

# A Narrative Review on Risk factors of Upper Respiratory Tract Infection.

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**Abstract:** -Upper respiratory tract infection (URTIs) is the illness caused by an acute infection which involves the upper respiratory tract includes nose, sinuses pharynx or larynx. This commonly includes: tonsillitis, pharyngitis, laryngitis, sinusitis and the common cold. Symptoms of URTIs commonly include cough, sore throat, runny nose, nasal congestion, headache, low grade fever, facial pressure, sneezing, malaise, myalgias. This review aims to provide information about risk factors associated with URTI includes: exposure to environment (season, air temperature, pollution, altitude) individual factors (age, gender, medical history, and co morbidities), immunological factor, non-immunological factors, Demographic factors and Individual factors. This Article mainly focus on preventive measures for URTIs it also includes nutritional supplements, personal hygiene, dietary supplements immune stimulants, antibiotic prophylaxis and vaccines. Our article also talks about the pharmacological treatment and also enhancing the healthcare team outcomes which includes decongestants and combination antihistamines/ decongestant, h1 receptor antagonist, topical and nasal decongestants (topical oxymetazoline, oral pseudoephedrine), vitamin C, antiviral treatment.

**Key words:** URTIs, URIs, Acute infections, Tonsillitis, Pharyngitis, Laryngitis, Sinusitis.

## **Objectives:** -

The main objective of our study is to

- Describe the risk factors of upper respiratory tract infections.
- To outline the pathophysiology of URTIs.
- To outline the preventive measures and management of Upper respiratory tract infections (URTIs).

## **I. Introduction & Background:** -

Upper respiratory tract infections [URTI] can be defined as self-limited irritation and swelling of the upper airways with associated cough and no signs of pneumonia in a patient with no other condition that would account for their symptoms or with no history of COPD, emphysema or chronic

bronchitis. Upper RTI involves the nose, sinuses, pharynx, larynx, and large airways. Acute upper respiratory tract infections include rhinitis, pharyngitis, tonsillitis, and laryngitis. Most common symptoms of URTI includes cough, sore throat, runny nose, nasal congestion, head ache, low grade fever, facial pressure, sneezing, malaise, myalgias. The onset of symptoms usually begins one to three after exposure and lasts 7-10 days and can persist up to 3 weeks.<sup>[1]</sup>

URIs are caused by numerous pathogens, including rhinoviruses, coronaviruses, influenza, respiratory syncytial virus (RSV), Streptococcus pyogenes, Streptococcus pneumoniae, Haemophilus influenzae, and Mycoplasma pneumoniae.

The global number of new episodes of URIs was 12.8 billion (95% uncertainty interval 11.4 to 14.5) for all ages across males and females in 2021. The global all-age incidence rate of URIs decreased by 10.1% (- 12.0 to -8.1) from 1990 to 2021, the global all age incidence rate fell by 0.5% (-0.8 to -0.1). Globally, the incidence rate of URIS was 162484.8 per 100000 population (144834.0 to 183289.4) in 2021, a decrease of 10.5% (-12.4 to -8.4) from 1990, when the incidence rate was 181552.5 per 100000 population (160827.4 to 206214.7).<sup>[2]</sup>

Upper respiratory tract infection [URTI] is an illness caused by an acute infection by viruses or bacteria of the nose, sinuses, pharynx and larynx. Most URTIs are short, mild, and self-limiting but some can lead to serious complications, resulting in heavy social and economic burden on individuals and society.<sup>[3]</sup>

## **II. Review:**

Infections of upper respiratory tract, such as laryngitis, pharyngitis, nasopharyngitis, and rhinitis, are among the most common disease. Most common symptoms of upper respiratory tract infections (URIs) include coughing, sore throat, runny nose, myalgias, malaise, nasal obstruction, and headache. In some cases, URIs are mainly caused by viruses, including rhinovirus, coronavirus, respiratory syncytial virus.<sup>[4]</sup> complications of upper tract infections are relatively rare, except with influenza. Complications of

influenza include primary influenza viral pneumonia; sinusitis; otitis media; coinfection with bacterial agents; and exacerbation of preexisting medical conditions, particularly asthma and chronic obstructive pulmonary disease. Pneumonia is one of the most common complications of influenza illness in children and contributes significantly to morbidity and mortality.<sup>[1]</sup>

#### **Pathophysiology:**

A URTIs usually involves direct invasion of the upper airway mucosa by the organism. The organism is usually acquired by inhalation of infected droplets. Barriers that prevent the organism from attaching to the mucosa include;

1) The hair lining that traps pathogen, 2) The mucus which also traps organisms 3) The angle between the pharynx and nose which prevents particles from falling into the airways and 4) Ciliated cells in the lower airways that transport the pathogens back to the pharynx.<sup>[1]</sup>

