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RECURRENT RESPIRATORY INFECTIONS IN SOMATICALLY HEALTHY ADULTS

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In clinical practice and epidemiological research, Recurrent Respiratory Infections (RRIs) are defined as a pathological frequency of acute infections involving the upper and/or lower respiratory tracts (e.g., rhinitis, pharyngotonsillitis, laryngitis, and bronchitis) that exceeds the statistical norm for a specific age group. In the adult population, RRIs are generally defined by the occurrence of more than 3 to 4 episodes per year. Constant state of inflammation is triggered by multiple factors which causes significantly impaired immunity without primary physical illnesses or immunodeficiencies. Such a state results in recurrent respiratory and other infections. Lack of sleep, Obesity, Stress and even low physical activity creates the factors in the body causing long term inflammation.

Sleep is a key regulator of both innate and adaptive immunity. Long term sleep deprivation affects the activity of natural killer cells, alters B- AND T- cell response, elevates pro inflammatory cytokines (like IL1, IL6 and TNF-alpha) and stress which disrupts the normal balance and creates a state of chronic inflammation. Sleep loss lowers the activity of T cell and antibody production which collectively weaken the body's defence against pathogens.

High level of stress activates the hypothalamic-pituitary-adrenal (HPA) axis and sympathetic nervous system leading to sustained high cortisol and catecholamine release which reduces the numbers, action and function of key immune cells. Chronically high levels of cortisol blunt the action of glucocorticoid receptors in immune cells, leading to glucocorticoid-resistance, which in turn allows inflammation and dysregulated antiviral defences along with more severe or prolonged symptoms. It creates a vicious cycle: Body is too weak to defend against pathogens but over active enough to damage its own cells and tissues.

In obese people, adipose tissue causes the macrophages to secrete cytokines and chemokines in the bloodstream and disrupt metabolism of lipids, insulin release and vascular functions promoting metabolic syndrome and chronic low-grade inflammation. But regular physical activity boosts immune markers such as IgA and immune surveillance cells which reducing long term inflammation collectively lowering the severity and likelihood of infections.

In summary, lifestyle factors like loss of sleep, chronic stress, obesity, and no physical activity trigger persistent low-grade inflammation that cripples innate and adaptive immunity, leading to frequent infections. Overcoming these with quality sleep, reducing stress, having healthy weight, and doing exercise normalizes cytokines, enhances immune cell function, and breaks the cycle of vulnerability towards infections.