

Impact of The Use of Chemicals in Salons Around Universitas Negeri Semarang

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Abstract: The use of cosmetics containing chemicals must be balanced with the risks that must be accepted, including side effects or other unwanted reactions. Groups that are vulnerable to this usually include those directly involved in using or application, one of which is salon workers. This study will discuss the impact of using chemicals in beauty salons X and Y at Universitas Negeri Semarang and one branch of another beauty salon X at Universitas Muhammadiyah Semarang, with a total of 10 respondents. The study used a survey method with a cross-sectional research design, employing primary data collected by interviews using questionnaires and direct observation. The high level of risk for respiratory disorders and skin irritation, as obtained from data taken from beauty salon X and beauty salon Y, concludes that it is necessary to carry out controls such as labeling the ingredients used in salons, especially chemicals, rotating or shifting employees and the use of Personal Protective Equipment (PPE) for salon employees who are doing treatment. The recommendations that can be given can be applied to various parties, not only to salon employees but also to owners and customers of the beauty salon itself.

Keywords: risk, hazard, chemicals, beauty saloon

INTRODUCTION

The public now has easy access to information obtained regarding research from scientists in various fields that significantly impact industrial progress, one of which is in the chemical field, namely related to medicine, food, health, and beauty. Amid today's busyness, trends, and socialite society, people are used to applying cosmetics, skincare, or treatments that use chemicals. The high public interest in lifestyle and the importance of appearance make beauty treatments in salons considered one of the basic needs for some people (Nurfatriani et al., 2016). The emotional, psychological, and sociological advantages of using cosmetics and skincare must be balanced with the risks that come with their use, including possible side effects or other unwanted reactions, even though they are generally considered safe. Some of the undesirable reactions that can occur include irritation, allergies, hyper/hypopigmentation, skin and respiratory disorders, carcinogenicity, and reproductive effects, as well as genotoxicity. Groups that are prone to experiencing these disorders usually include those directly involved in the product or use of cosmetics, such as cosmetics factory workers, cosmetic users, and salon workers who are particularly vulnerable to these risks. Thus, workers should identify hazards and risks to prevent accidents and occupational diseases (Choi et al., 2020).

People who work in beauty salons, including their customers, can be exposed to high concentrations of chemical compounds released within these establishments. Consequently, assessing these high-risk environments for the types and concentrations of toxic pollutants that can lead to human exposure is needed. Occupational diseases, in general, are often considered "silent killers", as they not only harm workers who unknowingly suffer from work-related illnesses or poor working environments, but also result in social and economic losses and decreased work productivity. For this reason, the implementation and supervision of Occupational Safety and Health (OSH) in the beauty salon business needs to be conducted regularly (Quach et al., 2015).

Based on the issues above, this study will focus on the harmful effects of using chemicals in beauty salons around Universitas Negeri Semarang. The employees hired in these salons often include students, particularly those who have graduated from related study programs or those who have not completed their studies. Moreover, the customer base of these salons is also predominantly comprised of students or university students who may not possess sufficient knowledge about the chemicals in beauty salons' products. This study aimed to analyze the potential and risks of harm posed by some of the chemicals used and provide recommendations to prevent occupational diseases for salon employees and risks for salon customers. Therefore, based on the dangers posed by exposure to chemicals used by employees in the beauty salon, it is

important to conduct research regarding the hazards and impacts of chemicals in the beauty salons where they work, which pose a risk to salon employees and their customers. The results of this study can support the prevention of the effects of hazardous chemicals used in beauty salons around Universitas Negeri Semarang.

METHODS

This study uses a survey method with a cross-sectional research design, a research design that analyzes the relationship between cause-and-effect factors with an approach through observation and data collection at one time. The variables to be examined are work processes, hazards and risks of work accidents and occupational diseases, as well as control of existing hazards and risks.

In this study, primary data was collected through interviews using a questionnaire and direct observation. The data collection instrument used in this study was a questionnaire containing questions to collect information according to the researchers' objectives, observation sheets, cameras, and stationery.

This research was conducted in two beauty salons at Universitas Negeri Semarang and one salon branch of Universitas Negeri Semarang, located at Universitas Muhammadiyah Semarang, with a total of 10 respondents. The research sample includes the salon environment, the materials used, and the employees and owners of the beauty salon.

RESULT AND DISCUSSION

Occupational health refers to the relationship between work and health. Occupational health aims to improve the health status of workers, increase labor productivity, and improve business and economic performance. Occupational health is designed to protect employees from potential risks and hazards in the workplace, helping with everything from injury prevention to injury treatment (Fit for Work team, 2015). Health hazards involve the risk of illness or injury in the workplace. Occupational hazards, as a term, signifies the long-term and short-term risks associated with the workplace environment and is a field of study in occupational safety and health as well as public health.

