Formalin Hazards and Health Insurance Coverage Needs among Exposed Personnel

Abstract

Formaldehyde is a colorless, strong-smelling gas often found in aqueous (water based) solutions and commonly used as a preservative in medical laboratories and mortuaries or an industrial fungicide, germicide and disinfectant. The WHO in its 2019 health report has classified Formalin as a potential carcinogen and an occupational hazard. The more concentrated overexposure is paradoxically related to the medical and lab technology field. Its use has been eliminated in most high-income country facilities owing to the well-known teratogenic effects; however, in facilities of many middle- and low-income countries, it is still used freely.

The safety protocols requiring regular monitoring of formalin air level concentrations under permissible levels are often ignored; owing to logistics, staff crisis, lack of observernesship by management and key stake holders, lack of awareness or sometimes, plain carelessness and underestimation of immediate risks. Short term symptoms of exposure are mainly respiratory, nasopharyngeal, ocular and/or dermal irritation. But the long term more grave effects include permanent metaplastic changes majorly in nasopharynx, oropharynx leading to nasal or lung cancers.

While health care is entering the era of big data, insurance companies still remain in the dark when it comes to Formaldehyde perils. This is alarming and calls for not only developing safe working protocols but also increased awareness of the need for “safety coverage umbrellas” under health insurance schemes (considering Formalin being a potential occupational hazard that can hamper not only the life quality of the exposed health care / medical lab personnel; but also lead to significant morbidity and death).

This paper elucidates the gravity of formalin usage, need for awareness about its associated risks, safety protocols and health insurance coverage for personnel exposed to such occupational hazards.

Keywords

Carcinoma; Formalin; Occupational Hazard; Respiratory Tract Inflammation; Safe Formalin Working Protocol

Introduction

“Formaldehyde” is a colorless, strong-smelling gas often found in aqueous (water based) solutions and commonly used as a preservative in medical laboratories and mortuaries or an industrial fungicide, germicide and disinfectant. The WHO in its 2019 health report has classified Formalin as a potential carcinogen and an occupational hazard. The more concentrated...
overexposure is paradoxically related to the medical and lab technology field. Its use has been eliminated in most high-income country facilities owing to the well-known teratogenic effects; however, in facilities of many middle- and low-income countries, it is still used freely.

Another pungent fixative, preservative and disinfectant of the aldehyde family is “Glutaraldehyde”. It is a bi-functional cross linker and is often used in hospitals to sterilize surgical instruments and also as excipients in cosmetics. Its commercial usage is in the leather tanning industry is common. Despite its pungent odor and irritant effects; there is no strong evidence of its carcinogenic effects and the WHO declared it as an essentially safe medicine in the health system. The lab workers of fixation units, sterilization zones and X ray film developing hospital workers need to wear protective attire and maintain levels below 0.05 ppm.

While both chemicals are considered risky to health, formaldehyde is potentially more dangerous than Glutaraldehyde as per the WHO standards of health and occupational hazards. Also, the use of Formaldehyde is more frequent in the medical industry than Glutaraldehyde, especially in the developing countries. Hence, awareness of the perils of Formaldehyde and need for health insurance is pivotal.

The OSHA (Occupational Safety and Health Administration) of the USA Department of Labor fact sheet describes Formaldehyde as a colorless, pungent gas found in aqueous base and commonly used as a preservative in medical laboratories and mortuaries or an industrial fungicide, germicide and disinfectant. Formalin is classically 37% formaldehyde and 6-13% methanol mixed in water. The WHO in its 2019 health report has classified Formaldehyde; commonly known as Formalin as a potential carcinogen and an occupational hazard [1].

Formaldehyde and its associated ill effects

The recent survey of WHO declared the formalin exposure levels and associated health symptoms reaching a crisis level among personnel in 57 countries; mostly underdeveloped and developing nations. The WHO Global Plan of Action on workers’ health calls on all member states to develop national programs for worker occupational health. The monograph on the evaluation of the carcinogenic risk of Formaldehyde is published on the official web page of WHO under Health and Sustainable Development category. This focus on Formalin by an esteemed body like the WHO elucidates the gravity of formalin usage, its associated risks and the need for safety protocols and health insurance coverage for personnel exposed to such occupational hazards. Formalin is mainly used in two industries: The ‘building industry’ and the ‘anatomical studies and body part preservation’ industry. In the building industry, it is mainly confined to residential or commercial buildings. Urea-formaldehyde is found in plasterboard, carpeting products and glues. Their use has been eliminated in most high-income country facilities owing to well-known teratogenicity of formalin. However, in facilities of many middle- and low-income countries, they are still used for their flame retardant and insulation properties. In most cases, the workers as well as the dwellers lack awareness of how to safeguard themselves from this vicious substance [2].

Discussion

Formalin usage in the Medical/Health Sector

The more concentrated overexposure is paradoxically related to the medical field where doctors and students fervently inhale high doses of pure liquid formalin in their attempts to excel in anatomy and understand the structure of the human body better. Most exposed groups are the dissectors, prosectors, students and technicians handling and embalming fresh cadavers or body parts in museums and histopathology samples in labs [3].

