Irregular Menstruation, A New Allergic Symptom of Parthenium Weed's Pollen Inhalation

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Abstract

Parthenium (*Parthenium hysterophorus*), a weed plant in the tribe Heliantheae within the family Asteraceae, is a noxious weed found in America, Asia, Africa, and Australia. In India, it is a well-known weed that occupies roadsides, uncultivated barren lands, and in and around cultivated crops, competing for crop nutrients and space, responsible for lower crop yields and compromised food quality. More importantly, the weed has several negative impacts on human health, including allergic respiratory problems, contact dermatitis, and mutagenicity in humans, as well as systemic toxicity, loss of skin pigmentation, dermatitis, and diarrhoea in animals. The weed plant and all its parts, including trichomes and pollen, contain toxins called sesquiterpene lactones, which are responsible for several allergic symptoms. We have observed a new allergic symptom of this weed, particularly its pollen, which causes irregular menstruation in females who come into contact with the pollen of this weed for more than three days during the farm operations. This is the first report of irregular menstruation caused by the contact of this weed, which was unknown hitherto.

Keywords: Parthenium, Allergy, Menstruation.

Parthenium (*Parthenium hysterophorus*) is a noxious weed, also known as False ragweed, Bitterweed, Carrot grass, Congress grass, and Santa Maria, etc. This weed is often spotted on abandoned lands, developing residential areas around the towns, railway tracks, road sides, alongside drainage and irrigation canals, in and around farms, and in cultivated field crops, including plantations, and vegetable crops competing for crop nutrients and space, responsible for lower crop yields and compromised food quality besides its human and animal health hazards (Huma Nawaz et.al, 2025). In India, approximately two million hectares of land have been infested with this weed menace (Dwivedi et al. 2009). Due to its high fecundity, a single plant can produce 10,000 to 15,000 viable seeds, which can disperse and germinate to cover large areas of uncultivated and cultivated land, grow very fast, and compete with main crops to reduce the crop yield and food quality. Therefore, this weed has to be removed from its place of infestation, in most of the cases by employing the manual work force due to herbicide toxicity to the main crops.

During the process of its removal, contact with this weed causes several allergic symptoms in people coming in contact with it. Additionally, the dairy animals, which graze on such weed plants, also suffer from various symptoms. The leaves and pollen grains of the weed plant are the main sources of allergies for humans and animals (Patel, 2011).

These health hazards include allergic contact dermatitis in humans (Gunaseelan, 1987; Morin et al., 2009), which manifests as itchy erythematous papules and papulovesicular lesions on exposed areas of the body (Akhtar et al., 2010), which have been related to cytotoxicity of the sesquiterpene lactone parthenin, a toxin of this weed plant (Narasimban et al., 1984). Persons exposed to this plant for a prolonged period manifest the symptoms of skin inflammation, eczema, asthma, allergic rhinitis, hay fever, black spots, burning, and blisters around the eyes. It also causes diarrhoea, severe papular erythematous eruptions, breathlessness, and choking (Maishi et al. 1998). Exposure to *its* pollens causes allergic bronchitis (Towers and Subba Rao 1992). Sharma et al. (2005) observed that the clinical pattern of Parthenium dermatitis progresses from airborne contact dermatitis to a mixed pattern or chronic actinic dermatitis pattern. Eczema herpeticum is reported to complicate parthenium dermatitis. People might not have an allergic reaction the first time they touch a plant, but allergies can develop after a few exposures. Once a reaction to parthenium weed develops, some people develop allergies to related plants such as sunflowers. This reaction can be so severe that people with the allergy may need to move away from areas infested with parthenium weed.

The Livestock do not usually eat parthenium weed, but if no other feed is available in the grazing grounds, they may eat large amounts of this weed, which may cause systemic toxicity, expressed in the form of alopecia, loss of skin pigmentation, dermatitis, and diarrhoea (Gunaseelan 1987). The milk and meat quality of cattle, buffalo, and sheep

deteriorate upon consumption of this weed (Lakshmi and Srinivas 2007). The sheep fed on this weed within one month of slaughter can taint the flavour of the meat. Degenerative changes in both the liver and kidneys, as well as inhibition of liver dehydrogenases, have been reported in buffalo and sheep (Rajkumar et al. 1988). Young cattle are most susceptible to dying from parthenium poisoning. Animals may also have allergic reactions, including skin irritation.

What is responsible for the allergies and toxicities of this weed is a toxin called sesquiterpene lactones (SQL), which is available in all its parts, including trichomes and pollen. Maishi et al. (1998) reported a bitter glycoside parthenin as a major SQL in the plant. Besides parthenin, hymenin, and ambrosin are found to be the culprits behind the menacing role of this weed in provoking health hazards (Lata et al. 2008). *Parthenium* from different geographical regions exhibited different SQL, which includes parthenin, hymenin, coronopilin, dihydroisoparthenin, hysterin, hysterophorin, and tetraneurin- A as the principal constituents of their sesquiterpene lactones (De La Fuente et al. 1997). Gupta et al. (1996) identified a novel hydroxyproline-rich glycoprotein as the major allergen in *P. hysterophorus* pollen. These SQL play an important role in inducing hypersensitivity or disease reactions in affected humans or animals.

Besides these known human health hazards, a new complication of irregular menstruation was observed in the ladies who worked with the parthenium weed for their removal in the field crop. The exposure of lady labourers to the pollen of the weed for more than three days has resulted in irregular menstruation, which occurs before their due dates or two menstruation cycles per month. The same pattern was observed for two consecutive years, when these lady labourers worked in the crop field for the removal of parthenium weed at their flowering stage. The removal work of the parthenium weed plant in its vegetative stage did not cause such an effect, i.e., irregular menstruation during their eradication program from the crop field, confirming that parthenium pollen was a major culprit behind this irregular menstruation in ladies. This is the new allergic symptom of parthenium toxicity, unknown hitherto, in the female worker engaged in the parthenium removal program in the crop fields, and can be a major issue in the female workers exposed to parthenium pollen for a longer period.

Irregular menstruation is reported to occur due to hormonal imbalances, often due to conditions like PCOS, thyroid issues, stress, significant weight changes, or perimenopause, disrupting ovulation; lifestyle factors such as excessive exercise, poor nutrition, and certain medications. Structural problems like uterine fibroids or endometriosis, along with pregnancy, can also cause cycle changes (Ghalia et al., 2023). Nowhere in the literature, parthenium toxicity is reported to be a cause of irregular menstruation, and thus, this is the first report of irregular menstruation due to parthenium toxicity.

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