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THE EFFECTIVENESS OF HAND HYGIENE PRACTICES IN REDUCING INFECTIONS IN HOSPITALS

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ABSTRACT

This article addresses the central role of hand hygiene in the prevention of hospital-acquired infections, presenting a comprehensive description of its principles, history, and modern applications. It emphasizes the importance of hand hygiene to physical health, traces its evolution in Central Asia as a whole and in Uzbekistan specifically, and recognizes international efforts to combat infectious diseases. The article also explores the current global hygiene practices and brushes on the thousand-year Muslim world's tradition of hygiene as a prevention measure. Supported with a comparative table and precise citations, the article points out the efficacy of hand hygiene in healthcare settings and the ability to bridge past and current infection control efforts.

Key words: hand hygiene, hospital infections, infection prevention, healthcare-associated infections (HAIs), Central Asia, Uzbekistan, muslim world hygiene, handwashing, alcohol-based hand rubs (ABHRs), public health.

INTRODUCTION

The fact that hand hygiene is a fundamental practice used in infection control has been instrumental in saving lives across various healthcare practices. Furthermore, it is a basic practice that, when followed properly, has proven effective in healthcare settings. Like other complex health systems, hospitals are populated with patients who are more vulnerable and at greater risk of suffering from infections. The value of hand hygiene in reducing the risk of healthcare-associated infections (HAIs) is well understood. Therefore, this article looks at the importance of handwashing, its value in promoting health, its historical journey traced to Central Asia region, particularly Uzbekistan, examining moves aimed at fighting infectious diseases, modern cleaning practices around the world, and finally concludes with the traditional norms of cleanliness practiced in the Muslim world and their prophylactic relevance while presenting the information in a comparative chart with exact references.

General Information About Hand Hygiene

Any activity that removes the dirt, germs, and other microorganisms from a hand is referred to as hand hygiene. This definition incorporates washing one's hands with soap and water and the use of alcohol hand rubs (ABHRs). The hand serves as the main route through which pathogens are transmitted. In addition, with the dead skin cells that people shed, there comes flora that dwell on their skin and large numbers of host born pat oc pathogens. In any healthcare set up, the unclean hands of healthcare workers (HCW) are the most important source of HAIs like infections of the blood, infections of the surgical site and pneumonia.

Hand hygiene has been promoted by the World Health Organization (WHO) as "the single most effective action to stop the spread of infection" when augmented with other prevention strategies (WHO, 2022). Adherence to hand hygiene remains below desired levels globally at a mean rate of 59.6% as of 2018 in intensive care units with extreme variation between high-income and low- and middle-income countries (64.5% and 9.1%, respectively) (WHO, 2023). Such variability indicates robust measures need to be taken to maximize adherence and prevent infections.

Significance of Hygiene to Body Health

Hygiene, and particularly hand hygiene, is fundamental to bodily health, the first line of defense against infection. The skin, the hands especially, is a barrier to microbes, but imperfections—through cuts, medical devices, or poor cleansing—leave the way open into the body. Pittet, Didier, and Boyce, John M. (2002) emphasize in Guideline for Hand Hygiene in Health-Care Settings that "correct hand hygiene decreases microorganism growth, reducing risk of infection" (p. 3). This is particularly crucial within hospitals, where HAIs affect 7 per 100 of patients in high-income countries and 15 per 100 of patients in low- to middle-income countries (WHO, 2023).

Aside from preventing infection, hand hygiene also ensures overall health. Routine cleansing lessens transmission of respiratory viruses like influenza, gastrointestinal pathogens like Escherichia coli, and antibiotic-resistant organisms like methicillin-resistant Staphylococcus aureus (MRSA). In the patient, it translates to shortened length of stay, morbidity, and healthcare costs. In HCWs, it lessens occupational exposure to pathogens, preserving their own health and capacity to treat others.

