

Primordial Multimodal Infection Control Mandate in Health-Care Infrastructure

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Abstract

Introduction: Thousands of people die every day around the world from infections attained while receiving health care. Hands are the pathway of germ transmission; hand hygiene is, therefore, a prime measure to avoid transmission. Caregivers of a person involved in direct or indirect patient care, need to be concerned about meticulous hand hygiene, and should be able to perform it promptly and decorously as primordial prevention. **Aims:** Broadly intent to a cynosure, “Save lives: Clean your hands World Health Organization (WHO campaign).” **Materials and Methods:** A comprehensive search of the literature database from various search engines emphasizing the importance of hand hygiene and available gray literature was included in the study. **Results:** Consistent evidence shows that hygiene is the building block of infection prevention and control. Implementation of optimal hand hygiene compliance in health-care facilities has resulted in a drastic reduction in the spread of health care-related infections. **Conclusion:** Hand hygiene in health care is a modifiable behavioral intervention and the WHO’s multimodal improvement strategy is a well-established, organized, and systematic approach to instigate optimal hand hygiene compliance in health-care facilities single cost-effective mechanism to fight back against all forms of infections.

Keywords: Behavioral modification, Hand hygiene, Infection control

INTRODUCTION

Infection prevention and control (IPC) is the appropriate primordial and primary preventive approach to the disposition of a serious disease burden and imparts a remarkable economic impact on common wealth and health-care systems throughout the globe. A significant number of vulnerable individuals seeking health care develop health care-associated infections,^[1] resulting in morbidity and severe cases even mortality, especially in low- and middle-income countries. The present study is an evidence-based infallible, cost-effective solitary measure to attain health by meticulous upkeep of hand hygiene.^[2]

Multilevel intervention for behavior modification in infection control is a social-ecological model that strongly influences health-promoting behavior. It includes intrapersonal and interpersonal factors, environmental modifications through organized efforts of the community, reinforcement of public policies, and appraisal of multimodal infection prevention and control at each level individual or professional.^[3-7]

May 5th globally acknowledged “save lives: Clean your hands, by World Health Organization (WHO), predominance

as a building block of IPC.”^[3] Each year recommences with global promotion and innovations. A multimodal hand hygiene improvement strategy is introduced for achieving health for all initiatives. Optimal hand hygiene is a simple task of cleansing hands at the appropriate time with suitable methods through the enhancement of knowledge and perception and behavior change.

Evidence-based hand hygiene protocol of an integrated approach resulted in a reduction in the spread of infection which affects millions of humankind. Thus, hand hygiene is a major global issue for patient safety with multifaceted causation related to systems and processes of health care influencing political and economic constraints of the nation. Education, training, and monitoring of IPC of the front-line

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health-care workforce can bring revolutionary changes in health-care delivery systems.

MATERIALS AND METHODS

A comprehensive search of the literature database PubMed, Medline, Scopus, Web of Science, and Google Scholar along with the published cross-referencing, peer-reviewed, systematic review, WHO Monographs, Protocols, Guidelines of CDC, OSHA, UNICEF, NCDC, ICMR, and Biomedical Waste Management and Handling (Principle) Rules 2016 and 2018, website educational material, and other literature available in the English language. The scientific evidence-based literature overwhelmingly shows that appropriate hand hygiene is the single most effective action to stop the spread of infection.

A historical perspective of hand hygiene

Hand hygiene has been a central component of personal hygiene and a religious and cultural custom from historic times. The timeline of hand hygiene started in the mid-nineteenth century. In 1847, hand-hygiene pioneer Ignaz Semmelweis championed hand washing with a chlorinated lime solution as a way to reduce the predominantly high rates of mortality in maternity clinics. Florence Nightingale advocates hand hygiene in an army hospital during the Crimean war 1.^[8]

It was not until the 1980's when a string of foodborne outbreaks and healthcare-associated infections led to public concern. The Centre for disease control and prevention identifies hand hygiene as an important way to prevent the spread of infection. So, the main focus of the hand hygiene mandate is to follow universal precautions.

The 1980s represented a landmark in the evolution of concepts of hand hygiene in health care. The first national hand hygiene guidelines were published in the 1980s, followed by several others in more recent years in different countries. In 1995 and 1996, the CDC/Healthcare Infection Control Practices Advisory Committee (HICPAC) in the USA recommended that either antimicrobial soap or a waterless antiseptic agent be used for cleansing hands upon leaving the rooms of patients with multidrug-resistant pathogens.

