

# Occupational Hazards Plaguing Jewellery Workers: A Review

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## ABSTRACT

*Health risks are inherent in every close contact, prolonged work requiring manual labor, and goldsmithing is no exception. With recent studies unearthing the several health hazards affecting workers with both acute and chronic ailments, this work enumerates the major health hazards and impediments that affect the natural and proper working of the personnel engaged in jewellery work. The extent of such risks to health and preventive measures are discussed in detail.*

**Keywords:** Jewellery Workers, Occupational Risks, Computer Vision Syndrome.

## Introduction

While a 'Hazard' is the potential for an agent or process to do harm, 'Risk' is the likelihood that an agent will cause an injury or disease under specified conditions (National Occupational Health and Safety Commission, 1990). Some hazards cause or contribute to the incidence of occupational dermatitis. They include: chemical agents - a large number of organic and inorganic substances, as solids, liquids or gases, a few of which may be carcinogenic for the skin; physical agents - mechanical effects, heat, cold, water, relative humidity, sunlight and other forms of radiation which may be carcinogenic for the skin; and biological agents - bacterial, viral and fungal infections, parasite infestations, plants and plant products and so on.

Globally, occupational risks have been classified as the tenth leading cause of morbidity and mortality (WHO, 2007). The paper tries to examine the major hazards in gold manufacturing activities, their reasons for occurrence and measures to be taken for ensuring proper worker safety.

Jewellery making, including jewellery casting, is a unique profession that requires application of artistic skill and knowledge of the scientific properties of fine jewels and metals (Panchadhyayee, P., Saha, K. et al., 2016). One who engages in jewellery manufacturing activities is known as an artisan, and they use only hand tools and hand made machines for the creation of complex designs and shapes. They employ their artistic skills and the service of family members for the completion of their work. Most of them work within their home settlements. In the due course of their work, a number of chemicals are used which have been directly or indirectly affecting them in the form of chronic diseases such as asthma, bronchitis, cancer, skin problems, urinary problems, parkinson, reproductive problems etc. In this context, it can be pointed out that a healthy and strict guideline is essential for the occupational safety among jewellery workers. It is important to note that several of the occupational carcinogens as stated in the tenth revision of the International Classification of Diseases and Related Health Problems (ICD-10) include asbestos, arsenic, cadmium, chromium, nickel, silica and so on which are at least part players in a jewellery worker's occupation (WHO,1999). Apart from cancer, these can also result in Pneumoconiosis, a respiratory disorder. India is considered as one of the major consumers of gold, and a huge sector of workers are directly involved in the production and selling of designed gold ornaments and other utensils all over the country. It thus becomes quite clear how impactful the hazards could be for them should they choose not to have proper work practices or worker safety policies. Jewellery manufacturing activities come under the informal sector, especially after the 1990s as they were not regulated by any laws (Sumeetha, 2014). The government had no systems in place to regulate the working hours of the goldsmiths. Also, they never gave proper attention to pristine working environment. All the above factors prove that these were preventable hazards and hence the government should have implemented policies to check the risks involved in it.

Occupational safety ensures to meet the challenge of occupational health during work situations. Occupational health in India is on the threshold of a significant revolution (Rajagopal, 2000). To be aware of the general risks to health at work and their causes could be the single best method to avert health hazards. The general lack of information, awareness and substandard work environments, especially in developing countries have resulted in the widespread effects of ailments among the jewellery workers.

The following section deals with major occupational hazards faced by gold manufacturers and their reasons.

### Visual Impairments

Since goldsmithing requires ample attention and focus on the work piece at all times, it is only natural to find that the most commonly occurring ailment is in the form of visual impairment. Since the value of ornaments lies in the level of precision and detailing that is involved in the creation of the end product, better quality asks for severe concentration and prolonged work hours dedicated to focused attention. One of the major diseases that affect jewellery designers is the visual malfunction named as Computer Vision Syndrome (CVS). Jewellery manufacturing activities include precision designs, which usually entail the setting of tiny metals and stones which require high visual attention and mental concentration and are often near point tasks. Thus, the workers engaged in jewellery manufacturing may experience the symptoms of CVS (Salve, U. M., 2015). The American Optometric Association (2017) defines the CVS as "a complex of eye and vision problems related to near work which are experienced during or related to computer use". The causes of CVS could be a combination of individual visual problems, poor workplace conditions, and improper work habits (prolonged work exposure, sitting in non-optimal posture), high concentration, continuous focus at a fixed object, and lesser blinking of eyelids ( Salve, 2015.).

Some other visual problems in relation to jewellery manufacturing as pointed out by Sheedy, J.E., Harris, M.G., et. al. (1991) includes blurred vision or squinting, eyestrain, headaches, fatigue, photophobia and musculoskeletal problems including neck, shoulder and arm discomforts. It is peculiar to note that these discomforts directly affect productivity and force workers to take even more time to complete their work, thereby prolonging the difficulty to such an extent where it becomes no more possible to work effectively. The study conducted by Orrapan, U., Wanpen, P., et. al. (2006) among jewellery workers in Thailand points out that workers above the age of forty have a higher chance to be affected with presbyopia and visual fatigue. Thus, in a global perspective, regardless of the change in work environment, the discomforts encountered by personnel in gold jewellery manufacture are universal in nature.