#### **Risk factors:**

Risk factors associated with ARTIs can be categorised broadly in to individual factors (age, gender, medical history and co-morbidities), nutritional factors, environmental factors (season, air temperature, pollution, altitude), exposure factors (household exposure, personal hygiene, physical hygiene, physical distancing, crowded and indoor environments), and immune/haematological risk factors and biomarkers.<sup>[7]</sup>

**1) Environmental exposure:** several environmental factors may contribute to URTI: climate exposure to infectious agents, exposure to irritant, molds, indoor and outdoor air pollution and tobacco smoke. Recent studied have been focused on secondary tobacco smoke as risk factor for respiratory infections in childhood. Maternal smoking during pregnancy is associated with reduced forced expiratory flows after birth and during the first years of life. Also, exposure to tobacco smoke in the postnatal period is associated with an increased frequency of otitis media. Wheezing, bronchitis, asthma exacerbations and lower respiratory tract infections during infancy.

**2) Immunological factors:** It may be related to atopy or immunodeficiency. any defect of immunity, such selective immunoglobulin A (IGA) deficiency, may be linked with frequent respiratory infections by bacteria and viruses: it has been shown that frequent respiratory tract infections by bacteria and viruses. URTI including otitis media and

sinusitis, also characterize the onset of more severe immunodeficiency such as XLA.

**3) Non immunological factors:** Non - immunological host related factors include anatomical abnormalities, chronic systemic (diabetes) and metabolic disease (i.e. cystic fibrosis). Also, in individuals with use of corticosteroids. Transplantation and post-splenectomy are at high risk for URI.<sup>[5]</sup>

**4) Demographics factors:** Factors such as age and nutritional status. Another influential factor is the lack of knowledge. Other factors that can affect acute upper respiratory tract infection are the physical environment of the house and community behavior, room density, ventilation area, floor type, and ceiling are factors that can increase the risk of upper respiratory tract infection.

**5) Individual factors:** Individual factors such as exercise-induced immunosuppression, mental stress, nutritional restrictions, air travel, human crowding, low temperature with low humidity, smoking habits, low serum vitamin D levels, lack of physical activity.<sup>[6]</sup>

#### **Preventive measures:**

**1) Nutrition:** Nutrition may be the single most important factor in optimizing immune function because it can have a positive or negative impact depending on dietary patterns. Antioxidant micronutrients (vitamins and minerals which are only required in small amounts) such as zinc, fatty acids and vitamins E A and D help to regulate the function of immune system.

**2) Personal hygiene:** a number of simple hygiene and environmental tactics can be used to prevent spreading or contracting of viral URTIs.

- Sneezing and coughing into tissues keeps the viruses from spreading, especially when the tissues are immediately discarded and hands are then washed.
- Keeps the hands out of contact with the eyes, nose and mouth.
- Avoid, as much as is practical, prolonged contact with anyone who has a cold.
- Focus on temperature and humidity
- Keeping the kitchen and bathroom countertops clean is important.

**3) Dietary supplements:** Some evidence supports use of vitamin C at doses ranging from 200-500 mg daily for prevention or early intervention at first onset of symptoms of a URTI. Vitamin C has led to significant reductions in the risk of developing colds by approximately 50%. Zinc containing products seem to be beneficial for reducing the duration of symptoms of the common cold in adults by 1.6 days.

Garlic has a role in decreasing frequency of URTIs and shortening duration if a cold is experienced. Honey has been studied as an antitussive in children and found to be better than both no treatment and diphenhydramine, but not better than dextromethorphan.<sup>[8]</sup>

**4) Immune stimulants:** pre- and probiotics and immune stimulants are not proven to be useful in reducing URTI. A recent meta-analysis on immune stimulants found slight beneficial effect of bacterial lysates.

**5) Antibiotic prophylaxis:** the effectiveness of long-term antibiotics in preventing URTI is controversial. Antibiotics for periods longer than 6 weeks for prevention of AOM and its complications have been analyzed. Antibiotics given once or twice daily will reduce the probability of AOM.

**6) Vaccines:** vaccination against influenza and pneumococcal infections is the best approach for URTI in children. It is well documented that the widespread use of conjugated pneumococcal vaccine has led to decreasing incidence of otitis media and acute bacterial rhino-sinusitis.<sup>[5]</sup>

#### **Treatment or management:**

- The goal of treatment for the common cold is symptom relief. Decongestants and combination antihistamine/decongestants medications can limit cough, congestion and other symptoms in adults.

- H1-receptor antagonist may offer a modest reduction of rhinorrhea and sneezing during first 2 days of a cold in adults. First generation antihistamines are sedating, so advice the patient about caution during their use.

- Topical and oral nasal decongestants (i.e., topical oxymetazoline, oral pseudoephedrine) have moderate benefit in adults and adolescents in reducing nasal airway resistance.