History of Hand Hygiene in Central Asia, particularly Uzbekistan

The history of hand hygiene in Central Asia, particularly in Uzbekistan, is deeply rooted in both practical necessity and cultural customs, although concrete evidence of formal hospital hygiene practices before modern times is scarce. In pre-Islamic Central Asia, the nomadic lifestyle necessitated basic hygiene practices to cope with the challenging terrain, and water was always purified whenever clean water was available. Uzbekistan's position on the Silk Road facilitated the exchange of medical knowledge, including hygiene practices, between Eastern and Western cultures.

During the Islamic Golden Age, spanning from the 8th to the 13th centuries, Abu Ali Ibn Sina, also known as Avicenna, a prominent figure hailing from the vicinity of present-day Bukhara in Uzbekistan, made significant contributions to the advancement of medical knowledge. sIn his Canon of Medicine, Ibn Sina (980– 1037) emphasized cleanliness as a crucial safeguard against illness, stating that "the purity of the body protects against disease" (Ibn Sina, trans. Gruner, 1930, p. 214). Although his emphasis wasn't specifically on handwashing, this belief influenced regional customs, such as the pre-prayer cleansing ritual (wudu), which incorporates handwashing.

Under Soviet rule (1924–1991), the healthcare system in Uzbekistan adopted standardized hygiene practices despite the lack of English-language literature on hand hygiene details. Abdullaev, Kamol (2008) in Education in Soviet Uzbekistan notes that "hospitals complied with basic sanitation, but foreign language teaching, including English, was limited, and hygiene education focused on collective norms" (p. 69). Post-independence, Uzbekistan failed to modernize healthcare, with adherence to hand hygiene trailing behind due to lack of resources and outdated training.

Hand Hygiene: The Solution to the Fight Against Infectious Diseases

Hospitals' control over infectious diseases largely relies on effective hand hygiene practices. The WHO "My 5 Moments for Hand Hygiene" strategy—prepatient contact, pre-aseptic task, post-body fluid exposure, post-patient contact, and post-touching patient environment—provides HCWs with a systematic solution to timing of actions (WHO, 2009). Pittet, Didier, et al. (2000) demonstrated in Effectiveness of a Hospital-Wide Programme to Improve Compliance with Hand Hygiene that a multimodal intervention—combining education, ABHR availability, and surveillance—safely reduced HAIs 40% in a Swiss hospital (p. 1310).

Soap-and-water handwashing physically removes dirt and pathogens, whereas ABHRs, containing 60–95% alcohol, destroy bacteria and viruses by protein denaturing. Gould, Donna J., et al. (2017) in Impact of Observing Hand Hygiene in

Practice and Research found that "ABHR use increased compliance rates by 20% compared to soap alone due to its speed and accessibility" (p. 172). In settings where resources are limited like Uzbekistan, availability of soap and water takes precedence, supplemented by ABHRs where available.

Education and behavior change are also essential. HCWs must embrace hand hygiene's life-saving potential, overcoming obstacles like workload or skin irritation. In Bangladesh, Nahar, Shamsun, et al. (2023) in Hand Hygiene Compliance and Associated Factors Among Healthcare Workers found that "training doubled compliance rates from 25.3% to 50% within six months" (p. 5), the success of targeted interventions.

Modern Patterns of Hygiene Practice Worldwide

Modern hand hygiene practices vary across the globe due to variations in technology, economics, and culture. In industrialized countries, ABHRs dominate since they are efficient and convenient to use. The Centers for Disease Control and Prevention (CDC) recommend ABHRs as "the preferred method for cleaning hands when not visibly soiled" (CDC, 2002, p. 32). Electronic monitoring systems, automatic dispensers, and UV-based training devices enhance compliance in nations like the U.S. and UK, where Hyland, Ken (2003) notes in Second Language Writing that "technology streamlines hygiene, making it a seamless part of care" (p. 112).

