

Shifting Patterns in Varicella-Zoster Virus Infection: Epidemiological Insights and Clinical Relevance

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Abstract:

Background:

Varicella (chickenpox), caused by the varicella-zoster virus (VZV), is a highly contagious viral disease that predominantly affects children but can also result in significant complications in adults, pregnant women, and immunocompromised individuals. This study explores the clinical presentation, systemic involvement, transmission knowledge, seasonal patterns, and the role of traditional and Siddha medicinal practices in managing chickenpox, while examining public perception through a structured questionnaire-based approach.

Methods:

A descriptive cross-sectional study was conducted using a pre-validated questionnaire distributed among 201 participants from various socio-economic backgrounds, primarily in rural and semi-urban regions. The questionnaire assessed symptomatology, transmission awareness, climate-related beliefs, and traditional treatment practices, including both home remedies and Siddha-based approaches. Responses were analyzed to identify trends and knowledge gaps.

Results:

Among the respondents, 81.1% experienced musculoskeletal symptoms, 87.1% reported respiratory symptoms, 81.6% had ocular manifestations, and 74.6% experienced upper gastrointestinal disturbances. The findings suggest that chickenpox impacts multiple organ systems beyond dermatological involvement. Awareness of direct transmission routes was high, but indirect modes were less recognized. A significant number of participants linked outbreaks to cooler seasons and expressed concern about climate change increasing disease frequency. Traditional treatments such as neem leaf applications, turmeric paste, and cooling diets were commonly reported. Siddha practices, including the use of Karisalai Podi, Nilavembu Kudineer, and various herbal churnams, were widely acknowledged for their symptomatic relief and immune-supportive properties.

Keywords: Varicella-zoster virus, Chickenpox, Climate change, Traditional medicine, Siddha medicine, Epidemiology.

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1. Introduction

Varicella, commonly known as chickenpox, is a highly contagious viral disease caused by the varicella-zoster virus (VZV), which belongs to the Herpesviridae family. The disease is characterized by an itchy, vesicular rash, usually accompanied by fever, fatigue, and mild flu-like symptoms. While chickenpox is typically self-limiting in children, it

may result in serious complications in adults, pregnant women, and immunocompromised individuals (1).

VZV is transmitted through airborne respiratory droplets, direct contact with lesions, and indirectly via contaminated surfaces (2). Once a person recovers from chickenpox, the virus remains latent in sensory nerve ganglia and may reactivate later in life as herpes zoster or shingles (3).

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Globally, chickenpox continues to affect millions, with seasonal patterns observed especially in temperate climates where outbreaks peak in winter and spring. In countries like India, where universal vaccination coverage is limited, a large segment of the population remains vulnerable (4). Climate change, urbanization, and environmental alterations may further influence the spread and seasonality of VZV infections (5).

In many Indian communities, particularly rural and semi-urban populations, traditional systems of medicine such as Siddha play an essential role in managing chickenpox. These include herbal remedies, cooling baths, and immunity-boosting concoctions, often passed down through generations (6).

This review aims to investigate the clinical profile, environmental influences, and traditional treatment modalities of chickenpox, while analyzing public perception and home care practices using a structured questionnaire.

2. Materials and Methods

A descriptive cross-sectional study was conducted using a structured, pre-validated questionnaire to evaluate the clinical experience, awareness, and traditional management practices associated with chickenpox (varicella). The survey included both closed and open-ended questions and was distributed among individuals from various age groups, primarily in rural and semi-urban areas. The questionnaire focused on identifying symptoms experienced during infection, knowledge of disease transmission, treatment preferences (including traditional and Siddha methods), and beliefs regarding the impact of seasonal and climate-related factors on disease occurrence. A total of 201 responses were collected. The data were analyzed qualitatively and quantitatively, with special attention to the frequency of system-specific symptoms including musculoskeletal, respiratory, ocular, and gastrointestinal involvement. Responses were anonymized to maintain confidentiality and were used solely for academic and public health insight purposes.

