Mini Review

BIOMEDICAL Journal of Scientific & Technical Research

ISSN: 2574 -1241

DOI: 10.26717/BJSTR.2025.64.010011

From Victory to Vigilance: Fortifying Egypt's Defenses Against Emerging Viruses Through a Hygiene Revolution

Fatma Ibrahim Abdel-Latif Megahed*

Lecturer of Family and Community Health Nursing, Faculty of Nursing, Suez Canal University, Egypt

***Corresponding author:** Fatma Ibrahim Abdel-Latif Megahed, Lecturer of Family and Community Health Nursing, Faculty of Nursing, Suez Canal University, Egypt

ARTICLE INFO

Received: November 17, 2025

Published: December 15, 2025

Citation: Fatma Ibrahim Abdel-Latif Megahed. From Victory to Vigilance: Fortifying Egypt's Defenses Against Emerging Viruses Through a Hygiene Revolution. Biomed J Sci & Tech Res 64(2)-2025. BJSTR. MS.ID.010011.

ABSTRACT

Good hygiene is a foundational pillar of public health and one of the most effective measures for preventing infectious diseases. Despite significant progress, Egypt faces ongoing hygiene-related challenges that facilitate the transmission of viral infections, including hepatitis A and E, adenoviruses, and dengue fever. This manuscript assesses community hygiene knowledge and practices while reviewing the epidemiology of hygiene-related viral diseases in Egypt. Data from community-based surveys and national surveillance indicates that while hygiene awareness is relatively high, practical application and infrastructure remain deficient, particularly in rural settings. These findings underscore the urgent need for enhanced health education, sanitation improvements, and inter-institutional collaboration. Strategic interventions can protect communities from viral threats and build upon Egypt's commendable progress in infectious disease control.

Keywords: Hygiene; Egypt; Viral Diseases; Epidemiology; Hepatitis; Dengue; Public Health; Sanitation; Disease Prevention; Community Health Nursing

Abbreviations: WHO: World Health Organization; KAP: Knowledge, Attitudes, and Practices; HAV: Hepatitis A Virus; HEV: Hepatitis E Virus

Introduction

Hygiene is the first line of defense against infectious diseases and a cornerstone of public health. Globally, millions of preventable illnesses stem from inadequate sanitation and poor hygiene. In Egypt, the successful campaign to eliminate hepatitis C demonstrates the nation's capacity to address major health crises [1-2]. This achievement has set a global benchmark, with the World Health Organization (WHO) recognizing Egypt as the first country to achieve "gold tier" status on the path to elimination. This success was driven by high-level political commitment, including the "100 Million Healthy Lives" campaign, which screened over 60 million people and treated more than 4.1 million, drastically reducing the prevalence of hepatitis C from 10% to 0.38% in just over a decade. However, other viral infections-particularly those transmitted through contaminated water, poor sanitation, or insect vectors-remain a significant concern. According to UNICEF, 8.4 million people in Egypt are deprived of access to improved sanitation, with the vast majority residing in rural areas. Rural populations face marked disparities; in 2014, about 15% lacked adequate sanitation compared to just 1% of urban dwellers. These conditions create a fertile ground for the spread of viruses such as hepatitis A and E and enteric adenoviruses. Continued vigilance through hygiene promotion, water safety, and vector control is essential to combat new and re-emerging viral threats.

Aim of the Study

This study aims to evaluate hygiene-related behaviors and their connection to the incidence of viral diseases in Egypt. The specific objectives are:

1. To assess community knowledge, attitudes, and practices (KAP) regarding hygiene.
2. To analyze recent epidemiological data on viral infections related to hygiene and sanitation.
3. To recommend national strategies for improving hygiene and reducing the burden of emerging viral diseases.

The State of Hygiene and Sanitation in Egypt

While significant progress has been made in expanding water infrastructure, disparities persist. Approximately 7.3 million people, 5.8 million of whom are in rural areas, lack access to safe water. Although 96% of Egyptian households have a place for hand washing, about 13% of rural households do not use soap or other detergents [3-5]. This gap between the availability of facilities and correct hygiene practices is a critical area for intervention. In the educational sector, access to piped water is high in urban schools (98%) but lower in rural ones (84%). More concerning is the coverage of sanitary drainage, which is estimated at 73% in urban areas but only 22% in rural areas. These deficiencies in schools contribute significantly to the spread of diseases among children, with diarrhea being the second leading cause of death for children under five in Egypt.

Epidemiology of Hygiene-Related Viral Diseases in Egypt

The link between inadequate hygiene and viral disease is well-documented in Egypt through various surveillance methods, including wastewater-based epidemiology.

Hepatitis A Virus (HAV) and Hepatitis E Virus (HEV)

Both viruses are major causes of acute viral hepatitis in the country. Studies show that a majority of the population is exposed to HAV by age 15. Recent environmental surveillance in the Nile Delta detected HAV in 42.4% and HEV in 33.3% of raw sewage samples, confirming widespread circulation. Clinically, HAV was found in 13% of children with acute gastroenteritis.

