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CRUCIAL INSIGHTS INTO HAND, FOOT, AND MOUTH DISEASE: UNVEILING STRATEGIES FOR PREVENTION AND MANAGEMENT

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Abstract

Hand, Foot, and Mouth Disease (HFMD) is a viral infection primarily affecting children, commonly caused by enteroviruses like EV71 and CV-A16. It presents a significant public health challenge, especially in the Asia-Pacific region, leading to hospitalizations and fatalities, particularly in children under 5 years old. The disease burden includes strain on healthcare resources, economic impacts, and long-term health consequences. Diagnosing HFMD involves clinical assessment and laboratory tests to confirm the viral presence. Symptoms include fever, skin rashes, and oral vesicles, with severe cases requiring early identification for effective treatment. Complications can range from mild skin lesions to severe neurological issues and fatalities, especially in EV71-associated cases. Preventing HFMD involves promoting hand hygiene, maintaining public cleanliness, and implementing surveillance systems for early outbreak detection. Research focuses on vaccine development and public health interventions to reduce the impact of HFMD. Collaboration among healthcare providers, public health agencies, and researchers is crucial for effective HFMD control and prevention. Understanding the epidemiology, transmission dynamics, diagnosis, and complications of HFMD is essential for developing preventive strategies and effective management. Continued research and collaboration are vital in addressing the challenges posed by HFMD and reducing its impact on individuals and healthcare systems.

Keywords: Enteroviruses; epidemiology; diagnosis; complications; prevention

1. Introduction

Hand, foot, and mouth disease (HFMD) is a viral infection that mostly affects children and infants, with an estimated 90% of cases resulting from enteroviruses from the species Coxsackie virus A16 [1,2]. Fever, excruciating mouth sores, and a rash on the hands, feet, and buttocks are the disease's hallmarks. Although HFMD is often self-limiting, it can lead to severe complications, such as viral meningitis, encephalitis, and paralysis, highlighting the necessity for effective prevention and management strategies[1].

The incidence of HFMD varies considerably, with outbreaks occurring globally, particularly in Asia where countries like China have reported millions of cases in recent years. The disease's epidemiology is complex, influenced by factors such as viral strain diversity, host age, immune status, and environmental conditions like hygiene levels and population density. The clinical spectrum of HFMD varies from moderate to severe manifestations, with fever, mouth sores, and rash being typical symptoms. However, some individuals may exhibit atypical manifestations such as hemorrhagic or purpuric lesions, desquamation, and nail shedding. Severe complications, notably associated with enterovirus 71 infection, including encephalitis and paralysis, underscore the range of potential outcomes[3].

In various Asian nations, the discovery of effective vaccines to prevent HFMD outbreaks has been a national priority due to the significant impact that the disease has on the health care and nursery systems, as well as the necessity of controlling broad panic reactions in the public during epidemics. As evidenced by the poliovirus vaccine's effectiveness, inactivated EV71 vaccinations will be the first to become accessible soon. [4].

Recent studies indicate a clear link between HFMD and climate change, with a rise in thedisease's occurrence during the spring season. Nevertheless, research on the precise cause of this relationship is still lacking. Temperature discrepancies have been reported in many investigations; however, Wang et al.'s study has the largest incidence range, spanning from 21.1 to 26.6 °C. Data above 32 °C and at times when the change in temperature between the minimum and maximum is larger than 7 °C are cited in research by Hii et al. [5,8]. Rainfall is also not a definite risk factor because there are more incidents of heavy rainfall, whereas for others, there is a minimal incidence rate of 0.5% for precipitation above 75 mm (Table 1) [7].

Recent research indicate that males have a higher prevalence compared to females [8]. A number of neurologic disorders have been linked to EV71, including meningitis, meningoencephalomyelitis, transverse myelitis, cerebellar ataxia, Guillain-Barré syndrome, opsoclonus-myoclonus syndrome, benign intracranial hypertension, and brainstem encephalitis.[9]

2. Epidemiology and Outbreaks

Hand, Foot, and Mouth Disease (HFMD) is a common viral illness resulting from enteroviruses, with Enterovirus 71 (EV71) and Coxsackie virus A16 (CV-A16) being the main culprits. These viruses are typically spread through various means such as close personal contact, respiratory droplets, the fecal-oral route, and contaminated surfaces. In addition to coxsackie virus A16 and enterovirus 71, other viruses that can cause Hand, Foot, and Mouth Disease include coxsackievirus A6, A10, A24, and B1 to B6. These viruses belong to the Enterovirus genus and are commonly responsible for outbreaks of the disease, especially in childcare settings and schools. Upon infection, these enteroviruses target the mucous membranes in the mouth, hands, and feet, resulting in symptoms like fever, skin rashes, and vesicles in the oral cavity [8].

