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Impact of Hazardous Chemical Compounds on the Reproductive System Reported in Sanitary Products

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Abstract: ***A particular group of routine essentials, feminine hygiene items, might expose women to plasticizers and antimicrobial agents. The entire world produces and uses a vast amount of chemicals, some of which may be harmful to reproductive health. The majority of chemicals and work environments have not been investigated for their potential to harm reproductive systems up to this point. The Republic of Korea and other recently industrialized nations have accumulated chemicals and other toxicants quickly, endangering well-being, especially their reproductive systems. (UTC) Women frequently utilize feminine hygiene products (FHPs) as personal care products. (2)According to a broad review, sanitary pads have an impact on endometriosis, vaginal microflora, and vulvar or vaginal skin. Female health has also been found to be impacted by social contexts, such as the use of hygiene products or puberty education. (temp) Chemicals that are dangerous now or in the future are included in the category of sanitary products. Infertility, ovarian cancer, skin rashes, and skin darkening are just a few of the problems that can arise from using sanitary products that contain hazardous chemicals and harm the reproductive system. menstrual cycle imbalance. Sanitary products contain a variety of substances, including VOC, furans, phthalates, bisphenols, and dioxin. Jppd Diapers and sanitary pads are composed of synthetic plastic materials, which may leak when being used. In the present study, the quantities of phthalates (DBP, DEHP, DEP, and BBP) and volatile organic compounds (VOCs) (methylene chloride, toluene, and xylene) in sanitary pads and diapers were measured. There were 5,900- and 130-fold variations in the VOC and phthalate contents between the brands of sanitary pads. (park). Future research should define the exposure to these chemicals during every menstrual period in addition to measuring the chemicals in these items to better understand how menorrhagia and cycle duration affect exposure to menstrual products. By highlighting the flaws of the earlier research, this study aims to address the need for more in-depth investigation and compile a list of possible health risks associated with sanitary pads.***
Keywords: Reproductive health, Sanitary pad, Feminine hygiene, VOC.

I. INTRODUCTION

As per the survey, 56% of women who are 19 years old and have menstruation use sanitary pads. In ancient India, the menstrual cycle was linked to mystical beliefs and was seen as taboo. While some societies viewed menstruation as immoral and hence prohibited women from participating in certain activities or interacting with other people, others openly praised it. The use of filthy materials during menstruation has been replaced with a safer one thanks to sanitary napkins. Women and girls need menstruation products that are economical, safe, and effective. An estimated 1·9 billion women worldwide, or roughly 26% of the population, were anticipated to be menstruation in 2017. These women suffered from monthly blood flow for an average of 65 days annually. Menstruation is an indication of healthy reproductive organs and a typical bodily function.They do, however, include chemicals that may be detrimental to one's health and personal cleanliness.

II. CHEMICALS WHICH ARE USED IN THE SANITARY NAPKIN/PADS

1) Dioxins
2) Furans
3) Phthalates
4) Bisphenols
5) Volatile organic compound (VOC)
6) Pesticide residue
7) Synthetic fragrance
8) paraben

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III. A FEW OF THESE SUBSTANCES ARE IMPACT ON INTIMATE HYGIENE AS FOLLOWS

1) *Dioxins:* Carcinogens present in sanitary napkins that may impact hormone systems and cause rashes.
2) *Bisphenols:* Synthetic polymers present in pads that may raise women's cancer risk. Phthalates are hormone-disturbing substances that resemble estrogen and may be harmful to one's health.
3) *Furans:* Dangerous substances used in the manufacturing of pads that can cling to cotton fibers and result in irritation or skin diseases.
4) *Phthalates:* In feminine care product manufacturing, phthalates are added as humectants, emollients, or skin penetration enhancers in PCPs like perfumes, deodorants, cosmetics, nail polishes, and skin and hair care products (Bao et al., 2015, Guo and Kannan, 2013, Hubinger and Havery, 2006, Hyun and Byung, 2004, Koniecki et al., 2011).
5) *VOC:* (VOCs) (xylene, toluene, and methylene chloride). The risks of cancer, asthma, congenital disabilities, and neurocognitive impairment are increased by VOCs [21]. The development and functionality of the reproductive system are known to be adversely affected by exposure to methylene chloride, toluene, and xylene [22–25].
6) *Paraben:* Breast cancer has been connected to the use of parabens, which are estrogen agonists (Jagne et al., 2016).

