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ADVERSE EFFECTS OF AGROCHEMICAL EXPOSURE ON PREGNANCY W.S.R TO *DOOSHI VISHA* AND ITS MANAGEMENT THROUGH *AYURVEDA*.

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Abstract : **Introduction**- The term "Agrochemical" describes a wide variety of agricultural chemicals, including fungicides, insecticides, synthetic fertilizers, herbicides, and additional chemical fertilizers. In agricultural production, despite of their widespread use and popularity, there are significant worries regarding the health dangers that the general public faces due to pesticide residues in food and drinking water.

Methodology- The accumulation of toxins within the body is significantly influenced by these components. Toxins build up as a consequence, of these leading to major health issues. We unintentionally come into contact with several types of toxins through the course of our everyday activities. During pregnancy, those toxins may be mobilized and are transferred to the growing fetus. Unfortunately, that problem continues into the postpartum period, as the toxic body burden continues to be mobilized into mother's milk.

Result- The detail analysis shows that Pregnant women are more susceptible to toxins; nevertheless. Pregnant women who are exposed to pesticides have impaired fetus growth and neurodevelopment. It may lead to miscarriages, preterm births, low birth weight, birth defects and learning problems in children. *Ayurveda* provides a unique explanation of *Dooshi Visha* where the toxin remains in the body for an extended period of time then produces various ill effects on the body.

Discussion and Conclusion - *Ayurvedic* interventions not only address toxic effects but also contribute to a healthier pregnancy, fostering a disease-free environment for both mother and child through preconception planning and lifestyle changes by following *Dooshi visha* line of treatment followed by *vishagna dravyas* (herbal medicines) *prayoga* which possess the qualities to treat pesticide-related illnesses as well as enhance the quality of life of the mother and the child.

IndexTerms - Agrochemical, maternal health, pesticides, toxicity, *Dooshi visha, Vishghna dravyas.*
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I. INTRODUCTION

The term "Agrochemical" describes a wide variety of agricultural chemicals, including fungicides, insecticides, synthetic fertilizers, herbicides, and additional chemical fertilizers. In agricultural production.

Despite of their widespread use and popularity, there are significant worries regarding the health dangers that the general public faces due to pesticide residues in food and drinking water. The accumulation of toxins within the body is significantly influenced by these components, because of their poor excretory capability and fat solubilitythe human body is unable to eliminate them as a result of these there will be toxins build up, leading to major health issues[1]. We unintentionally come into contact with several types of toxins through the course of our regular activities. Exposure to substances at low levels that may have long-term consequences may not result in immediate harm, but repeated exposures may increase the chance of long-term negative effects.

AIM-

To provide an overview of the effects of pesticide exposure during pregnancy and to newly born baby with its possible management and preconceptional care through Ayurveda

History-

Throughout history, numerous instances highlight how human pursuits, driven by inadequate judgment or ignorance, have jeopardized human existence within a short span. Revolutionary procedures, often rooted in synthesis, may yield unforeseen negative consequences. A longstanding concern in societal awareness is the use of pesticides. While these chemicals are commonly employed to eliminate specific pests, they can pose risks to non-targeted species. The pesticides utilized on crops may wash into reservoirs or water outlets, causing harm to fish and other aquatic life or potentially contaminating sources of drinking water[2].

Transportation of agrochemicals and its effect on environment-

Some pesticides, designed to resist degradation by living organisms, natural processes, and physical elements, can persist in the environment for extended periods. These pesticides may leach into the lower layers of the soil, where they can be absorbed by plant roots. As plants take up these pesticides, the chemicals accumulate in their tissues. When herbivores consume these plants, they also accumulate the pesticides, and this process continues up the food chain. This biomagnification of pesticides in the food chain raises environmental concerns due to the potential harm to organisms at higher tropic levels, including humans who consume contaminated food. Environmental mitigation efforts involve using eco-friendly pesticides, adopting integrated pest management practices, and implementing sustainable agriculture, along with regulatory measures to monitor and control pesticide use. Numerous reports have highlighted the accumulation of pesticide residues in both plant and animal tissues. The pesticides applied in specific areas can be transported beyond the intended target, reaching non-target areas away from the crops. This not only impacts pest species but also raises concerns for potentially endangering non-target species. The unintended spread of pesticides poses risks to a broader range of organisms, including those that may be endangered[3].