Although the majority of HFMD cases are moderate and self-limiting, severe complications can arise, especially in children, resulting in potentially lethal neurological and systemic symptoms, especially when EV71 is involved [1]. Since its discovery in California in 1969, EV71 has increased in frequency throughout the Asia-Pacific area. The severity of HFMD and the risk of fatality are higher in younger children, particularly those under 5 years old, high lighting the vulnerability of this age group to severe outcomes [8].

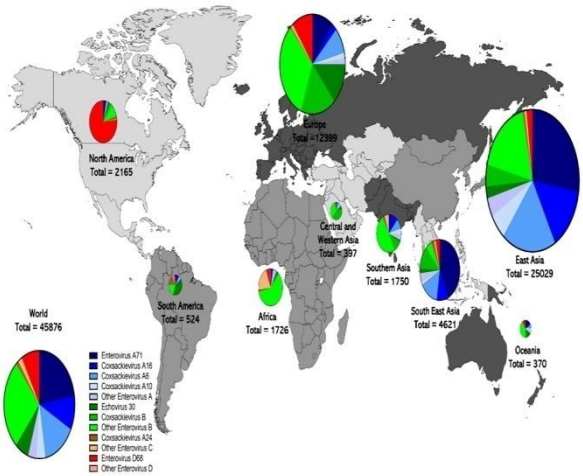


Fig. 1: Geographic distribution of non-polio enterovirus genomic sequence records. [40]

Understanding the etiology and pathogenesis of HFMD is crucial for the creation of efficient prevention strategies. The investigation of vaccines and public health measures to lessen the effects of an infectious disease are included in this.

The epidemiology of Hand, Foot, and Mouth Disease (HFMD) is a serious issue for public health, particularly in the Asia-Pacific region, where the disease has become increasingly prevalent [18]

The incidence of HFMD has been particularly high in China, with over a million reported cases in 2013 alone[17].

The severity of HFMD varies, with most cases being mild and self-limiting. Nevertheless, in certain instances, serious consequences like neurological disorders, myocarditis, and even death, particularly in cases associated with EV71.Children under the age of five have the largest risk of experiencing severe outcomes, highlighting the importance of targeted interventions to protect this vulnerable population [11].

3. Public Health Implications [12,13]

The public health implications of hand, foot, and mouth disease (HFMD) include several key areas of concern-

Firstly, HFMD can lead to significant morbidity, especially among young children, and can result in hospitalizations and even fatalities in severe cases. The disease burden of HFMD is therefore a significant concern, with the potential for long-term health impacts and reduced quality of life for affected individuals.

Secondly, HFMD outbreaks can strain healthcare resources, leading to increased hospital visits, admissions, and the need for specialized care for severe cases. Healthcare systems may be severely burdened by this, especially in low-resource environments where access to care may be restricted.

Thirdly, the economic impact of HFMD includes healthcare costs, productivity losses due to caregiver absenteeism from work, and potential impacts on education and childcare services. The economic burden of HFMD can therefore be significant, with potential impacts on both individuals and healthcare systems.

Fourthly, early detection requires surveillance methods that are effective, monitoring disease trends, and implementing timely control measures to stop the HFMD from spreading furtherin neighborhoods and medical facilities. Surveillance and response efforts are therefore a critical component of HFMD prevention and control.

Fifthly, public health efforts focus on promoting preventive measures such as good hand hygiene, proper sanitation practices, and awareness campaigns to educate the public about HFMD symptoms, transmission, and when to seek medical care. Prevention strategies are therefore a key component of HFMD control efforts.

Finally, continued research into HFMD epidemiology, transmission dynamics, and immunity patterns is crucial for developing effective vaccines and optimizing interventions to lessen the illness's burden. Research and vaccine development are therefore essential for long-term HFMD control.