Based on the results of the questionnaire obtained from beauty salons X Universitas Negeri Semarang branch and Universitas Muhammadiyah Semarang branch and beauty salon Y Universitas Negeri Semarang, skin irritation and respiratory problems were classified as the main occupational health problems experienced by the study population. 5 out of 10 employees of beauty salons X and Y said that sometimes they felt irritated skin (dermatitis/itching) when making physical contact with chemicals from hair dye. At the same time, there was one employee of beauty salon Y admitted that she often experienced skin irritation when doing coloring treatments. Likewise, during the smoothing treatment, 4 out of 10 employees admitted that sometimes they experienced skin irritation (dermatitis/itching). During the keratin treatment, 2 out of 10 salon employees also felt the same way. As for respiratory problems, 3 out of 10 beauty salon employees X and Y said that they sometimes experience shortness of breath when doing coloring treatments, and 1 in 10 salon employees experience the same thing when smoothing or keratin treatments.

Potential Hazards in Beauty Salons

In the various treatments performed at the beauty salon, there are five treatments that are most often performed by employees and requested by customers: haircut, cream bath, smoothing, coloring, and keratin. From the hazard analysis in beauty salons X and Y, physical and chemical hazards are hazards that often occur because beauty salons cannot be separated from physical activity and the use of chemicals to perform treatments such as cream bath, smoothing, keratin, bleaching, coloring, etc. Some of the chemicals used to carry out treatments in beauty salons will sometimes cause unwanted reactions; these reactions include irritation, allergies, hyper/hypopigmentation, skin and respiratory disorders, carcinogenicity, and reproductive and genotoxic effects, both to employees as well as beauty salon customers.

Hazardous chemicals used and their effects

Parabens

Parabens are a group of chemical substances used as preservatives in cosmetic and pharmaceutical products. Esther alkyl of p-hydroxybenzoate (paraben) is widely used as an antimicrobial agent, with antimicrobial activity increasing in line with the length of the chain of methyl to alkyl n-butyl (Darbre, 2004). The purpose of the addition is to help prevent the emergence of mold and bacteria and maintain product quality. The types most often used in cosmetic products are methylparaben, propylparaben, and butylparaben. In product packaging, parabens (*para-hydroxybenzoate*) can be written with names, such as *methylparaben, propylparaben, butylparaben, ethylparaben, 4-*

hydroxy methyl ester benzoic acid, or *methyl 4-hydroxybenzoate*. Many care products have parabens, including shampoos, shaving gels, lubricants, pharmaceuticals, facial make-up, lotions, and toothpaste. At the beauty salon X branch of Universitas Negeri Semarang, it is known that they have products that contain parabens, namely in smoothing products. Meanwhile, at the beauty salon X branch of Universitas Muhammadiyah Semarang, they are also known to have products that contain parabens, and the product is an instant conditioner that is useful for keeping the hair structure healthy and fresh, especially on dry and damaged hair.

The safety of parabens as preservatives has been reviewed by the Cosmetic Ingredient Review (CIR) in 1984. It has been concluded that methylparaben, propylparaben, and butylparaben were safe to use in cosmetic products at levels up to 25%. Usually, parabens are used at levels ranging from 0.01 to 0.3 %. According to the United States Food and Drug Administration (FDA), the use of parabens is still permitted if it is not more than 0.3%, likewise with the Food and Drug Supervisory Agency (BPOM) in Indonesia. It's different in Europe, where regulations no longer allow the use of parabens in cosmetic and personal care products.

The impact of the dangers of parabens that most threaten health is damage to the endocrine system in the body. If the endocrine system is disrupted, the body's metabolism will also be disrupted. The result can cause breast cancer, problems in the reproductive system, premature aging, and allergies. Meanwhile, for pregnant women, parabens can damage the fetus, such as inhibiting the growth of the baby's nerves, causing congenital disabilities, low birth weight babies, and miscarriages. The impact on breastfeeding mothers is that it can inhibit the growth of the child's brain and nerves and can cause children to have growth delays to a low IQ.

Fragrances

Cosmetics are a significant cause of allergic contact dermatitis (ACD). Fragrances and preservatives are the two most clinically relevant allergens found in contact allergy-causing cosmetic products. It is believed that about 1-3% of allergic contact dermatitis or allergic contact urticaria is caused by fragrances. Women seem to be more often allergic to fragrances than men, reflecting the more frequent use of scented products among women. In the two salons studied, in the products they use, almost all products have a fragrance in their composition.

Contact allergies to fragrances occur when a person has been exposed to a fragrance at sufficient levels to cause an allergy. Overexposure to these fragrance products can cause a range of adverse effects on human health, including migraine headaches, contact dermatitis, asthma attacks, respiratory difficulties, etc. Fragrant ingredients can penetrate the skin, be absorbed into the bloodstream, and be distributed to other organs. Allergic contact dermatitis (ACD) is an inflammatory skin disease characterized by erythema, swelling, and vesicles in the acute phase. If exposure continues, it can develop into a chronic condition with painful scaly sores on the skin. Allergic contact dermatitis disease to fragrance ingredients is most often caused by cosmetic products and usually affects the face and hands.