Exposure to pesticides and chemical fertilizers during pregnancy can have potential health effects on both the developing fetus and the pregnant woman. It's important to note that the impact can vary based on the specific chemicals involved, the level of exposure, and individual susceptibility. Here are some potential effects[4]

Pesticide-

- Developmental risk:
  Prenatal exposure to certain pesticides has been linked to developmental issues in the fetus, including neurodevelopmental delays and birth defects.
- Reproductive health:
  Some pesticides may interfere with the endocrine system, affecting reproductive health in both males and females.
- Low birth weight:
  Prenatal exposure to certain pesticides has been associated with an increased risk of low birth weight, which can have implications for the health of the newborn.
- Neurological effect:
  Exposure to certain pesticides has been correlated with an increased risk of neurological disorders in children.

- Respiratory issues:

There is evidence suggesting that pesticide exposure during pregnancy may contribute to respiratory problems in offspring.

Chemical fertilizers-

- Nitrates: High levels of nitrates in drinking water, often stemming from the use of nitrogen-based fertilizers, have been associated with an increased risk of birth defects.
- Heavy metals:Some components of chemical fertilizers, such as heavy metals, can be toxic and may pose risks to fetal development.
- Ground water contamination:Improper use of fertilizers can lead to the contamination of groundwater, potentially affecting drinking water quality and posing risks to both maternal and fetal health.

Pesticide exposure on children-

Children are more susceptible to the potential harmful effects of pesticides due to their developing and comparatively weaker immune systems in comparison to adults. Infants, especially those under six months, can be exposed through breast milk, and their propensity to inhale small particles increases their vulnerability. Dietary exposure, where even small amounts of pesticide residues in food can have a relatively higher impact, is another concern. Furthermore, due to their smaller size and developing physiology, the accumulation of pesticide residues in the body over time may pose long-term health risks for children[5]

Pesticide exposure over maternal health-

It's important to emphasize the potential risks associated with exposure to certain pesticides and heavy metals during pregnancy. Pregnant women should indeed be cautious about the substances they come into contact with, as these can have adverse effects on the developing fetus.

Pesticides: Especially those containing harmful chemicals, can pose a risk to pregnant women and their unborn children. Some pesticides are known to disrupt the endocrine system and may have adverse effects on reproductive health. It is crucial for pregnant women to be aware of the types of pesticides used in the environment and limit exposure as much as possible.

Heavy metals: Arsenic, lead, copper, and mercury are heavy metals that can be found in certain agrochemicals, and exposure to these metals can be harmful to the reproductive system. The developing fetus may be particularly vulnerable because these heavy metals can cross the placenta and accumulate in fetal tissues. Long-term exposure to heavy metals has been associated with developmental issues and abnormalities in infants.

Routes of exposure: As mentioned, exposure to these harmful substances can occur through ingestion, inhalation, and dermal exposure. It is essential for pregnant women to be mindful of their environment and take precautions to minimize exposure, such as using protective clothing, ensuring proper ventilation, and consuming foods that are free from pesticide residues

Nutrition: Maintaining a nutritious diet during pregnancy is crucial for the health of both the mother and the developing fetus. Choosing organic and pesticide-free foods can help reduce the risk of exposure to harmful chemicals. Adequate intake of essential nutrients, vitamins, and minerals is important for the proper development of the fetus[6].

RESULTS-

The associations between pesticide exposure, especially during pregnancy, and various adverse outcomes for both the fetus and the newborn have been documented in scientific studies. Here are some of the reported risks:

Fetal growth retardation: Pesticide exposure has been linked to an increased risk of fetal growth retardation, which refers to the inadequate growth of the fetus during pregnancy.

Infertility: There is evidence suggesting that pesticide exposure may contribute to fertility issues in both men and women.

Perinatal death: which includes stillbirth and early neonatal death, has been associated with pesticide exposure during pregnancy

Spontaneous abortion: Pesticide exposure has been linked to an elevated risk of spontaneous abortion (miscarriage) during the early stages of pregnancy.

Premature birth: Exposure to pesticides has been correlated with an increased risk of premature birth, which can lead to various health complications for the newborn.