Addressing these public health implications requires a coordinated approach involving healthcare providers, public health authorities, policymakers, and the community to mitigate the impact of HFMD on population health and well-being. This includes efforts to improve healthcare access, promote preventive measures, and support research and vaccine development.

4. Diagnoses[1,14]

The public health implications of hand, foot, and mouth disease (HFMD) include several key areas of concern. The clinical appearance and medical history are the main factors used to diagnose hand, foot, and mouth disease, especially in areas where the disease is prevalent. However, laboratory confirmation can be obtained through various Diagnostic tests

4.1 Laboratory test.

Routine blood testing, including CRP. Most instances show a normal white blood cell count. Some patients may show leukocytosis and neutrophilia. Elevated CRP levels may be observed. Blood biochemical examination. Mild increases in ALT, AST, and CK-MB levels may occur in some circumstances. Severe cases show elevated troponin, blood glucose, and lactic acid levels.

4.1.1 Cerebrospinal fluid analysis

CNS involvement and injury can cause cerebrospinal fluid alterations. Elevated WBC count (mostly monocytic, but multinucleate in early stages) often leads to higher CSF pressure. The presence of normal or slightly elevated protein, glucose, and chloride levels suggests viral meningitis or encephalitis.

4.1.2 Blood gas analysis

When the respiratory system is affected, arterial oxygen partial pressure drops. Acidosis, elevated partial carbon dioxide pressure, and reduced blood oxygen saturation are possible outcomes of severe instances.

4.1.3 Virologic and serological examination

Clinical specimens such as throat swabs, stool, anal swabs, and blood can be tested for specific enterovirus nucleic acids. Enteroviruses can also be isolated and cultivated. During the acute phase, IgM-specific antibodies should be positive. Neutralizing

Table 1: The connection between climate and biology[8].

Study	Results	Conclusion
Han Wang et al. Beijing, China 2011 [5]	Spring OR = 1.4-1.6 Other seasons OR <1.2 Increased risk of transmission: Temperature 21.1-26.6 °C High relative humidity Low wind speed High rainfall High population density Schools open	Strong relationship between climatic factors and the transmission of HFMD
Hii et al. Umea, Swe- den 2011 [7]	With each degree Celsius that the maximum temperature rises above 32 °C, the risk of disease incidence increases by 36 % Rainfall below 75 mm increases risk by 0.3 %. Above 75 mm, risk fell by 0.5 % Temperature differences of more than 7 °C between the minimum and maximum temperature increase the incidence rate by 41 %	The results suggest a strong association between HFMD and climate changes
Park et al. South Korea, 2010 [6]	Having a non-water closet toilet, changes in water quality, and contact with HFMD patients were associated with risk of HFMD (OR = 3.3, 2.8, 6.9, and 5.0, respectively) Visiting a hospital, changes in water quality, presence of a skin wound, eating out, and going shopping were significantly associated with the risk of HFMD (OR = 9.0, 37.0, 11.0, 12.0, 37.0, and 5.0, respectively)	The results suggest that seasonal variations, geographic localization, person to-person contact and contaminated water could be the principal modes of transmission of HFMD

antibodies against EV-A71, CV-A16, and other HFMD-relevant enteroviruses should have four times the titer during the recovery phase than during the acute stage.

4.1.4 Imaging CT scans of the chest

In mild cases, children's lungs are unlikely to exhibit any visible abnormalities. Reduced radiolucency with ground-glass opacities in both lung is likely to be present in extreme and serious cases accompanied by neurogenic pulmonary edema; patchy alteration may demonstrate a restricted or broad distribution. Lesions in the lungs may spread quickly.

4.1.5 Brain MRIs and/or CT scans

Intracerebral hemorrhage, cerebral hernia, and intracranial lesions can all be detected with cerebral CT imaging. Patients with CNS involvement may experience abnormal MRI findings. In the pons, medulla oblongata, and midbrain, Sporadic or patchy T1 and T2 signals are indicative of brainstem encephalitis patients. Patients with acute faccid paresis exhibit sporadically symmetric or asymmetric T1 and T2 signals in the anterior horn of the brain.

4.1.6 Diagnostic standards

Based on virological research, clinical manifestation, and current epidemiology, a diagnosis can be made.