Short term symptoms of exposure are respiratory and nasopharyngeal irritation, burning sensation and watering of eyes, skin irritation or allergy at point of contact, nausea, dizziness, fatigue and impaired concentration. But the long term and more grave effects include permanent dysplastic or metaplastic changes majorly in nasopharynx, oropharynx, lungs or anywhere else in the body that’s constantly exposed to the substance [4,5].

The safety protocols require regular monitoring of formalin air level concentrations by special monitors which should ideally be below 3 ppm and maximum exposure time must be limited to 8 hours per day. Also, ventilation must be free and masks / gloves / eye shield glasses etc. must be worn by the handlers [6]. But these are easier said than done. The reasons are multifactorial. There are lapses in following safe work environment protocols owing to logistics, time shortage, staff crisis, student trainee overload, lack of observernesship by management and key stake holders, lack of awareness or sometimes, plain carelessness and underestimation of immediate risks.

Why ‘Formalin exposed personnel’ should be protected by appropriate occupational hazard and health insurance umbrella?

Formaldehyde was classified as “carcinogenic to humans” (Group 1) by the International Agency for Research on Cancer
(IARC) as early as 2004 and in 2011 formaldehyde’s European classification was revised to that of Category 1B carcinogen (presumed to have carcinogenic potential for humans) and Category 2 mutagen. It has been recorded in epidemiological researches that sometimes the workstations like lab settings actively handling formalin agents may have concentrations over 100 times the permissible limit.

The NIH cancer institute study has confirmed Formalin as causing nasal cancer in rats and mammals. It also stated Formalin as a very likely carcinogen in humans who are continuously exposed to high formaldehyde concentrations either in air or in liquid form [7].

The National Institute for Occupational Safety and Health (NIOSH), provides an “Immediately Dangerous to Life or Health (IDLH) document” that includes acute toxicity data for formaldehyde.

While health care is entering the era of big data, insurance companies still remain in the dark when it comes to Formalin exposures. This is alarming and calls for not only developing safe working protocols but also increased awareness of the need for safety coverage umbrellas under health insurance schemes (considering Formalin being a potential occupational hazard that can hamper not only the life quality of the exposed health care / medical lab personnel; but also lead to significant morbidity and death).

What if Health insurance companies could develop an offering that, for the first time, truly aligned incentives around long-term behavioral change?

Till date, the health insurance coverage for formalin related hazards has been undermined in not only least developed but also least developed countries. It is ‘not’ a popular practice except in very few American and European institutions where appropriate risk compensation is given to health care personnel like nurses, doctors, surgeons, mortuary workers and lab staff for their occupational hazard exposure.

Health policy and insurance managers need to design an approach that embraces ‘pay-for-performance’ not as a limited experiment, but as the basis for its entire health insurance offering. This will boost the much-needed startup for the issue at hand and assist the key beneficiaries and insurance providers alike through self-feeding mechanisms. Health insurance offering would find new sources of revenue to supplement earnings from the core underwriting business while the target population would get access to better health care in face of need. With this new approach, the insurer would enter a very different business - not just pricing the risk, but influencing and reducing risk as well therefore, transforming into the health insurer of the future.

Allowing for a greater insight and influence over behaviors and driving down costs through widespread adoption by health institutions and insurance companies.

We need a multi-faceted approach in dealing with Formalin exposure and occupational health insurance. The key stakeholders and personnel must make the first move in spreading awareness of the detrimental effects of formaldehyde and encourage embracing of safety and prevention protocols.

These will automatically include optimal health insurance coverage, a dimension that will have to be adopted by the lead institutional policy makers. This will improve the quality and efficiency of health care services provided to those who might invariably need it and is much preferable to ‘out of pocket’ expenditures in case of urgencies. These benefits will reach out to all sections; thus, evenly distributing the risks between low- and high-income groups and low and high-risk groups.

For the insurance companies, it will generate stable revenues and facilitates generating broad package services and stronger networking with social partners. The insurance could be based on multiple business models and either of the following could be adopted or tailored to specific needs: Tax based insurance, Social health insurance, Micro-insurance and Community based insurance schemes, Private health insurance.

Conclusion and Recommendations

Representatives of the health insurance sector must adopt a framework for assessing access to health care services to explore geographic accessibility, availability, affordability and acceptability of services. This model of health insurance will govern decisions about enrolling in a health insurance scheme and utilizing health care services. Planners must give due consideration to these aspects when making decisions regarding health insurance and health care services utilization to ensure that the peculiar needs of the target population is taken on board.

But strong social and federal policy controlling mechanisms and a tough administrative and financially capable infrastructure is needed to promote confidence in schemes and limit abuse and fraud that could lead to attrition and incredible cost pressure on public health financing systems.

The new façade of “Formalin related health insurance” is bound
to face a disrupted landscape as any new venture does. In such cases, it is pivotal for insurance partners to remain customer centric, go digital, liaise with capable and skilled innovators, use appropriate metrics when comparing to today’s market and be proactive.

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