

Deleterious Chemicals Found in Nail Polish Raise Public Health Alarms

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Introduction

Over the last century western civilization has exponentially increased the amount of chemical substances utilized in everyday life. This increased exposure to hazardous substances has placed the public at risk for developing adverse health effects and diseases. A potential source of the deleterious effects is nail polish. Philanthropic organizations, such as the Teal Toes, utilize nail polish as a means of raising money and awareness for ovarian cancer as they provide a teal nail polish painting service to the public.

A recent study co-authored by researchers at Duke University and the Environmental Working Group deemed common nail polish chemicals, such as triphenyl phosphate or TPHP, as suspected endocrine disruptors. Triphenyl phosphate is a common addition to many polishes and can be found in 1,500, or approximately half, of all nail polishes (Lurie 2015). Evidently, there are two conflicting interests. While the organization is successfully raising awareness for ovarian cancer, it is also jeopardizing the public health of those who participate based off of recent studies on the effects of triphenyl phosphate found in nail polish. Philanthropic organizations should not promote the use of nail polish as it poses public health, environmental and social consequences.

Background

There is a growing amount of evidence that the TPHP chemical could affect metabolism, hormones, reproduction and development. A study co-authored by researchers at Duke University and the Environmental Working Group illustrated that TPHP is leaching into bodies via nail polish (Lurie 2015). The *Environmental International* published that women who painted their nails with nail polish containing this chemical saw a sevenfold increase in the TPHP metabolite in just ten to fourteen hours. An even more disturbing statistic is that about 1,500 polishes contain the TPHP chemical, or about half of all polishes sold. Researchers theorized that

the additional solvents rendered in nail polishes make the nails more absorbent. These toxins are then carried into the body through the network of capillaries surrounding the cuticle. This study provides compelling evidence that the main vehicle of exposure to the chemical is through the application of nail polish (Eede 2015).

For those unfamiliar with the term endocrine disruption, it refers to the interference of normal hormone functioning and has been known to cause hormone, metabolism, reproductive and developmental irregularities in animals as well as humans. In a 2014 study, rats were exposed to a mixture that contained up to twenty percent TPHP before and after birth. The rats grew obese and the females experienced puberty early, indicating abnormalities in hormone signaling (Patisaul et al., 2013). Another experiment performed using zebrafish illustrated similar results. Researchers from Seoul National University in South Korea found that exposure to TPHP altered sex hormone balance as the chemical changed the gene expression of certain receptors, either increasing or decreasing a hormones activity. This change interfered with the endocrine and developmental signaling (Liu, Ji, Jo, Moon, & Choi, 2015).

Environmental Sustainability

This public health issue is directly intertwined with several principles of environmental sustainability. True Cost Accounting refers to the cost of products and services while also taking into account the environmental and social impacts (Payne-Sturges 2015). This method looks at not only the direct costs but also allocates the indirect costs of a substance by collecting and analyzing the possible environmental, social, and economical costs and benefits. In this case, the utilization of TPHP in nail polishes threatens these very pillars of sustainability.

Endocrine disruptors pose environmental and ecological repercussions. The National Center for Biotechnology Information published an article illuminating that both humans and wildlife have suffered adverse effects from exposure to endocrine disruptors. The article describes

the mounting concern over endocrine disruptors as wildlife populations are at risk for irregularities in growth and reproduction (Bergman 2013). Additionally, the U.S. Fish & Wildlife Service reported that there is mounting concern regarding the effects of endocrine disruptors on wildlife. They cause irregularities in reproduction, behavior, and can cause neurological issues and tumors (“Endocrine,” 2014). Cosmetic chemicals, such as TPHP in nail polish, are polluting the water. As technology has advanced, it has allowed an unprecedented look into the different chemical contaminants in various water bodies throughout the United States. In 2002, 139 streams were tested for man-made chemicals and hormones and it was revealed that 80 percent of these streams were contaminated (Koplin 2002). Fish and other aquatic organisms inhabiting these contaminated waters are at risk of developing various health disorders. For example, there has been an increasing number of male fish with immature eggs in their testes. Man-made hormone-disrupting chemicals damage the reproductive health of vulnerable fish and may result in detrimental effects to aquatic ecosystems as well as local fisheries. There is also concern that people could be exposed to endocrine disruptor chemicals by consuming fish that has been contaminated (Koplin 2002). Utilizing nail polish has various societal consequences as well.