4.1.7 History of epidemiology

Preschoolers frequently have these, especially the younger ones. During outbreaks, there may be a rise in occurrence in neighboring nurseries and among the children's contacts. Prior to the commencement of the illness, it is possible to ascertain a history of direct or indirect interaction with sick people.

4.1.8 Clinical signs and symptoms

This will mostly follow the clinical staging section's previously provided descriptions. Atypical look of the rash is observed in uncommon instances, and meningitis or encephalitis may be present in few situations. It will be necessary to confirm the diagnosis in these unusual cases using serological or viral methods.

4.2.Importance of early diagnosis

Early and accurate diagnosis of HFMD is paramount for patient care and public health interventions. Early case detection enables prompt supportive care to be started and control measures to be put in place to lessen the virus's spread through communities and healthcare settings. Early diagnosis also facilitates the implementation of appropriate infection control measures in childcare settings, schools, and other communal environments, reducing the spread of the disease and its associated burden on society. [1]

In summary, the diagnosis of HFMD relies on a comprehensive approach encompassing clinical assessment, symptom recognition, and laboratory testing. Through the integration of these diagnostic modalities and an understanding of the disease's differential diagnosis, healthcare providers can effectively identify and manage cases of HFMD, minimizing its impact on affected individuals and populations.

5. Clinical Manifestations

Hand, foot, and mouth disease (HFMD) is a common viral infection that primarily affects children under the age of five. This contagious illness is caused by various strains of enteroviruses, most commonly the coxsackievirus. HFMD is characterized by a distinctive set of symptoms, which include fever, sore throat, and a general feeling of malaise at the onset. This is often followed by painful sores or blisters inside the mouth, similar in appearance to oral herpes, as well as a rash on the hands, feet, and sometimes buttocks and legs.

The mouth sores can make eating and drinking uncomfortable for children, potentially leading to dehydration if they refuse to drink fluids. The skin rash typically appears as red spots, sometimes with blisters, which can be itchy and uncomfortable. Despite these symptoms, HFMD is generally mild and self-limiting. Most children recover completely within 7 to 10 days without medical intervention.

However, it is important for caregivers to monitor for

any signs of complications, such as persistent high fever, dehydration, or neurological symptoms, which could necessitate medical attention. Good hygiene practices, such as regular handwashing and avoiding close contact with infected individuals, can help prevent the spread of HFMD [15].

Stage 1: Eruption

The main signs typically involve fever and outbreaks on various parts of the body like the hands, feet, lips, and buttocks. The oral rash, known as an enanthem, can sometimes occur alone, leading to a condition called herpangina. Additional symptoms may include coughing, a runny nose, loss of appetite, and general systemic discomfort. In some cases, the infection might only result in a rash or herpangina, without other symptoms. The typical rash is usually flat with raised areas, and it might develop small blisters. These blisters might have a slight ring of inflammation around them and could contain minimal fluid. The rash might not itch or cause pain, and it usually heals without scarring. In atypical cases, the rash might appear milder with smaller, hardened lesions. Occasionally, there might be spots of bleeding or larger bruises.[16].

Stage 2: Nervous system involvement

There may be involvement of the nervous system, typically appearing 1–5 days after infection. Symptoms can include lethargy, weakness in sucking, heightened startle response, headaches, vomiting, irritability, trembling limbs, muscle weakness, and stiffness in the neck. In more severe cases, more extensive neurological damage may be evident. While most cases resolve, this stage presents the classic severe manifestation of HFMD[1].

Stage 3: Early cardiopulmonary failure

Moving to the third stage, early cardiopulmonary failure often arises within the initial 5 days of illness. Indicators include elevated heart and breathing rates, clammy skin, cold extremities, a blotchy appearance to the skin, and heightened blood pressure. This stage marks a critical phase of HFMD, with early recognition and appropriate management being crucial to reducing mortality. [1]

Stage 4: Cardiopulmonary failure

The transition to the fourth stage, cardiopulmonary failure, can be rapid. Symptoms encompass rapid heart rate (though occasional slow heart rate can occur), fast breathing, bluish discoloration of the skin, coughing up pink or bloody mucus, low blood pressure, and eventual collapse of the cardiovascular system. Some cases may also involve severe brain dysfunction, leading to seizures and unconsciousness. This stage signifies a critical phase of HFMD, often associated with high mortality rates.[1]

Stage 5: Recovery

Fever gradually diminishes, and reliance on cardiovascular support diminishes.

