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Original Research Article

Conjunctival Disorders among Paint Factory Workers

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ABSTRACT

Paint is a chemical substance that is designed to coat a surface in order to protect or decorate it. Some of its constituents have been known to body tissues and organs when constantly exposed to them. Paint factory workers have constant exposures to these chemical agents hence the need to investigate its effect on the conjunctiva. A cross-sectional study was carried out on employees of three paint industries. They included 200 volunteers comprising of 155 males and 45 females within the age range of 18 to 55 years (28.88±4.16yrs). Case history, ocular examination using the penlight and ophthalmoscope were used and the results for both the right and the left eyes were presented in graphs. The most occurring conjunctival disorder was pterygium which consisted of 40% of the workers right eyes and 37% of the workers left eyes. Others included conjunctivitis, pinguecula, irritation and tearing. Proper eye safety measures were recommended.

Keywords: Paint factory workers, conjunctival disorders, pterygium, conjunctivitis, pinguecula, tearing.

INTRODUCTION

Paint is a chemical substance that is designed to coat a surface and have the ability to protect or decorate it. Damage to the object at the surface can be minimized by giving the object a coating. Coating can also be used to decorate the object to give colour, smooth, to disguise any irregularities made by the manufacturing process. [1] Paint has three main constituent which includes pigment, Binder and Solvent. Pigments are used for colouring and there could be in the form of an opaque pigment, which has the sole property of providing colour and opacity, as well as the anti-corrosive pigment which are added to increase corrosion prevention. Others include metallic pigment, extender pigment and laminar pigment. A binder provides the desired chemical and physical properties of the paint. It determines the adhesion, corrosion and flexibility of the paint. Examples of binder include; Acrylic, Emulsion, Alkyd, Epoxy, Silicone, Cellulose, Natural oils, Styrene, Vinyl. A solvent is the medium where the binder, pigment and additives are dispersed in molecular form or as colloidal dispersions. Examples of such solvents include Toluene. Exposure to toluene is by breathing in or getting it on your skin, getting it splashed in your eyes or swallowing it. Symptoms include; Irritation of the eyes and nose, weakness, exhaustion, euphoria, lacrimation, dilated pupils, Insomnia, tingling of the skin, liver and kidney damage. [2] Organs and system that toluene affects include; the eye, the central nervous system, the skin, respiratory system, liver and kidney. Others include turpentine and lead which can be injurious to organs of the body.

Paint industrial workers are usually exposed to many solvents (toluene, acetone, butanol, xylene, benzene, trichloro ethylene). It was investigated whether chronic exposure to solvents had any adverse effect. Solvents are the most important components of paints. The major purpose of their application is to dilute paints to a suitable handling consistency or viscosity for easier manufacturing and application. After the application of paint, the solvents evaporate leaving the dry paint on the painted surface. [3] In paint, solvent vapours are produced throughout the manufacturing process, if the process is not controlled, high concentration of organic solvents can be accumulated within the working environment threatening workers health and safety. Paint industry workers are exposed to inhalation of solvents and other volatile paint components, which can cause eye irritation, respiratory illness and chronic obstructive pulmonary disease. [4-6] In a work carried out by Daisy Shu, [4] on how lead exposure affect our eyes. It was stated that lead exposure can result in reduced sensitivity of rod photoreceptors, blurred vision, irritated eyes and increased susceptibility to cataract and optic neuritis. [4,7]

METHODOLOGY

This was a cross sectional study carried out on employees of three paint industries in Lagos state Nigeria. They included 200 volunteers comprising of 155 males and 45 females within the age range of 18 to 55 years (28.88±4.16yrs).

Informed consent were sought from each of the participants and approval were given from the authorities of the industries were the study were carried out. Study was in accordance with the tenets of the declaration of Helsinki. Inclusion criteria included workers exposed to organic solvents in the production unit of the industry and who had spent ample time working with the industry. Excluded from the study included workers in other sections other than the production unit who were not directly exposed to the organic solvents in the industry. Materials used for the study included pen light and direct ophthalmoscope.

Case history was carried out and then with the help of the pen light and direct ophthalmoscope, external ocular examination was carried out. The lids, cornea, conjunctiva, sclera and pupils were inspected. Posterior segment of the eyes were examined using the direct ophthalmoscope. The cup to disc ratio, arteries to vein ratio and the general fundus appearance were noted.

Results of conjunctival disorders were presented in graphs.

RESULTS

A total of 200 human subjects comprising of 155 males and 45 females within the age range of 18 to 55 years (28.88±4.16yrs) participated in the study. Conjunctival examinations were carried out on each eye making a total of 400 eyes tested.