- Evidence based data does not support the use of antibiotics in the treatment of the common cold because they do not improve symptoms or shorten the course of illness. There is also a lack of

convincing evidence supporting the use of dextromethorphan for acute cough.

- Vitamin C used as daily prophylaxis at doses of 0.2 grams or more had a “modest but consistent effect” on the duration and severity of common cold symptoms (8% and 13% decreases in duration for adults and children, respectively). When taken therapeutically after the onset of symptoms, however, high dose vitamin C has not shown clear benefit in trials.

- Early antiviral treatment for influenza infection shortens the duration of influenza symptoms, decreases the length of hospital stays, and reduces the risk of complications. Give antiviral therapy within 48 hours of symptom onset (or earlier), and do not delay treatment for laboratory confirmation if a rapid test is not available. Antiviral treatment can provide benefit even after 48 hours in pregnant and other high-risk patients.

- Vaccination is the most effective method of preventing influenza illness. Antiviral chemoprophylaxis is also helpful in preventing influenza (70% to 90% effective) and should be considered as an adjunct to vaccination in certain scenarios or vaccination is unavailable or not possible. Generally, antiviral chemoprophylaxis is used during periods of influenza activity for high-risk persons who cannot receive vaccination (due to contraindication) also in high-risk persons with influenza exposures.<sup>[1]</sup>

#### **Enhancing healthcare team outcomes:**

- Upper respiratory tract infections are one of the most common illnesses that health care workers will encounter in an outpatient setting. The infection may vary from the common cold to a life-threatening illness like acute epiglottitis. Because of the diverse causes and presentation, upper respiratory tract infections are best managed by an interprofessional team.

- The key is to avoid over-prescribing of antibiotics but at the same time not missing a life-threatening infection. Nurse practitioners who see these patients should freely communicate with an infectious disease expert if there is any doubt about the severity of the infection. The pharmacist should be educating the patient on URI and to refrain from overusing unproven products.

- Similarly, the emergency department physician should not readily discharge patients' home with antibiotics for the common cold. Overall, upper respiratory tract infections lead to very high

disability for short periods. Absenteeism from work and schools is common; in addition, the symptoms can be annoying and extreme fatigue is the norm. Patients should encourage to drink ample fluids, rest, discontinue smoking and remain compliant with the prescribed medications.

- Nursing can monitor the patient's condition and symptoms, counsel on medication compliance, and report any concerns to the clinicians managing the case. Interprofessional cooperation is key to good outcomes.

- Finally, clinicians should urge patients to get vaccinated before the flu season. While the vaccine may not decrease the duration of the infection, the symptoms are much less severe.<sup>[1]</sup>

### III. Summary of article:

Upper respiratory tract infection (URTI) is the self-limited irritation and swelling of the upper respiratory airways with associated cough. URTI caused by different pathogens including rhinoviruses, coronaviruses, influenza, *Streptococcus pneumoniae*, *Haemophilus influenzae*, and *Mycoplasma pneumoniae*.

The global number of new episodes of URIs was 12.8 billion (95% uncertainty interval 11.4 to 14.5) for all ages across males and females in 2021. URTI's usually involves direct invasion of the upper airway mucosa by the organism. The organism is usually acquired by inhalation of infected droplets. Barriers that prevent the organism from attaching to the mucosa. Risk factors associated with different factors includes environmental exposure, immunological, non-immunological, demographics and individual factors. Preventive measures include nutrition, personal hygiene, dietary supplement, immune stimulants, antibiotic prophylaxis and vaccines. The effective management strategies, including symptom-based on diagnosis, targeted antimicrobial therapy, and preventive measures (vaccination, hand hygiene), can reduce morbidity and mortality.

### IV. Conclusion:

Upper respiratory tract infections (URTIs) are common, self-limiting illnesses that significantly impact quality utilization. Effective management strategies, including symptom-based diagnosis, targeted antimicrobial therapy, and preventive measures (vaccination, hand hygiene), can reduce morbidity and mortality.

URTIs pose a substantial burden on global health, particularly among vulnerable populations (children, older adults, immunocompromised individuals). Enhanced surveillance, vaccine development, and evidence-based policies can mitigate URTI transmission, complications, and economic consequences.

Effective management strategies include;

- Elucidate URTI pathogenesis and immune response.
- Develop novel, broadly protective vaccines.
- Investigate microbiome and environmental influences on URTI susceptibility.
- Optimize diagnostic and therapeutic strategies.

URTIs are primarily viral, with rhinoviruses, influenza viruses, and coronaviruses being common causes. Bacterial coinfections and antimicrobial resistance complicate treatment.

Host factors (age, immune status, comorbidities) and environmental factors (Air pollution, climate change) impact URTI risk and severity. Preventive measures and evidence-based management can reduce URTI burden.

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