Central nervous system (CNS) and cardiopulmonary functions gradually improve, though some neurological complications may persist in certain cases.

Rarely, especially in cases involving the strains of CV-A6 and CV-A10, nail anomalies known as piptonychia may appear, usually 2-4 weeks after infection, with new nails appearing 1-2 months later.

The majority of infected children experience a positive prognosis, recovering without lasting effects typically within a week.

A tiny number of children may, however, suffer a CNS injury in rare instances with rapid progression and severe disease, presenting with symptoms such brainstem encephalitis, encephalomyelitis, cerebrospinal meningitis, or other severe neurological diseases.

Mortality rates are elevated in such cases, usually due to circulatory failure or neurogenic pulmonary edema. [1]

To summaries, hand, foot, and mouth blisters along with fever are the main symptoms of HFMD, a viral infection that mainly affects young children. While

the disease is usually mild and self-limiting, severe complications can occur in some cases, particularly with EV71 infections. Prevention measures include good hygiene practices and vaccination in some countries.

Figure 2: Clinical Menifestations (A) Multiple individual, flat-topped, erythematous papules on the external surface of the lower limbs. (B) Well-defined and non-squamous papules on the right thigh. (C) Multiple monomorphic, flat-topped, erythematous papules on the external surface of the upper limb. (D) Monomorphic erythematous papules on the face, with sparing of the trunk. [39]

6. Treatment And Management

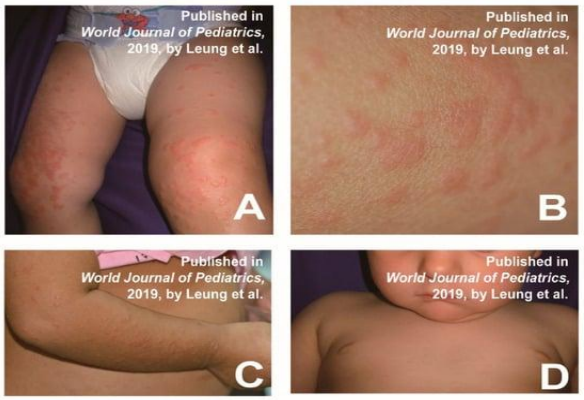
Hand, Foot, and Mouth Disease is an acute viral illness characterized by oral and characteristic distal extremity lesions. Treatment and management of Hand, Foot, and Mouth Disease focuses on relieving symptoms, preventing complications, and reducing the spread of the virus. The National Health Commission of China's guidelines for the diagnosis and treatment of hand, foot, and mouth disease state that early identification of severe cases is essential for successful treatment. Children under three years old, patients whose illness has lasted less than three days, and the presence of specific symptoms like ongoing hyperthermia, nervous system involvement, worsening breathing rate and rhythm, circulatory dysfunction, elevated peripheral white blood cell count, elevated blood glucose, and elevated blood lactic acid should all be closely monitored by clinicians. Most patients with moderate instances can be treated as outpatients; nevertheless, they should be kept apart to prevent cross-infection. For severe situations, intensive treatment approaches ought to be administered. This may include hospitalization, administration of antiviral medications, management of symptoms such as fever and pain, ensuring hydration and nutrition, and monitoring for complications such as dehydration or secondary bacterial infections. Strict hand washing and maintaining public hygiene are important measures in controlling the spread of Hand, Foot, and Mouth Disease[1].

6..1 General Treatment

Outpatient HFMD treatment includes isolation, fever management with ibuprofen (5–10 mg/kg) or acetaminophen (10–15 mg/kg) every 6 hours. Maintain a calm environment. Promptly control seizures using intramuscular midazolam (0.1–0.3 mg/kg) or slow intravenous diazepam (0.3–0.5mg/kg). Keep a tight eye on your vital signs and be ready to provide breathing support. Think about chloral hydrate if necessary. To keep the balance of fluids and electrolytes, make sure you eat right and drink enough water [1].