Maintaining general health and preventing infections is especially crucial regarding intimate hygiene during the menstrual cycle. Tampons, menstrual cups, biodegradable menstrual pads, and washable cloth pads are some options for sanitary pad replacements. In conclusion, sanitary pads are convenient, but because of their chemical composition, health hazards may be involved. Investigating safer choices for period hygiene products can benefit women.

Enhancers in PCPs like perfumes, deodorants, cosmetics, nail polishes, and skin and hair care products (Bao et al., 2015, Guo and Kannan, 2013, Hubinger and Havery, 2006, Hyun and Byung, 2004, Koniecki et al., 2011).In conclusion, sanitary pads are convenient, but because of their chemical composition, health hazards may be involved. Investigating safer choices for period hygiene products can benefit women.

IV. ALTERNATE TO SANITARY PADS



A. *Menstrual Cups*

Although the menstrual cup has a lengthy history, it is not well known (appendix p 2).13. Menstrual cups are placed inside the vagina, much like tampons, but the blood is collected in a container that has a capacity of 10–38 milliliters. Depending on your menstrual flow and the type of cup you use, you should empty your menstrual cup every 4 to 12 hours. There are two varieties of cups: a vaginal cup which is typically placed in the vagina in the form of a bell, and a cervical cup, which is placed around the cervix high in the vagina similar to a contraceptive diaphragm.

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B. Biodegradable Sanitary Pads

Superabsorbent polymer is the most often utilized substance in commercial sanitary pads (SAP). In the 1970s, this material was first used to make sanitary pads and diapers in affluent nations like the US and Japan. The problems with SAP include its high cost and highly technical manufacture, which calls for sophisticated technology and a large amount of cash. Natural plant fibers, unlike SAP, are very absorbent since they are cellulose-based and attract water. Because of the presence of hydroxyl and other oxygen-containing groups in the cell wall, which draw moisture through hydrogen bonding, the diameters of plant fibers vary as the moisture level varies. The fiber grows until the cell wall is saturated with water as a result of moisture causing the cell wall to bulge.

C. Washable Cloth Pads

Superabsorbent polymer is the most often utilized substance in commercial sanitary pads (SAP). In the 1970s, this material was first used to make sanitary pads and diapers in affluent nations like the US and Japan. The problems with SAP include its high cost and highly technical manufacture, which calls for sophisticated technology and a large amount of cash. Natural plant fibers, unlike SAP, are very absorbent since they are cellulose-based and attract water. Because of the presence of hydroxyl and other oxygen-containing groups in the cell wall, which draw moisture through hydrogen bonding, the diameters of plant fibers vary as the moisture level varies. The fiber grows until the cell wall is saturated with water as a result of moisture causing the cell wall to bulge. After this saturation point, moisture stays in the void structure as free water and doesn't help it continue to expand. A superabsorbent polymer may absorb water up to 200 times its weight [17]. Cotton fibers can usually hold up to 24–27 times their weight in water [18].cotton plants produce these fibers.

D. Tampons

Tampons are a widespread feminine hygiene device and are put into the vagina to absorb menstrual blood; 50–86% of American women report using them during menstruation [1]. However, the vagina is a very efficient way to carry medications to the systemic circulation system [2], which implies that it could also be beneficial to deliver other substances, such as chemicals, to the circulation. This is because the walls of the vaginal mucosa are full with arteries, blood vessels, and lymphatic vessels. Additionally, absorption by this route avoids first-pass metabolism by going straight into the peripheral circulation [2].

V. HEALTH DANGERS OF USING SANITARY PADS

1) Ovarian Cancer
2) Hormonal Imbalance
3) Allergies of the vagina
4) Rashes
5) Inflammation in the lower abdomen
6) Compromised Immune System
7) Thyroid Dysfunction
8) Diseases affecting the endometrium
9) Infertility

A. Bleach Is Present in Sanitary Pads

It may surprise you to learn that these menstruation pads undergo bleaching before being delivered to you. Cotton always has a hint of yellow in it rather than being completely white. But how is it possible when the pads we use are bright white? The majority of us assume that everything white is cleaner since white is a color that is connected to cleanliness. The idea behind pads is the same: women feel safer knowing they are using something clean because they think crystal white pads are clean. But the cotton is bleached to get this white color! Indeed, dioxin—a highly toxic chemical—is used to bleach it. An effective environmental contaminant. Several companies now claim the low dioxin content of their products, yet even minimal exposure to this toxin can result in liver damage and skin discoloration. A woman uses roughly 6-7 thousand pads in her lifetime on average. Now consider how much dioxin may have gotten into her system. Could you calculate the concentration and potential harm? In the worst-case scenario, dioxin is associated with ovarian cancer, diabetes, immune system issues, and disorders causing inflammation in the pelvis.