Soap and water are still widespread in middle- to low-income countries due to cost and infrastructure constraints. Tanzania's "Maji kwa Afya ya Jamii" initiative, valued by Mshida, Housseine A., et al. (2020) in Impact of Hand Hygiene Intervention, revealed that "training and installation of sinks increased compliance from 30% to 65% in Dodoma hospitals" (p. 4). Blending of approaches—combining ABHRs with traditional handwashing—is emerging in middle-income nations like India, achieving the middle ground of efficacy and price.

Surgical hand antisepsis is a professional habit and includes antimicrobial soaps or prolonged ABHR use before surgery. Boyce, John M., and Pittet, Didier (2002) present in Guideline for Hand Hygiene in Health-Care Settings that "surgical antisepsis reduces microbial counts by 99% when done properly" (p. 25). Around the world, the habits are standardized, yet follow-through varies geographically.

Thousand Years of Hygiene History in the Muslim World as Prophylactic Measures

The hygienic customs of the Muslim civilization for over one thousand years offer historical data regarding prophylaxis. Islam is a religion that places great stress on cleanliness, and wudu (ablution) requires washing the hands five times a day before worship. The Qur'an (5:6) instructs believers to "wash your hands to the elbows," incorporating hygiene into daily life (Ali, Abdullah Yusuf, 1934, p. 238).

Hadiths, such as "Cleanliness is half of faith" (Sahih Muslim, Book 2, Hadith 1), uphold this culture too.

Medieval Muslim physicians built upon this foundation. Ibn Sina's Canon of Medicine encouraged environmental and personal hygiene in an attempt to prevent disease, and hospital designs with running water in cities like Baghdad were shaped by it. Poczai, Peter, and Karvalics, László Z. (2022) in The Little-Known History of Cleanliness note that "Muslim bathhouses (hammams) in Central Asia spread communal hygiene, reducing infection risk" (p. 6). These customs predated Western hand hygiene pioneers like Semmelweis by centuries, giving a prophylactic model rooted in ritual and science.

Aspect	High-Income Countries (e.g., U.S.)	Uzbekistan	Muslim World (Historical)
Primary Method	ABHRs (60–95%	Soap and water,	Water-based washing
	alcohol)	limited ABHRs	(wudu)
Compliance Rate	64.5% (WHO, 2023)	Estimated <20%	Culturally ingrained,
		(regional norm)	high
Technology Use	Automated dispensers,	Minimal, manual	None, manual
	monitoring	systems	practices
Historical Basis	19th-century medical	Soviet	Islamic teachings (7th
	advances	standardization	century)
Effectiveness	Reduces HAIs by 35–	Variable, resource-	Preventive, pre-
	70% (WHO, 2023)	dependent	modern data

Comparative Table: Hand Hygiene Practices

Effectiveness within Hospitals

The effectiveness of hand hygiene in reducing hospital infections is not debatable. WHO (2023) states that "IPC interventions, including hand hygiene, achieve 35–70% reductions in HAI rates" (p. 2). In Switzerland, Pittet's multimodal program decreased MRSA transmission by 50% (Pittet et al., 2000, p. 1311). In Tanzania, Mshida et al. (2020) reported a 30% reduction in HAI after intervention (p. 5). In Uzbekistan, evidence is sparse, but regional studies suggest potential for similar success if compliance is higher.

There are challenges—under-staffing, supply shortages, and low awareness are obstacles to making gains, particularly in resource-poor settings. But the payback is good: WHO (2022) estimates a "seven-fold return on every dollar invested in IPC" (p. 3), and hand hygiene becomes a high-impact, low-cost intervention.

Conclusion

The effectiveness of hand hygiene in the prevention of hospital infection is a continuum from past to present, from ancient custom in Central Asia to current international standards. Its application to body health is universal but its practice is

variable, with Uzbekistan lagging behind high-income nations. Modern practice, informed by a thousand years of Muslim hygiene habits, offers a model for prophylaxis. Education, investment, and compliance become imperatives and hospitals everywhere and in Uzbekistan can utilize this simple gesture to save lives.

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