Societal Repercussions

Nail polish poses serious social implications. Wearing nail polish has become almost a social norm and cultural mainstream for females in the western culture. A cultural mainstream means to be “dominant” or in the “center” of a cultural norm. People who do not conform to the common ideologies fall into the margins and are denied opportunities and resources that would be normally available. The use of nail polish does not only result in adverse health effects, but also provide the foundation of sexism and privilege. In western culture, it is frowned upon for those who do not identify as a woman to wear nail polish. Deviance from this social norm would otherwise be considered unacceptable and have social impacts to that person such as being

shunned. The Journal of the American Academy of Religion published an interview with Amir Hussain, a professor teaching an “Introduction to Religion” course, in which he, a male, wore nail polish for a week as a social experiment. The professor received a great amount of negative attention from student, faculty and even his wife. One faculty member after seeing his nails asked, “So, really, who did this to you?” These negative responses pave the way for sexism as people would’ve had little interest in his painted nails had he been a female (Martin 2012). By utilizing nail polish at the event, you are inflicting these social norms, or rules of behavior, on students and faculty members.

European Initiative Against Chemicals found in Nail Polish

Europe has taken the initiative to begin banning chemicals found in nail polish that are linked to hormonal abnormalities such as underdeveloped genitals and long-term fertility problems. In 2004, controversy erupted as the chemical dibutyl phthalate, or DBP, was banned from polishes sold in Europe. Major nail polish brands such as OPI, Essie, and Sally Hansen refuse to remove DBP from polishes sold in the United States, justifying that the level is so low that it poses no health risk. Stacy Malkan, spokeswoman for The Campaign for Safe Cosmetics watchdog coalition stated, “We’re concerned about workers who use the products all day long and especially about pregnant women and developing babies and kids, the most vulnerable. [Dibutyl] phthalates affect the male reproductive system, lowered sperm count, and sperm damage, birth defects” (Jones 2006). Although the Food and Drug Administration must approve nail polishes, legislation does not require cosmetic companies to prove that the products are safe before placing them on the market. This is just another ingredient, in addition to TPHP, that is posing various health problems to individuals via nail polish. To utilize nail polish as a way of raising money for ovarian cancer would be unethical as science illustrates a possible linkage to endocrine disruptors and the chemicals found in nail polish.

Conclusion

In conclusion, the chemical TPHP found in common nail polishes poses many public health, environmental, and social repercussions. The study conducted by Duke University and the Environmental Working Group illustrated that TPHP is leaching into bodies through nail polish and even saw a sevenfold increase in the TPHP metabolite in just ten to fourteen hours after nail polish application (Lurie 2015). Nail polish can also contain other chemicals, such as DBP, which are linked to hormonal abnormalities such as underdeveloped genitals and long-term fertility problems (Jones 2006). This chemical also poses a threat to ecological systems as a study in 2002 illustrated that of the 139 streams tested for man-made chemicals, 80 percent were contaminated (Koplin 2002). Aquatic organisms inhabiting these contaminated waters are at risk of developing various health disorders. Lastly, the utilization of nail polish provides the foundation of sexism and privilege.

At first it may seem extreme to criticize an organization such as Teal Toes based off new research that suggests TPHP *may* be harmful to hormone regulation without any concrete evidence. The Duke-EWG study fails to establish whether elevated levels of TPHP actually hurt human beings. Most of the study implicates correlation, not causation, between hormonal imbalances and nail polish. Although this may be true, research has shown compelling evidence that the chemical is harmful to the environment and wildlife. The research from Seoul National University illustrated that exposure to the TPHP altered sex hormone balance and changed the gene expression of certain receptors. This was further demonstrated in other studies utilizing zebrafish and rats (Liu et al., 2015). TPHP is just one of many chemicals found in nail polish. Chemicals such as DBP, also a suspected endocrine disruptor, can be found in certain brands of nail polish. The fact that this chemical has been banned in Europe and can still be found in nail polishes in the United States should raise serious concern (Jones 2006).

In conclusion, Teal Toes should reevaluate utilizing nail polish as a means of raising money and awareness for ovarian cancer as it poses many public health, environmental, and social repercussions and. The study conducted by Duke University and the Environmental Working Group illustrated that TPHP is leaching into bodies through nail polish and even saw a sevenfold increase in the TPHP metabolite in just ten to fourteen hour after nail polish application (Lurie 2015). Nail polish can also contain other chemicals, such as DBP, which are linked to hormonal abnormalities such as underdeveloped genitals and long-term fertility problems (Jones 2006). This chemical also poses a threat to ecological systems as a study in 2002 illustrated that of the 139 streams tested for man-made chemicals, 80 percent were contaminated (Koplin 2002). Aquatic organisms inhabiting these contaminated waters are at risk of developing various health disorders. Lastly, the utilization of nail polish provides the foundation of sexism and privilege. By using a different method to raise money and awareness it eliminates the pitfall of a gender-biased campaign. The United States should continue to conduct further testing on the deleterious chemicals found in nail polishes and adverse health effects associated with these products to ensure the safety of the public.