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B. Cancer May Be Caused by Sanitary Pads

It has been determined that using pads can lead to genital cancer. This does not imply that sometimes using pads will increase your risk of developing cancer, but individuals who use them every month should be concerned. This mostly applies to pads that include chemicals. As a result, these substances, which are easily absorbed by the body and harmful, are exposed to your delicate vaginal area. Certain ones are malignant and have the potential to negatively impact a woman's ability to conceive. Cervical cancer can also result from the fiber used in pads to improve absorption.

C. They Might Possess Insecticides and Herbicide

.Cotton material is highly likely to contain them, not because they are administered with them. As is common knowledge, cotton is a crop and is used to make sanitary napkins. Herbicides and pesticides are applied to crops to keep them free of pests, but this may also harm cotton, which could contaminate your body through the bloodstream. Additionally, cotton contains "furan," another hazardous chemical that has the potential to enter the body. This chemical has been linked to thyroid dysfunction, cancer, and a host of other health problems. It is also sprayed on cotton together with other pesticides and herbicides.

D. Sanitary Pads may Contribute to Infertility

To minimize blood odor, most pads include odor neutralizers or deodorants. Women desire it, and since they cannot handle problem, manufacturers are not to blame. However, using scented pads has the risk of impairing your fertility and maybe endangering the lives of the unborn child. Scent-related compounds have been connected to both deleterious effects on embryonic development and birth abnormalities. Experts advise staying away from perfumed feminine hygiene products because of this. They not only irritate the skin but also raise the possibility of additional illnesses, including vaginal yeast infection.