Small head circumference and low birth weight: In utero exposure to pesticides has been associated with an elevated risk of small head circumference and low birth weight in newborns.

Reduced length: Pesticide exposure during pregnancy has been linked to a reduction in the length of newborns.

Congenital analomies: There is a reported increase in the risk of congenital anomalies following in utero exposure to pesticides. Specific anomalies include limb reduction, eye defects, urogenital defects, cryptorchidism (undescended testes), orofacial clefts, hypospadias (abnormal opening of the urethra), and heart defects[7].

It's important to note that the exact mechanisms by which pesticides contribute to these adverse outcomes may vary and are not fully understood. Additionally, the severity of the risks can depend on factors such as the type of pesticide, the timing and duration of exposure, and individual susceptibility.

According to findings from the California Birth Defects Monitoring Program, a substantial majority of women, approximately 75%, are exposed to pesticides within their home environments. This underscores the pervasive nature of pesticide exposure in the general population. The significance of this information is particularly highlighted during the first trimester of pregnancy, a crucial period characterized by the rapid development of the fetal nervous system.

Given the sensitivity of the early stages of pregnancy, the recommendation is for pregnant women to exercise caution and avoid any contact with pesticides during the first trimester. This precautionary measure is aimed at minimizing potential risks to the intricate and delicate development of the fetal nervous system

Moreover, the program's observations reveal that pregnant women exposed to pesticides in the context of family farming face a modest increase in the risk of specific birth defects. These include oral clefts (such as cleft lip and cleft palate), heart defects, and limb abnormalities. This information underscores the need for pregnant women engaged in agricultural activities or living in close proximity to such activities to be particularly vigilant about potential pesticide exposure[8].

Similarly, residing within a quarter-mile of agricultural crops has been associated with a comparable modest increase in the risk of neural tube defects. Neural tube defects are serious congenital conditions affecting the development of the brain, spinal cord, or their protective coverings. This suggests that geographical proximity to areas where pesticides are utilized in agricultural practices may contribute to specific health risks for pregnant women and their developing fetuses.

Effects seen due to the result of Pesticide exposure –

During the first 3–8 weeks of the first trimester poses the greatest risk to fetal neurodevelopment. It can lead to subtle and permanent effects on brain structure, neuronal differentiation, synaptogenesis, programming of synaptic function, and alterations in the serotoninergic system.

Prenatal exposure to pesticides is associated with childhood cancers like renal cancer, brain tumors, leukemia, and non-Hodgkin lymphoma. Brain cancer is linked to maternal exposure during agricultural activities[9].

Pesticides, even at low doses, may disrupt endocrine function, leading to birth defects, changes in sex ratio, infertility, low sperm count, and early puberty.

Limited evidence suggests immunotoxic effects, with infants exposed to chlordane and heptachlor showing cytokine panel abnormalities[10].

AYURVEDIC CORRELATION-

Dooshi Visha is a unique concept explained in Ayurveda[11] where toxin which remains inside the body for a long time and then produces various ill effects on the body. It does not kill the human instantly, but as it is encapsulated by *kapha dosha*, it remains accumulated in the body for several years producing various ill effects[12]. Toxins tend to accumulate in various body tissues over the years, including the liver, bones, and fat cells. During pregnancy, these stored toxins can be mobilized and transferred to the growing fetus, posing potential risks to its development. This concern persists into the postpartum period, where natural bodily processes, such as breastfeeding, may continue to mobilize and transfer toxins into the mother's milk, potentially exposing the infant[13].

DISCUSSION-

Elimination of the accumulated toxins is the first step in treating and preventing the conditions caused due to the agrochemical exposure. These chemicals are referred to as *Dooshi visha* and the line of treatment is described as *swedhana*(sudation), by which the *dosha* will move from *shaka* to *kostha* through liquefaction and eventually eliminated out through adho marga(purgation) or through *urdwa marga*(emesis). Later, internally *Dooshivishari agada* with honey along with other vishagna dravyas[14] can be given to eliminate out the remaining chemicals present in the body.

CONCLUSION-

As *Dooshi visha* refers to the harmful chemicals that affect the mother and the fetus. Hence proper management should be done by understanding the concept of *Dooshi visha* and its treatment in given a scientific manner, thus protecting the health of the mother and the fetus.

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