

Frequency correlation analysis of detected *Legionella pneumophila* in drinking water distribution system with water quality indicators in Sari

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Introduction

Legionella pneumophila, small gram negative bacteria are the etiologic causes of 1-30% of pneumonia in hospitals. These microorganisms can produce sporadic and epidemic infections because of their ability in living as an intracellular parasite, they can enter to alveolar macrophages and after binding the Complement C3b to their outer membrane porins, they can find their ability to attachment to CR3 receptors on mononuclear cells and enter them and prevent from forming phagolysosomes and because of this fact that they don't encounter with toxic forms of oxygen, they don't disappear. Producing cytokines from contaminated macrophages can induce a severe inflammatory response, so it can be very dangerous for hospitalized patients, especially for immunocompromised patients.

Materials and Methods

In this study, water samples of a hospital in Sari were collected for one year. These samples were gathered from three different parts of hospital in each seasons. Both cold and warm water were collected and examined for presence of *L. pneumophila*. Also some parameters like as turbidity, Free chlorine, PH, Nitrate, Nitrite, ... were measured. Isolation of *L. pneumophila* was done by water filtering and then by culturing on its specific media, GVPC. Bacterial species were confirmed by identification of 16sRNA gene by PCR.

Results and Discussion

This study showed an important positive correlation between *Legionella* counts and water pH. Water with a pH of 7.45 or higher is associated with a 4.05 times higher risk of *Legionella* colonization in cold water systems showed that slightly alkaline conditions may favor for *Legionella* growth. But it is a negative correlation between *Legionella* counts and both chlorine levels and water temperature. In cold water systems, a free chlorine concentration below 0.375 mg/L increases the risk of *Legionella* presence by 9.76 times, highlighting the importance of proper water disinfection and maintaining appropriate chlorine levels to inhibit bacterial growth. Additionally, high water temperatures above 50°C were found to reduce the growth of *Legionella*.

This study showed that *Legionella* are existing and its appearance are correlated by some parameters in drinking water distribution system in different seasons.

Key words: *Legionella pneumophila*, Frequency, drinking water distribution system, quality indicators