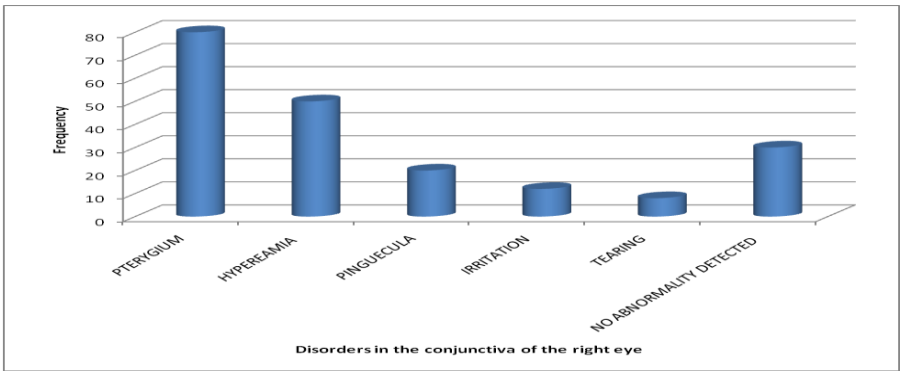

Figure 1: Below shows conjunctiva disorders of the right eye

From the figure above, pterygium 80(40%) is the most occurring conjunctival disorder while tearing is the least occurring 8(4%).

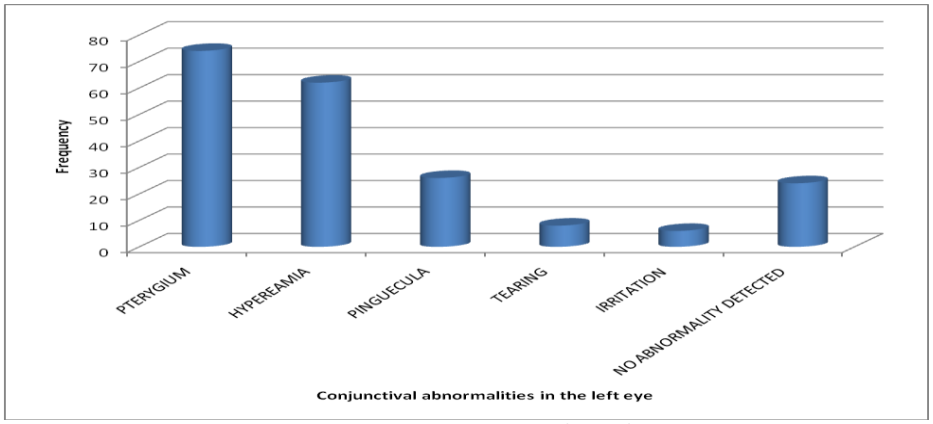

Figure2: Conjunctiva disorders of the left eye

From the figure above, 76(34%) of the workers tested had pterygium in their left eye while 6(3%) of the workers complained of tearing only.

DISCUSSION

Prevention of the eye from exposure to hazards and injuries is part of occupational safety measures. This study highlights conjunctival disorders found among paint factory workers. The total study population comprised of 200 workers (representing 400eyes tested) who were conveniently selected. The entire study population comprised of males predominantly. The mean age of subjects for this study was 28.88±4.16yrs.

The most occurring eye disorder among paint industrial workers right eye was pterygium 80 (40%) followed by conjunctivitis (redness) 50 (25%) followed by pingueculum20 (10%). Others included irritation 12 (6%) and tearing 8 (4%).

The most occurring eye disorder among paint industrial workers as found in the left eyes were pterygium 74 (37%) followed by conjunctivitis (hyperaemia) 62 (31%), followed by pingueculum 24 (12%). Others included irritation 6 (3%) and tearing 8 (4%).

The eye disorders reported in this study were common to those found in other industries since the risk factors of exposure to organic solvent were common. [2,3,8,9] More prominent were those precipitated or exacerbated by carcinogenic and irritant substances. Different chemicals used in the paint industry include xylene, toluene, benzene and turpentine. Volatile organic compounds from these organic solvents pose as a huge threat to the eyes.

Ogbomo *et al* [8] in their study on the oculovisual findings among industrial mine workers in Ghana, reported the prevalence of visual impairment (28.1%) among industrial miners of which refractive error was the major cause (5.8%). Presbyopia was observed (7.4%) and glaucoma (15.3%).

In a study carried out by Omoti *et al*, [9] on non traumatic ocular findings in industrial technical workers, it was discovered that ocular disorders were seen in 64.4% of the population and the most common disorders seen were pingueculum 21.5%, presbyopia 9.7%, refractive error 9.4%, pterygium 8.6% and chronic conjunctivitis 4.5%.

Workers that are constantly exposed to various chemical irritant may develop eye disorders if appropriate protective goggles are not worn. [10,11] From their findings, the pattern of ocular disorder is the same as what was reported in other industries in Nigeria, but there is a difference in the order of occurrence of these disorders. In a study in Kaduna (Northern Nigeria), it was discovered that conjunctivitis, corneal opacity, pingueculum, and pterygium were the most common ocular disorder. [10,11]

CONCLUSION

In conclusion, exposure to liquid, gaseous and solid particles may cause acute and chronic ocular irritation and make workers prone to allergic conjunctivitis, pterygium, corneal abrasion and foreign body as the case may be. Disorders such as

pterygium, cataract and chronic conjunctivitis could potentially obstruct vision at a later stage resulting in some form of visual impairment hence adequate protection of the eyes at all times is paramount. [10,11]

Recommendations

From the findings from this study and previous studies, it is hereby recommended that appropriate eye safety measures should be put in place for industrial workers to reduce the menace of eye disorders associated with industries.

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