3. Results and Discussion

Out of the 201 respondents, 163 individuals (81.1%) reported experiencing musculoskeletal symptoms during chickenpox, including joint pain, backache, muscle weakness, and general myalgia. These findings suggest a notable systemic impact of varicella-zoster virus beyond cutaneous manifestations, which aligns with emerging clinical observations that VZV may cause myositis and arthralgia in some patients (7). Respiratory symptoms were reported by 175 respondents (87.1%), with common complaints including cough, nasal congestion, sore throat, and sneezing. These symptoms may be attributed to viral replication in the upper respiratory tract mucosa during the early phase of infection, consistent with known transmission routes via aerosols and droplets (8).

Ocular involvement was also prominent, with 164 respondents (81.6%) indicating symptoms such as redness, itching, and irritation in the eyes. These findings are particularly important, as ocular manifestations are often underreported in typical varicella descriptions but can cause significant discomfort and risk for complications like keratitis if unmanaged (9). Additionally, 150 individuals (74.6%) reported upper gastrointestinal (GI) symptoms, including nausea, anorexia, and occasional abdominal discomfort. While GI involvement in chickenpox is not typically highlighted in textbooks, such symptoms may be related to systemic viremia or inflammatory cytokine response, especially in adults and adolescents (10).

These results emphasize that chickenpox is not merely a skin-focused disease but one that affects multiple organ systems. This systemic profile highlights the need for a holistic approach to disease management, which may explain the continued reliance on traditional and Siddha methods for symptomatic relief. The high incidence of musculoskeletal and respiratory complaints, in particular, supports the potential value of Siddha formulations known for anti-inflammatory, analgesic, and respiratory-modulatory effects (11). Traditional practices such as neem fumigation, turmeric paste application, and the use of cooling foods were also commonly reported by respondents, consistent with longstanding community beliefs aimed at reducing fever, inflammation, and viral load (12).

Furthermore, a significant number of participants associated disease outbreaks with seasonal changes, especially during cooler months, which supports existing literature that chickenpox peaks in winter and spring (13). Some respondents also perceived a possible link between shifting climate patterns and increased disease frequency, echoing the broader hypothesis that climate change may influence varicella epidemiology through alterations in human behavior, viral stability, and immune susceptibility (14).

3.1 Clinical Symptoms of Chickenpox

The majority of respondents correctly identified the classic symptoms of chickenpox, including a red, itchy vesicular rash starting on the trunk and spreading to limbs, fever, fatigue, and headache. A significant number also mentioned oral ulcers and mild flu-like symptoms, consistent with clinical literature (15).

3.2 Transmission Knowledge

Respondents demonstrated good awareness that chickenpox spreads via direct contact and airborne droplets. However, less than half recognized the risk of transmission through contaminated surfaces, indicating a gap in knowledge about indirect transmission routes (16).

3.3 Seasonal and Climatic Influence

Many participants associated chickenpox outbreaks with the cooler months (winter and early spring), which aligns with

established epidemiological data (17). Some also noted increased dryness and temperature changes as contributing factors. This supports ongoing research on the impact of climate change on infectious disease seasonality (18).

3.4 Traditional and Siddha Treatments

Traditional practices continue to play a significant role in the community management of chickenpox, particularly in rural and semi-urban areas where access to conventional healthcare may be limited. One of the most widely recognized traditional methods involves the use of neem (*Azadirachta indica*) leaves, which are employed in multiple forms—such as bathing water, fumigation, or as a mattress spread—to reduce itching and maintain hygiene. Other practices include the application of turmeric paste to lesions to promote healing and the use of cooling agents such as curd and castor oil, administered on specific days of illness. These approaches aim to reduce inflammation and purify the body according to traditional humoral theories(19). Dietary regimens also play a role, where foods like tender coconut water, rye water, and Abyssinian banana are consumed to maintain internal cooling and hydration. Spiced or seasoned foods are typically avoided.