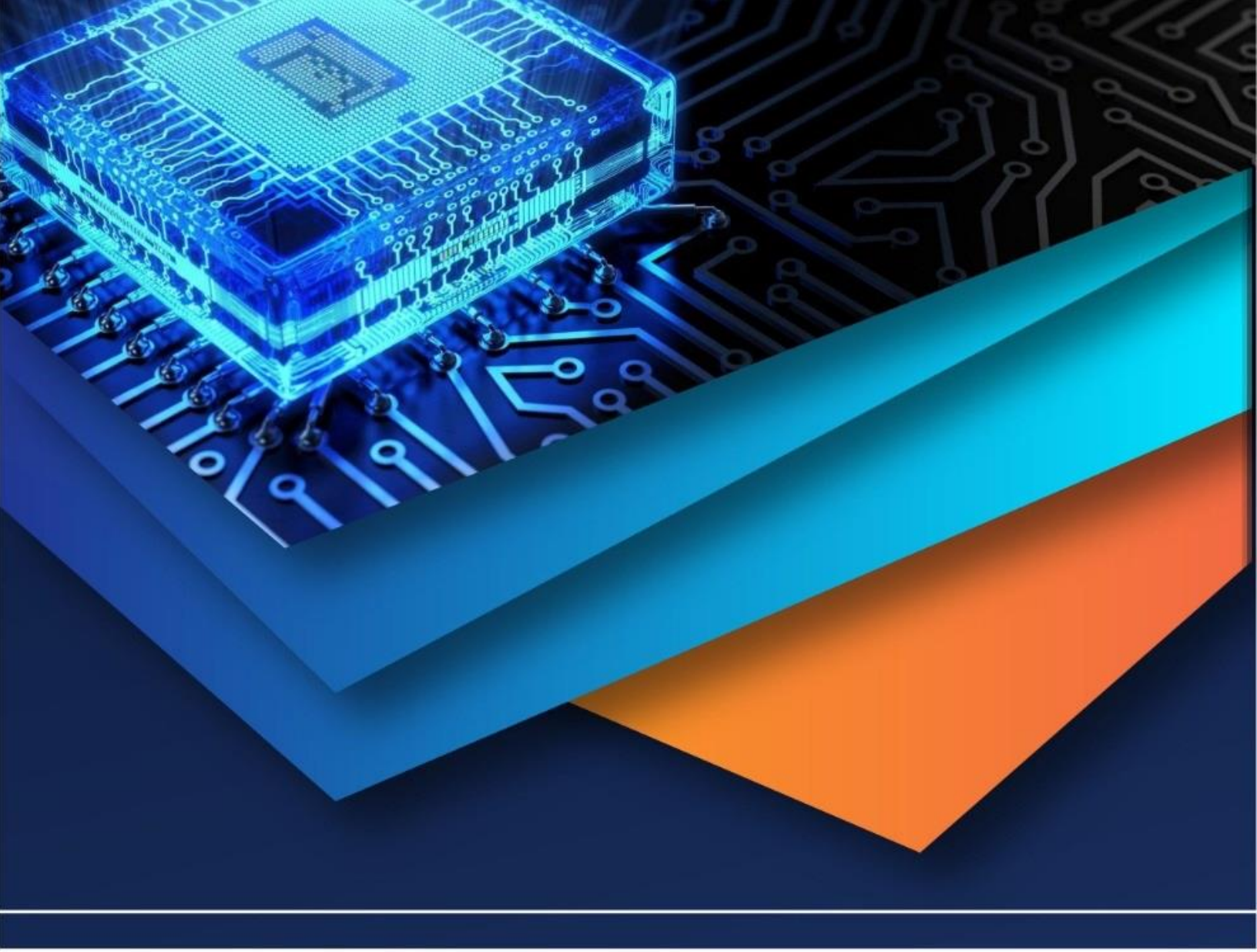
VI. DISCUSSION

The review of sanitary pads and diapers surveyed in this study concluded that they contained phthalates and volatile organic compounds (VOCs), with varied quantities among them. Considering that menstrual fluids, including blood, can remove chemicals from sanitary pads, panty liners, and tampons. Chemical transfer rates may exceed the values determined for this study. Additional research is required to ascertain the rates at which these chemicals are transferred from the product (under various real-world settings) and the rates at which they are absorbed transdermal by the vulva and vaginal mucosa. For the phthalates, oral DBP exposure has been related to decreased food intake, fetal, weight gain, and higher chances of miscarriages in rats [59, 60]. The harmful effects of chemicals are also absorbed from sanitary pads and other products. Women are exposed to a variety of toxins through a variety of routes. This result raises questions about the safety of utilizing some of the products and emphasizes the requirement for phthalate and volatile organic compound (VOC) content reduction.

REFERENCES

[1] Ministry of Food and Drug Safety. Status report on female hygiene products and safety information. Cheongju: Ministry of Food and Drug Safety; 2017.
[2] Ministry of Environment. Preliminary study of health effects of disposable sanitary pads. Sejong: Ministry of Environment; 2018.
[3] Nicole W. A question for women's health: chemicals in feminine hygiene products and personal lubricants. Environ Health Perspect 2014;122:A70-A75.
[4] Park, C. J. Barakat, R.Ulanov, A. Li, Z. Lin, P. C. Chiu, K. Zhou, S. Perez, P. Lee, J. Flaws, J. and Ko, C. J. Sanitary pads and diapers contain higher phthalate contents than those in common commercial plastic products. Reproductive Toxicology. 2019; 84, 114–121. https://doi.org/10.1016/j.dsx.2021.03.031
[5] Akahira J. Suzuki T. Ito K. Kaneko C. Darnel AD. Moriya T. Okamura K. Yaegashi N and Sasano H: Differential expression of progesterone receptor isoforms A and B in the normal ovary, and in benign, borderline, and malignant ovarian tumors. Jpn J Cancer Res. 2002; 93: 807–815. https://doi.org/10.1111/j.1349-7006.2002.tb01323.
[6] . Salthammer T, Zhang Y, Mo J, Koch HM, Weschler CJ. Assessing human exposure to organic pollutants in the indoor environment. Angew Chemie Int Ed 2018;57:12228– 12263.
[7] Churchill JE, Ashley DL, Kaye WE. Recent chemical exposures and blood volatile organic compound levels in a large population-based sample. Arch Environ Health 2001; 56:157–166.
[8] Division of Toxicology and Human Health Science. Agency for Toxic Substances and Disease Registry. Centers for Disease Control and Prevention. Public Health Statement for Toluene. 2015.
[9] Schettler T, Solomon G, Valenti M. Generations at risk: reproductive health and the environment. Cambridge: MIT Press; 2000.
[10] Wujanto L, Wakelin S. Allergic contact dermatitis to colophonium in a sanitary pad.
[11] Barragan-Martinez C, Speck-Hernandez CA, Montoya-Ortiz G, Mantilla RD, Anaya JM, Rojas-Villarraga A. Organic solvents as risk factor for autoimmune diseases: a systematic review and meta-analysis. PLoS One 2012;7:e51506
[12] Systematic Review on Sanitary Pads and Female Health Jingang Woo*, Soyeon Kim*, Haesoon Kim1 , Kyoung Sook Jeong2 , EunMee Kim3 , Eunhee Ha4 Ewha Med J 2019;42(3):25-3 https://doi.org/10.12771/emj.2019.42.3.25 eISSN 2234-2591

