Integrated efforts of general practitioners, nurses, and social workers supervised by occupational physician for counseling and referral of workers to specialists, physicians and consultants.

***Health educators**

All methods of health education should be integrated together to benefit of them, that to help minimize hazards to which workers are exposed. The message should be simple and accepted to the community.

***Occupational Safety and Health committee.**

The committee could provide periodic medical examination for all workers for early prevention and proper management before development of complications and follow up of those with abnormal liver function tests.

2. Non-human resources:

***Fund**

It can be obtained from the contribution of ministry of Industry, ministry of health group donations and international organizations.

*** Equipment for early diagnosis**

*** Medications and diagnostic kits**

*** Time**

It should be carefully estimated and adjusted to the need objective.

3. Technical resources

*** Laboratories**

Coop with laboratories under Health Insurance or contracts with certified laboratories (National Research Centre is one of the best).

***Community motivation**

Motivating the community to help and participate actively in the program designed to improve the quality of life of workers.

4. Organization Resources:

***Community participation**

Community members have the right and duty to participate actively in all programs for the welfare of occupationally exposed workers. So, establishment of

non governmental agencies to care for affected workers is highly needed for improvement of the quality of life of those workers.

Administration of the plan

Organization of the plan:

Coordination committee should be held among the ministries Industry, Health, National Research Centre and Universities. Through the committee all resources are pooled through the building of information system.

Manpower administration:

Members of committee should select their assistances from ministries as well as administration.

Financial administration:

The cost of the whole process should be precisely estimated and should be obtained from the budget of the factory or going to Health Insurance.

Public Relations:

Intrinsic: The arrangement between the committee and the ministries could be achieved through the representing members and their assistances.

Extrinsic: The arrangement between the committee and the community could be achieved through community leaders as well as mass media.

Operation:

****preparatory phase:***

1. Upgrading the reporting and recording systems.
2. Job description to the manpower through task analysis.

3. Conduction of training for the active manpower.

Hence, implementation can be performed in two terms, **long term** stage and a **short term** one.

**Long term stage for implementation:*

- Decrease number of workers involved in highly hazardous processes.
- Decrease duration of exposure to hazardous materials.
- Substitution of hazardous materials and investigate whether non-solvent or low-solvent inks can be used.
- Proper maintenance is important for reducing exposures and increasing the life and performance of the machine. Maintenance should be done properly to prevent the performance of the machine from degrading, which might result in increased solvent exposures. Maintenance activities that are particularly important in reducing solvent exposures include ensuring vapor recovery systems are in good working order and checking for liquid and vapor leaks on equipment piping and ductwork and on the machine. When available, follow the maintenance recommendations from the manufacturer.
- Effective ventilation can reduce employees' exposure to air contaminants substantially. If there is poor ventilation, consult a ventilation engineer to make necessary improvements for work environment.
- Implement a hazard-communication program. Such a program includes container labeling, training, and a written program.

**Short term stage for implementation:*

Medical, Safety, and Industrial Hygiene Programs

A. Medical

Pre-employment and periodic medical examination should be done. Arrangements should be made with the local hospital for acute medical care. Good social environment and psychological support is essential for the welfare of employees.

B. Safety

The factory, at the time of the survey did not have an organized safety program. They should show workers tapes on hazard communications, chemical safety, material handling, and Material Safety Data Sheets. Also, the company has to train the employees about basic principles of Cardiopulmonary resuscitation. Furthermore, the company has to conduct fire drills at risky places to reduce the potential damages. Prevention of accidents is one of the important safety issues at workplace.

C. Industrial Hygiene

The company must have an industrial hygiene program. The industrial hygiene evaluation involves air sampling for selected contaminants associated with substances and materials used in the industrial process. All personal exposure samples must be obtained in the workers' breathing zones. Sample duration is approximately a full work shift.

- The educational principles should be modified at different levels to ensure efficient training and effective learning of workers to raise their awareness.

➤ ***Educating workers about:***

- Personal protective equipment: Provide employees with respirators for use during performing work tasks. Personal protective equipment is the least effective way to control employee exposures because it requires a high level of employee commitment and can result in adverse physiological effects. Use of respirators should not be the only method for limiting exposures, but should be worn until hazardous chemicals can be substituted or engineering (ventilation) and administrative controls lower exposures to an acceptable level. Employees wearing respirators must be properly fitted, trained, and undergo medical evaluations.
- Encourage the employees to change their work clothes more frequently. More frequent changing of their clothes would reduce potential problems resulting from repeated contact with the materials being used.
- Prohibit smoking and eating in the work areas.
- Understanding the nature and hazards of the materials they are dealing with
- Learning how to identify symptoms of acute toxicity

➤ ***Educating the administration about its role towards workers in:***

- Always encouraging workers.
- Emphasizing the importance of the preventive measures and use of personal protective equipments at workplace.
- Emphasizing the importance of the continuous training programs to improve their performance and decrease exposure.

➤ ***Educating both workers and administration about :***

- Training programs for workers and administration to strengthen their relations.
- The importance of continuous screening of workers for potential health effects.
- To emphasize the importance of periodic medical examination.
- To emphasize the importance of coping methods with their illness or disability.