Another study conducted by Subroto, D. and Firoz, K. (2014) among Silver Jewellery workers of Rajasthan illustrates that the level of lead concentration in serum among the workers range between 0.4 to 142.65ug/dl. It is sufficient to create acute conditions such as encephalopathy, depression, abdominal colic, abnormal sperm, anemia, renal failure, muscular exhaustibility, joint pain and myalgia.

### Lung Diseases

Another study points out the major lung disease that affect jewellery manufacturers as Silicosis, due to their profound use of silica dust (Panchadhyayee, P., Saha, K., et. al., 2016). Silicosis is the oldest recorded untreatable chronic occupational lung disease that kills thousands of people all over the world every year (Anthony, S., Douglas, S., et. al., 2008). Recent reports indicate more than 10 million workers are exposed to crystalline silica in India alone (WHO, 2007).

Asthma, a very commonly occurring respiratory disorder regardless of age barriers, is also a threat to work in dusty and unclean work conditions. Agents such as chlorofluorocarbons, metals and their salts, and even welding fumes come under the category of asthmagens.

Toxic elements such as cadmium which is a by-product in the production of zinc is harmful to the proper functioning of kidneys. Cadmium can also lead to bone demineralization, bone damage and renal dysfunction. In the industry, excessive exposure to airborne cadmium may impair lung function and increase the risk of lung cancer (Bernard A., 2008).

A commonly found hazardous element used in jewellery is inorganic lead. The peculiarity of lead poisoning is such that its symptoms produce subtle changes in physiology like fatigue, cramps, dizziness, and headaches in some cases that gradually result in a variety of long term illnesses that may result in paralysis, brain damage and even death.

Tradition and culture in India follows the usage of great amounts of gold, especially by the women of the country, which is quite evident considering the fact that the country contributes significantly to the total amount of gold sold globally. But unfortunately, most of us are blissfully unaware that the workers who are engaged in goldsmithy are risking their very health to create their masterpieces. The major chemicals employed in the production of ornaments include silica, cadmium, cyanide, lead, palladium, iridium, sulphuric acid, nitric acid and so on. Even chalk moulds contains high percentage of silica. The potential danger of such chemicals is simply unfathomable should the workers choose to work with them for long periods of time. It is interesting to note that the wearers of ornaments are also at risk to some extent, as

these jewels contain traces of these elements such as silica and lead whose risk factors have already been discussed above.

In the study conducted on the pulmonary functions of goldsmith workers by Choudhari, S. P., Doiphode, R., et.al., (2014), the occupational hazards reported in the jewellery industry due to the varied list of chemicals mentioned above include anemia, digestive problems, nerve disorders, memory loss, concentration problems, cancer and so on.

### Skin Diseases

Skin Diseases (SD) are considered as the most significant occupational risk among workers (Susitaival, P., Flyvholm, M. A., et.al., 2003). They are listed as the second most occurring work related diseases in industrialized countries (Diepgen, T. L., 2003 and Dirksen, M. E., 2006). Emine, A. and Nihal, M. (2016) conducted a study of skin diseases in high risk jobs and found that skin diseases were widespread among jewellery workers due to their contact with oils and liquids such as sulfuric acid, zinc sulfate, hydrochloric acid, ammonium chloride, etc.

Skin diseases such as eczema is largely spread among jewellery workers since they are exposed to chemicals, metals, acids and heavy metals such as copper and nickel on a daily basis (Alkhatib, A. J., Boran, A. M., et. al., 2014 and Esin, M. N., Bulduk, S., et. al. 2006). About 65% of occupational diseases are skin diseases as pointed out by Stellman, J. M., and Daum, S. M. (1973).

Apart from external factors, several ergonomic factors also add to the list of occupational hazards. Vibration, work posture, improper tooling etc. can cause severe back pain which can reduce working hours and even the overall productive hours required for the job.

Receiving health education and maintaining the essential precautions in the workplace are the only perceivable solutions to reduce occupational hazards. Although these are prerequisite to any profession, the grave ignorance towards safe practices and an overall awareness about worker safety and health in the long run has caused serious long term ailments that directly affect productivity and efficiency of workers, at times forcing them into early retirements.

### Conclusion

Good education and work practices are necessary for reducing health hazards among worker community. As long as people are concentrated in high risk jobs, health hazards become considerably high, which also bring into attention the need for proper practices and education required to avoid any kind of harm to health. The possible solutions for the problem are the substitution of the substances or chemicals that are employed in production and making sure that each unit of jewellery making is functioning within the proper working environment. Hence, it is concluded with the statement pointed out by Choudary, S. P. , Doiphode, R. S., et. al. ,(2014) in their study as “all that glitters isn’t gold”, the case being quite literal for goldsmith workers.

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