Formaldehyde/formalin

Formaldehyde for preservatives comes from the results of chemical synthesis. Formaldehyde is a gas that is usually available in the form of a 40% solution (formalin). Formaldehyde in cosmetics is used as a deodorant and anti-hydrolytic in shampoos (inhibits sweat). A person can be exposed to this substance when inhaling or touching it.

The impact of inhaling the chemical formaldehyde with a concentration of 0.1 - 5.0 ppm can cause nose and throat irritation; 10-20 ppm may cause difficulty breathing, burning sensation in the nose and throat, and coughing; 25-50 ppm may cause tissue damage and serious respiratory tract damage such as pneumonia and pulmonary edema (rare). In women, there are menstrual disorders and infertility. If formaldehyde solution is swallowed, it can cause burns to the mouth and throat, stomach nausea, vomiting and diarrhea, possible bleeding, severe abdominal pain, headache, hypotension, vertigo, stupor, convulsions, loss of consciousness, and the worst condition is *coma*. The impact, when formalin is exposed to the skin in the short term, it can cause skin discoloration to white, skin to become rough and rugged, anesthesia, and first-degree burns. Whereas if exposed to repeated or continuous exposure in the long term can cause second-degree burns, numbness, and itchy rashes, damage to fingernails, hardening, and skin color to become brown and experience sensitization. Finally, the impact of formaldehyde when it comes into contact with the eyes in the short term at a concentration of 0.05 - 3.0 ppm can cause eye irritation accompanied by redness, itching, pain, blurred vision and mild lacrimation. Concentrations of 4 - 20 ppm can cause lacrimation and eye damage. Meanwhile, the impact in the long term can cause inflammation of the connective membrane of the eye and the loss of the ability to see.

Sodium lauryl sulfate (SLS)

Sodium lauryl sulfate (SLS) is a chemical called a surfactant, more commonly called a detergent. Shampoo manufacturers generally use SLS as a detergent ingredient in shampoo because it is cheap and can become thick with

the addition of salt. In cosmetics and personal care products, studies have shown that these substances are harmless if they are used only briefly and immediately rinsed from the skin. However, the use of SLS content in products that last a long time on the skin should not exceed 1% in the concentration.

In the *Journal of the American College of Toxicology*, the potential for skin irritation increases directly to how much SLS is in the product used, any concentration greater than 2% will cause skin irritation. The Cosmetic Ingredient Review also states that SLS has the potential to cause moderate to severe irritation to the eyes and skin, especially for users with dry, sensitive skin or certain skin conditions such as eczema and psoriasis.

Recommendation Chemical Control Measures

Based on the five hierarchies of control (elimination, substitution, engineering, control administration, and use of personal protective equipment), it is concluded that the most relevant recommendations to be carried out by beauty salons X and Y are engineering and control administration, wherein the two hierarchies the salon owner can carry out things that can help control the hazards in the salon environment, both from the individual (employees and salon customers) and the chemicals used. One example of engineering that the beauty salon owner can do is to install an exhaust fan to improve air circulation in the salon room so that air exchange runs well. The dangers of some volatile chemicals can be minimized. Furthermore, in the administrative control hierarchy, the owner can manage salon employees work shifts and conduct routine health tests for salon employees. Still in the administrative control hierarchy, where the owner can do a number of other things, such as providing first aid kits ranging from light drugs to chemical neutralizers to minimize the occurrence of allergic effects on salon employees and customers, the owner can also provide understanding and explanation regarding regulations regarding limits the use of chemicals used for salon employees to prevent unwanted things from happening and to carry out routine inspections of tools and materials used to carry out treatments especially those that contain chemicals. Apart from being carried out by the owner of the beauty salon, salon employees can also carry out control and prevention related to the dangers of the chemicals used by arranging tools or materials in the correct position and away from the reach of children's customers and labeling products containing chemicals in accordance with name and use. In addition, employees are required to comply with the work SOP that is implemented in the beauty salon and are required to wear appropriate PPE, such as aprons, handsoons, masks, etc., when carrying out treatment and immediately rinse with water the areas affected by liquid or smoothing cream or other chemicals. The recommendations for customers are to cross-check related to the materials that will be used to carry out the selected treatment to avoid allergic or irritating reactions, and must report to employees or salon owners directly if unwanted reactions occur either after carrying out treatment or while carrying out treatment, and stop the treatment being run if an unwanted reaction occurs.

CONCLUSION

The results of studies have shown that the type of activity and the composition of the products used play an important role in the level of risk found in the work environment of a beauty salon. In addition to the high level of risk of respiratory problems and skin irritation, according to data from the questionnaire that was distributed to the employees of the three beauty salons, several work accidents have occurred, namely one of the X and Y beauty salon employees who experienced chemical poisoning. when doing a coloring treatment, as well as one of the other Y beauty salon employees who had experienced chemical poisoning while doing a keratin treatment. Another accident in the form of ingesting chemicals for cream bath treatment by one of the X beauty salon employees. Thus, the recommendations addressed to owners, employees, and buyers need to be carried out, considering the risks in beauty salons which are very diverse and threaten human health This is because exposure to a mixture of pollutants in a work environment can have a greater detrimental effect on health.

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