6.2. Antiviral Treatment

No specific antiviral medication is tailored for enteroviruses. Some studies suggest potential benefits of interferon alpha spray or atomization and intravenous ribavirin in early HFMD management, though caution is warranted due to ribavirin's potential adverse effects, including reproductive toxicity. However, drugs like acyclovir, ganciclovir, and monosodium phosphate vidarabine are not recommended for HFMD treatment. The N-terminal myristoylation signal (MGXXXS) of viral capsid protein VP4, conserved in enteroviruses, is a potential antiviral target. The study done by Tan, Yong Wah et al. confirmed that human N-myristoyltransferase 1 is crucial for Enterovirus 71 replication. Inhibiting myristoylation with different myristic acid analogues affected virus replication in human rhabdomyosarcoma cells. Notably, 2-hydroxymyristic acid inhibited VP4-VP2 cleavage, crucial for virion maturation, while 4-



oxatetradecanoic acid reduced viral RNA synthesis. These results indicate that targeting myristoylation in viral protein processing could be a promising antiviral strategy.[21-27].

6.3. Fluid Therapy

In the management of severe cases of HFMD, meticulous monitoring and precise control of fluid intake are paramount. It's crucial to adhere to the target physiological fluid requirement, typically ranging between 60–80 mL/kg/day, to ensure optimal hydration status. Fluid administration should be maintained at a steady rate of 2.5–3.3 mL/kg/hour to uphold adequate tissue perfusion and prevent complications. In instances of circulatory shock, prompt resuscitation with normal saline at a dose of 5–10 mL/kg over 15–30 minutes is warranted. Concurrent monitoring of central venous pressure (CVP) and invasive arterial blood pressure (ABP) serves as valuable guidance in tailoring fluid therapy strategies. Should circulatory shock persist, the consideration of colloidal fluids becomes prudent, offering an alternative approach to address fluid imbalances effectively. [1]. Treatment with Jinzhen oral liquid may be beneficial for children with HFMD[28].

6.4. Decreased Intracranial Pressure

The management of increased intracranial pressure in severe HFMD cases demands a multifaceted approach. Administering 20% mannitol at a dose ranging from 0.25–1.0 g/kg every 4–8 hours emerge as a cornerstone intervention in mitigating intracranial hypertension. In cases of severe intracranial hypertension, the addition of hypertonic saline (3% sodium chloride) to the therapeutic regimen may provide synergistic benefits. Furthermore, the judicious use of diuretics, such as intravenous furosemide at a dose of 1–2 mg/kg, proves instrumental in alleviating cardiac overload and optimizing cerebral perfusion [1].

6.5. Vasoactive Agents

Effectively managing hemodynamic instability, particularly during the high dynamic and high resistance phase of severe HFMD, necessitates the strategic use of vasodilators. Milrinone, with its loading dose ranging from 50–75 μg/kg, offers promising efficacy in improving hemodynamics[29]. Rigorous monitoring of blood pressure parameters facilitates the titration of vasodilator therapy to achieve optimal outcomes (specific blood pressure values are shown in (Table 2). In instances of hypotension refractory to initial interventions, the sequential utilization of dopamine, norepinephrine, adrenaline, or dobutamine becomes indispensable. For cases resistant to conventional vasopressors, the consideration of vasopressin or levosimendan emerges as a viable therapeutic adjunct [1].

6.7. Intravenous Immunoglobulin (IVIG)

A blood product called intravenous immunoglobulin (IVIG) is made from the serum of ten thousand to fifteen thousand donors in each batch. In individuals with impairments in antibodies, it is the preferred course of treatment [19].While not typically recommended for routine use in the early stages of HFMD, IVIG assumes significance in specific clinical scenarios. Patients presenting with encephalomyelitis, persistent high fever, or critical illness may benefit from IVIG administration. Dosages typically entail 1.0 g/kg/day infused over a span of two days, aiming to modulate the immune response and mitigate disease progression [30].

6.8. Corticosteroids

The judicious use of corticosteroids represents a cornerstone in managing HFMD complications, particularly in cases of encephalomyelitis, persistent high fever, or critical illness. Options such as methylprednisolone, hydrocortisone, or dexamethasone, administered at doses ranging from 1–2 mg/kg/day, exhibit favorable efficacy profiles over a course of 3–5 days, contributing to the amelioration of inflammatory responses and attenuation of disease severity[31].

Table 2: Definition of severe hypertension in children under 5 years [1].

