

# Investigate Association between Environmental Exposure to Endocrine Disrupting Chemicals such as Phthalates and Environmental Phenols

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## Description

Common gynecologic disorders include uterine leiomyoma, adenomyosis, endometrial polyp, and benign ovarian tumors. Other symptoms include dysmenorrhea, infertility, and prolonged or heavy menstrual bleeding. The most prevalent benign smooth muscle tumor in women of reproductive age is uterine leiomyoma. By 50, the cumulative incidence of tumors was estimated to be greater than 80 percent for black women and nearly 70 percent for white women. The age group of 40–49 years old had the highest prevalence of uterine leiomyoma in Korea, at 41.4 percent. The myometrium's microscopic presence of endometrial tissue indicates adenomyosis. The prevalence of adenomyosis has been the subject of numerous studies, with estimates ranging from 5% to 70%. In Korea, adenomyosis was 22.5 percent common, and 55.6% of the 41–50 age group had uterine leiomyoma. Endometrial polyps are sessile, pedunculated, smooth-margined masses that protrude into the uterine cavity from the endometrium. Endometrial polyps are reported to occur between 10% and 40% of the time. Additionally, functional cysts and tumors, the majority of which are asymptomatic—are included in benign ovarian tumors. According to reports, the prevalence of benign ovarian tumors ranges from 3% to 5%.

## Sources of Exposure to Endocrine Disrupting Compounds

Age, obesity, ethnicity, lifestyle, and hormone levels have been identified as risk factors for conditions like uterine leiomyoma, adenomyosis, endometrial polyps, and benign ovarian tumors. The largest sources of exposure to endocrine-disrupting compounds, such as phthalates, bisphenols, parabens, benzophenones, and antibiotics, are found in diet and Personal Care Products (PCPs). PCPs, such as sunscreen, toothpaste, soap, lotion, and fragrances, are frequently used in large quantities all over the world. Hand cream was used by 94.1 percent of women in Korea, followed by skin toner (92.5 percent), body cleanser (92.3%), sunscreen (90.1%), and body lotion (84.8%), all of which were used more than once a day. Additionally, these compounds have been found in the urine of women of reproductive age and pregnant women. These

endocrine-disrupting substances may also play a role in the development of disorders like uterine leiomyoma, adenomyosis, endometrial polyps, and benign ovarian tumors, all of which are hormone-sensitive. Phthalates appear to have antiandrogenic effects and may reduce estrogen production in several studies on experimental animals. Bisphenol A (BPA) may modulate gonadotropin hormones by stimulating the production of estrogen. It is known to have estrogenic activity. It has been demonstrated that many parabens have weak estrogenic activity. In genetic and uterotrophic assays, for instance, 2-hydroxy-4-methoxybenzophenone was found to have weak estrogen-like activity. It was reported that triclosan had estrogenic activity because it increased uterine CaBP-9k and C3 expression and led to an increase in uterine weight.

## Urinary Phthalate Metabolites and Gynecological Disorders

Non-persistent compound exposures to gynecological conditions have also only been examined in a small number of epidemiological studies. Using plasma and serum levels, four studies found connections between phthalates and diseases, however, because environmental phenols, phthalates, and parabens are quickly glucuronidized in the blood to their conjugated forms, plasma and serum levels may not accurately reflect the internal dose. As a result, urine is the most effective matrix for determining their concentrations. Non-persistent compound levels in the urine were found to have no correlation with uterine leiomyoma or endometriosis. Urinary phthalate metabolites and gynecological disorders were linked in two studies. Small samples or self-reported uterine leiomyoma have been used in these studies. Chemicals like phthalates, benzophenone, and BPA were linked to uterine leiomyoma and endometriosis in other studies. In addition, very few studies have examined the connection between gynecological disorders in Korean women of reproductive age and exposure to environmental compounds. In addition, no studies have examined the relationship between triclosan and paraben levels in the urine and ovarian and uterine diseases. As a result, more research is needed to determine the connection between gynecological disorders and environmental exposure to these chemicals. Age differences were significant between the control

group, the groups with uterine leiomyoma, adenomyosis, and benign ovarian tumors, but not between the groups with endometrial polyps. Multiparous women were more likely than nulliparous women to be diagnosed with adenomyosis. In this study, phthalate metabolites and environmental phenols (bisphenols, parabens, benzophenone derivatives, triclosan) were found in urine samples taken from 484 women of reproductive age who had transvaginal ultrasonography performed to check for uterine diseases (benign ovarian tumors)

and uterine leiomyoma, adenomyosis, and endometrial polyps). Assuming that a single measurement is representative of exposure during the course of the disease, our study suggests that high levels of urinary concentrations of these compounds, such as DEHP metabolites and parabens and their metabolites, were associated with uterine leiomyoma, endometrial polyps, and benign ovarian tumors. However, the connection between these compounds and gynecological disorders requires additional investigation.