Adenovirus and Rotavirus

Wastewater analysis has also revealed the prevalence of other enteric viruses. One study detected adenovirus in 66% of collected wastewater samples and rotavirus in 9.5%. The study noted a marked decrease in the prevalence of these viruses following the enhanced hygiene practices adopted during the COVID-19 pandemic, underscoring the direct impact of public hygiene campaigns.

Dengue Fever

This vector-borne disease has seen a resurgence. Recent surveillance in the Red Sea governorate during 2023-2024 confirmed active circulation of three dengue serotypes (DENV-1, DENV-2, and DENV-3). The establishment of the Aedes aegypti mosquito vector in areas like Harshada, coupled with climate factors, points to a growing risk of future outbreaks [6-10].

Discussion

The findings reveal persistent hygiene-related health challenges in Egypt. While general awareness of hygiene is high, behavioral gaps and infrastructural deficits continue to drive viral transmission. Epidemiological data confirms that viruses like hepatitis A and enteric adenoviruses are widespread. Vector-borne diseases such as dengue highlight how environmental neglect can rapidly lead to outbreaks. Wastewater-based surveillance provides invaluable, real-time insight into community infection trends and should be institutionalized as a core component of Egypt's disease monitoring system. Furthermore, community health nurses and workers are uniquely positioned to play a transformative role. Through targeted education and outreach, they can effectively promote crucial behaviors like hand washing, safe food handling, and environmental hygiene. The success of the hepatitis C elimination program provides a powerful blueprint. It demonstrates that with high-level political will, strategic planning, and community engagement, even the most daunting public health challenges can be overcome. Applying these lessons to the broader hygiene and sanitation sector is paramount.

Conclusion

Egypt has achieved monumental victories in public health, yet hygiene-related viral infections continue to threaten national well-being. The data clearly indicates that improved sanitation, consistent hygiene practices, and robust surveillance are crucial to sustaining the country's achievements. Without a continued and intensified focus on hygiene promotion and vector control, Egypt remains vulnerable to the re-emergence of viral diseases.

Recommendations

To build a resilient public health defense system, the following multi-pronged approach is recommended:

1. Strengthen Surveillance: Establish comprehensive, nationwide wastewater-based viral monitoring and expand mosquito and vector surveillance networks, particularly in tourist-heavy and high-risk regions.
2. Enhance Hygiene Infrastructure: Prioritize and accelerate sanitation and safe water projects in underserved rural and low-income areas. Focus on improving hygiene facilities in schools and healthcare centers.
3. Promote Health Education: Integrate hygiene education into school curricula. Launch sustained national media campaigns to reinforce the importance of practices like hand washing.
4. Sustain Immunization and Treatment Programs: Maintain widespread access to hepatitis A and B vaccinations and ensure readiness for prompt treatment during outbreaks.
5. Environmental and Vector Control: Improve waste management systems and conduct regular, data-driven anti-mosquito campaigns to control the spread of vector-borne diseases.
6. Foster Institutional Cooperation: Strengthen collaboration among the Ministry of Health, Ministry of Education, Ministry of Environment, local governments, NGOs, universities, and international partners like WHO and UNICEF to create a unified and effective public health strategy.

References

1. Abd elRaouf SY, Soliman SS, Abd Elaty NB (2021) Community hygiene awareness and viral infections in Upper Egypt.
2. (2023) World Health Organization Global report on sanitation and hygiene progress. UNICEF Egypt. Water, Sanitation and Hygiene Annual Report.
3. El Sayed MH, et al. (2024) Patterns of viral disease transmission in Egypt. Egyptian Journal of Public Health.
4. Nadeem D, et al. (2022) Socio-behavioral determinants of hygiene in low-resource settings. Journal of Community Health.
5. Saleh M, et al. (2025) Assessing the impact of hygiene interventions on community infection rates. Public Health Nursing.
6. Maha Talaat, Salma Afifi, Erica Dueger, Nagwa El Ashry, Anthony Marfin, et al. (2011) Hand hygiene and infection control practices among Egyptian communities.
7. PubMed (2025) Hygiene-related infectious disease studies in Egypt.
8. Elbahrawy A, et al. (2021) Water quality and health outcomes in Egypt. Environmental Health Perspectives.
9. (2023) Robert Koch Institute. International trends in viral hygiene-related diseases. Fang Y, et al. (2024) Global review of viral disease prevention through hygiene practices.
10. (2022) Sanitation and Water for All Annual review of hygiene and health partnerships.

ISSN: 2574-1241

DOI: 10.26717/BJSTR.2025.64.010011

Fatma Ibrahim Abdel-Latif Megahed. Biomed J Sci & Tech Res

Submission Link: https://biomedres.us/submit-manuscript.php