[13] Menstrual cup use, leakage, acceptability, safety, and availability: a systematic review and meta-analysis Anna Maria van Eijk, Garazi Zulaika, Madeline Lenchner, Linda Mason, Muthusamy Sivakami, Elizabeth Nyothach, Holger Unger, Kayla Laserson, Penelope A Phillips-Howard
[14] IMPACT OF CHEMICAL COMPOUNDS ON REPEODUCTIVE SYSTEM REPORTED IN SANITARY PADS https://rjppd.org/AbstractView.aspx?PID=2023-15-3-4
[15] Reproductive Toxic Chemicals at Work and Efforts to Protect Workers' Health: A Literature Review Kyung-Taek Rim
[16] Sanitary pads and diapers contain higher phthalate contents than those in common commercial plastic products Chan Jin Parka,1 , Radwa Barakata,b,1 , Alexander Ulanovc , Zhong Lic , Po-Ching Lina , Karen Chiua , Sherry Zhoua , Pablo Pereza , Jungyeon Leed , Jodi Flawsa , CheMyong Jay Koa
[17] Occurrence and Distribution of Phthalates in Sanitary Napkins from Six Countries: Implications for Women's Health Zhenwu Tang Miao Chai Jiali Cheng* Yuwen Wang Qifei Huang*
[18] Chemicals in menstrual products: A systematic review Joanna Marroquin1 | Marianthi-Anna Kiomourtzoglou2 | Alexandra Scranton3 | Anna Z. Pollack
[19] Ding N, Lin N, Batterman S, Park SK. Feminine hygiene products and volatile organic compounds in reproductive-aged women across the menstrual cycle: a longitudinal pilot study. J Womens Health. 2022;31(2):210–8
[20] Phthalate concentrations in personal care products and the cumulative exposure to female adults and infants in Shanghai. Journal of Toxicol
[21] C. Lüthi, J. McConville, E. Kvarnström, Community-based approaches for addressing the urban sanitation challenges, Int. J. Urban Sustain. Dev, 1 (1-2) (2010), 49–63. http://dx.doi.org/10.1080/19463131003654764
[22] Koniecki, D. Wang, R. Moody, R. P. and Zhu, J. Phthalates in cosmetic and personal care products: Concentrations and possible dermal exposure. Environmental Research. 2011;111(3), 329–336. https://doi.org/10.1016/j.envres.2011.01.013
[23] Xiru Chen, Xinyue Gu, Chao Wang, Liuqing Huang, Dingding Wu, Hao Wu, Sijia Liang, Jingyi Ling, Cheng Gu. Bisulfite-assisted surface Fenton-like degradation of dimethyl phthalate by ferrihydrite-H2O2 system. Chemical Engineering Journal 2023, 452 , 139309. https://doi.org/10.1016/j.cej.2022.139309
[24] Magdalena Fabjanowicz, Justyna Płotka-Wasylka, Marek Tobiszewski. Multicriteria Decision Analysis and Grouping of Analytical Procedures for Phthalates Determination in Disposable Baby Diapers. Molecules 2021, 26 (22) , 7009. https://doi.org/10.3390/molecules26227009
[25] Reame N. Menstrual Health products, practices, and problems. Women Health 1983;8:37-51



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