GENDER	AGE(Y)	BLOOD PRESSURE	
		Systolic pressure (mmHg)	Diastolic pressure (mmHg)
Female	0-3	110	72
	>3	112	73
	>4	114	76
Male	0-3	112	73
	>4	114	74
	> 5	117	77

7. Prevention

7.1. General precaution

Maintaining good personal hygiene practices is paramount in preventing HFMD. This includes frequent hand washing, avoiding consumption of unpurified water and raw or cold foods, and regular cleaning and disinfection of toys and commonly touched surfaces. It's essential to minimize contact between children and individuals infected with HFMD. [1]Preventive actions in accordance with Standard Using antiseptic soap, alcohol-based rubs, or soap and water to maintain hand hygiene are examples of precautions. Although blood and bodily fluids should be avoided by wearing gloves, hand cleaning is still required after removal. In order to maintain good respiratory hygiene, cover your mouth and nose when you cough or sneeze, throw away tissues right away, and wash your hands. In crowded areas, those who are vulnerable should keep their distance and wear masks. Refrain from exchanging personal belongings, deny entry to anyone with exposed skin sores, and segregate sick patients. Carers should use single-dose medicine vials wherever possible, keep a close eye on medication equipment, dispose of needles in containers that can withstand punctures, and wipe surfaces to get rid of filth and contamination. Keep HVAC systems up to date, stay away from construction sites and windy areas, and wear N95 respirators if a patient has a weak immune system [20].

7.2. Vaccination

For children aged 6 months to 5 years, the EV-A71 inactivated vaccine offers protection against HFMD caused by EV-A71. The recommended immunization schedule involves administering two doses spaced one month apart, with completion encouraged before 12 months of age. [32-37]

7.3. Hospital Infection Control

Healthcare facilities play a crucial role in preventing HFMD transmission. Implementing proactive infection control measures involves identifying and isolating infected patients promptly. Designating specific consulting rooms for suspected HFMD cases aids in containment efforts. Hospitals should adhere rigorously to protocols for hand hygiene and facility disinfection, utilizing effective disinfectants containing chlorine (bromine). It's important to note that general disinfectants like 75% ethanol or 5% lysol are ineffective against enterovirus and should not be solely relied upon for disinfection purposes. [1]

7.4. Avoid spreading the virus

Focus on routine hand washing with soap and water, avoiding close contact with others, and cleaning toys and surfaces that are regularly handled in order to stop the spread of hand, foot, and mouth disease (HFMD). These simple steps help reduce the transmission of the virus and protect others from getting sick.

In conclusion, given the current circumstances, numerous businesses, institutions, and associations throughout Southeast Asia, particularly China, have started conducting research on CV-A16 vaccinations. The CV-A16 vaccine, also known as the bivalent vaccination (EV-A71 and CV-A16), is anticipated to be introduced in clinical trials shortly after the EV-A71 vaccine becomes commercially accessible. Non-polio enteroviruses, on the verge of eradicating the polio virus, pose a serious threat in the form of HFMD and its various sequelae. Moreover, the absence of a successful treatment or vaccination is still predicted and requires encouragement in this regard. These measures will aid in the management of HFMD, a problem for worldwide public health.[38]

8. Conclusion

In conclusion, Hand, Foot, and Mouth Disease (HFMD) remains a significant public health challenge worldwide, particularly impacting young children and infants. This comprehensive review has highlighted various aspects of HFMD, including its epidemiology, clinical manifestations, diagnosis, treatment, public health implications, and research advancements.

Despite the common occurrence of HFMD, significant gaps persist in our understanding of the disease and its management. Challenges such as the absence of specific antiviral therapies, the involvement of multiple viral strains, and the potential for outbreaks underscore the urgent need for effective prevention and control strategies.

Moving forward, prioritizing evidence-based strategies, fostering interdisciplinary collaboration, and enhancing surveillance capabilities will be essential in reducing the incidence of HFMD, preventing severe complications, and improving health outcomes for affected individuals.

Addressing the challenges posed by HFMD requires a coordinated effort across various sectors, including healthcare, public health, research, and policymaking. Through continued research, innovation, and collaboration, we can strive towards the goal of minimizing the impact of HFMD on population health and ensuring a healthier future for generations to come.

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