In parallel, the Siddha system of medicine provides both external and internal remedies that are still widely practiced and valued. Externally, **Karisalai Podi** is applied to soothe the skin and reduce itching, while **Kadukkai leaf decoctions** are used for bathing to relieve inflammation. Internally, preparations like **Amukkara Churnam** are administered to reduce fever and support the immune system, while **Nilavembu Kudineer**, a well-documented antipyretic decoction, is commonly consumed during febrile conditions. Other formulations such as **Kadukkai Podi**, **Vallarai Churnam**, and **Nellikai Churnam** are also utilized to support immunity, reduce systemic inflammation, and promote faster recovery(20). These Siddha practices are deeply embedded in cultural traditions and are often passed down through generations, highlighting the importance of integrating traditional knowledge into broader public health frameworks while supporting evidence-based validation(21).

3.5 Public Health Implications

The study underscores the need for public education campaigns focusing on comprehensive prevention strategies, proper hygiene, and awareness about vaccination. Moreover, collaboration between modern medical practitioners and Siddha experts could lead to more holistic and culturally acceptable care approaches (22).

Chart 1- Reported Respiratory System Symptoms Due to Chickenpox (n = 175)

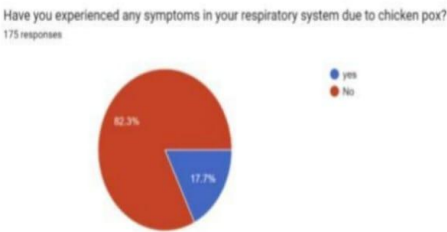


Chart 2 - Incidence of Oral and Throat Discomfort Due to Chickenpox (n = 150)

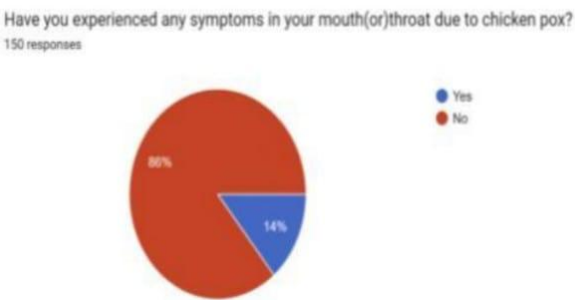


Chart 3 - Occurrence of Eye Symptoms among Chickenpox Patients (n = 164)

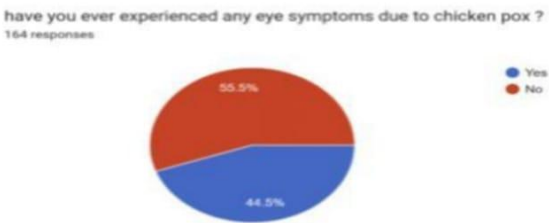


Chart 4 - Prevalence of Gastrointestinal Symptoms in Chickenpox Patients (n = 124)

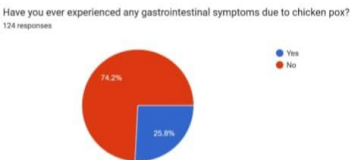
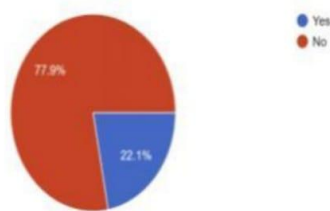


Chart 5 - Prevalence of Musculoskeletal Symptoms in Chickenpox Patients (n = 163)

Have you ever musculoskeletal symptoms due to chicken pox ?
163 responses



4. Conclusion

Chickenpox remains a widely prevalent viral disease, particularly in developing countries lacking universal immunization. Traditional and Siddha medicine continue to provide accessible, culturally embedded treatment options for chickenpox symptoms, especially in rural areas. There is growing evidence that climate change may influence disease patterns, necessitating adaptive public health responses. Integrating validated traditional practices with modern medicine, and increasing community awareness through educational outreach, can improve disease prevention and patient outcomes. Further research is needed to explore the environmental dimensions of VZV and establish evidence-based guidelines for traditional remedies.

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