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***CHAPTER 4***

***AIM AND OBJECTIVES***

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## **4.1 AIM AND OBJECTIVES**

### **4.1.1 AIM OF THE STUDY**

**Aim:**

The current study aimed to evaluate the effects of Breathing-Focused Yoga Intervention on respiratory function in pesticide-exposed farmers.

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## **4.2 OBJECTIVES OF THE STUDY**

The objectives of the trial are divided into two parts, i.e., primary and secondary objectives.

### **Primary objective:**

The primary objective of the current study was to evaluate the effects of a Breathing-Focused Yoga Intervention on respiratory function in pesticide exposed farmers.

### **Secondary objective:**

The secondary objective was to evaluate the effects of the Breathing-Focused Yoga Intervention on cognitive function, quality of life, and perceived stress in pesticide-exposed farmers.

### 4.3 JUSTIFICATION OF THE STUDY

In farmers, organophosphate toxicity works by inhibiting the acetylcholinesterase (Vale and Lotti, 2015) (Ecobichon, 2001). Due to this inhibition of AChE, there is an increase in acetylcholine (ACh) at the synapse. An increase in ACh causes some nicotinic, muscarinic symptoms and central nervous system toxicity (Namba, Nolte, Jackrel, & Grob, 1971). AChE leads to a cholinergic crisis, affecting several other enzyme systems (Colovic, Krstic, Lazarevic-Pasti, Bondzic, & Vasic, 2013).

Due to pesticides exposure, lung functioning is significantly less among pesticide sprayers. AChE and BChE also depleted (de Jong et al., 2014). A case report shows an unusual heart rhythm associated with organophosphate poisoning (Gul et al., 2012). Standard pharmacological treatment of organophosphate toxicity is a combination of atropine sulfate and pralidoxime. Atropine is indicated in hypersalivation, bronchial secretion, or bradycardia, but atropine is ineffective at the nicotinic receptor. The most common oxime used in organophosphate toxicity is pralidoxime (Eyer, 2003). The common adverse effects of pralidoxime are Vomiting, Tachycardia, and hypertension (particularly diastolic) therefore it is not recommended for routine use in controlling the airway (Eddleston et al., 2009). Acute toxicity can be recovered in patients who receive treatment promptly but may suffer from neurologic sequelae (Kwong, 2002). Many studies show yoga improves lung functions (Yamamoto-Morimoto et al., 2019). Yoga practice has shown significant favorable changes in cardiac function by reducing HR, arterial stiffness, blood pressure, and mental health (Damodaran et al., 2002) (Daukantaitė, Tellhed, Maddux, Svensson, & Melander, 2018). Regular yoga modules can affect mental and adverse cardiorespiratory health among agricultural farmers occupationally exposed to pesticides (Yeung et al., 2014). India is

predominantly a rural country, with 70–80% of the population living in villages engaged in agriculture. Though the average consumption of pesticides in India has been comparatively lower than many other developed economies, the unsafe and non-preventive work practices concerning pesticide use increase the risk of direct pesticide exposure. In India, farmers depend on government hospitals as the major health care setups, wherein the traditional medicine experts (Ayurvedic, homeopathic, and Ayush) have the predominance. Under these settings, Yoga-based clinical interventions could serve as practical and cost-effective solutions for healthcare needs. Hence, we tested the effectiveness of yoga as an intervention in a randomized clinical trial of 6 months against respiratory and cognitive deficits in pesticide-exposed farmers against a wait-list control condition.

Oxidative stress is one of the common biological pathways underlying the pathophysiology of pesticide-induced adverse health effects, including a decline in lung and cognitive functions. Exposure to pesticides could also cause a reduction of pulmonary function through airway obstruction and contribute to the development of clinical symptoms in farm workers.

#### **4.4 HYPOTHESIS AND NULL HYPOTHESIS**

**Hypothesis:** Breathing-Focused Yoga Intervention will improve respiratory function, cognitive function, quality of life and reduce perceived stress in pesticide- exposed farmers.

**Null-Hypothesis:** There will be no change in respiratory parameters, oxidative stress, and neuropsychological functioning after six months of Breathing-Focused Yoga Intervention in farmers occupationally exposed to pesticides.