As far as the implementation of recommendations on hand hygiene improvement is concerned, very significant progress has been achieved since the introduction and validation of the concept that promotional strategies must be multimodal to achieve any degree of success. In 2000, Pettit *et al.* reported the experience of Geneva's University Hospitals with the implementation of a strategy based on several essential components and not only the introduction of an alcohol-based hand rub.

More recently, the HICPAC guidelines issued in 2002 defined alcohol-based hand rubbing, were available, as the standard of care for hand hygiene practices in healthcare settings, whereas handwashing is reserved for particular situations only.

Imperative Milestones in hand hygiene protocol

- Global Handwashing Day, which is now observed annually on 15 October(9).was initiated by the Global hand washing partnership in August 2008 by the UN general assembly.
- The modern era of hand hygiene started in the mid-nineteen century.
- The World health organization 5 moments of hand hygiene observed-2000.^[9]
- CDC issues guidelines for strengthening hand hygiene in health care 2002^[10]
- The WHO issues the first global patient safety challenge, with a focus on hand hygiene to reduce health care-associated infection and antimicrobial resistance-2005^[11]
- Hand hygiene emerged as a solitary infallible answer to attain a healthful environment in 2009^[12]
- Sustainable Development Goal (SDGs) adopted by United Nations Member state includes hygiene with an indicator related to hand washing with soap 2015^[13]
- Public-Private Partnership for Handwashing becomes the global hand washing partnership's services ladder for hygiene was established by the WHO-UNICEF joint monitoring program for water supply, sanitation, and hygiene, 2017^[14]
- Minimum IPC has been launched by the WHO with hand hygiene prominent in 2019. The WHO issues recommendations on hand hygiene in the context of COVID-19 Progress on the prominence of hand hygiene is periodically accelerated by high-profile disease outbreaks, such as H1N1 influenza, Ebola viral disease, and most recently COVID-19. In response to COVID-19, governments have promoted hand hygiene not only as the first line of defense in controlling the pandemic but also to increase resilience to future disease outbreaks^[15]
- Hand hygiene for all initiative launched by UNICEF, WHO, and its partner in response to COVID-19 strengthening SDG 6 calls for the global community to achieve access to hygiene for all by 2030.^[13]

Hand hygiene initiative in health-care facilities

International multimodal hand hygiene programs using targeted training and other supporting materials improve the provision of hand hygiene and performance feedback to health care workers. Health care workers estimated average change in hand hygiene compliance through multimodal strategies catalyzing education system change and surveillance. A study on behavior design feedback intervention compared to routine practice feedback was provided to individual health care workers whose hand hygiene practices have been observed.^[16-19]

Global response to hand hygiene improvement

A global response 2005 WHO Patient Safety launched the first Patient Safety Challenge "Clean care is safer care" to galvanize International focus and action on the critical Patient Safety issue on the central role that hand hygiene compliance by health care workers plays in reducing

the spread of sepsis.^[20] In 2009, the WHO Patient Safety launched an extension to this program “Save lives: Clean your hands” initiative that aims to ensure ongoing efforts to promote hand hygiene at global, regional, national, and local levels. Successful and sustained hand hygiene improvement is achieved by implementing multiple actions to overcome hindrances and behavioral barriers. It is imperative to know that implementation, evaluation, and feedback activity should be periodically rejuvenated and repeated to ensure sustainability field.^[21]

Capacity-building toward hand hygiene

SDG 6 calls for the global community to achieve access to hygiene for all by 2030. Hand hygiene is one of the most important elements of hygiene. However, both access to the facilities to practice hand hygiene and support for the behaviors required are missing in many settings.

If current rates of progress continue, by the end of the SDG era in 2030, 1.9 billion people will still lack facilities to wash their hands at Homefield.^[13]

Building on this strong foundation, the “Save lives: Clean Your Hands” global campaign was launched in 2009 by marking the first world hand hygiene day on May 5 and continues with a different theme proposed each year.

In response to the COVID-19 pandemic, the WHO, UNICEF, and other stakeholders called on governments to place hand hygiene at the heart of strategies to protect patients, communities, and health workers from the virus as a basic, doable, and simple intervention.

On April 1, 2020, the WHO issued a formal recommendation for all member states as follows: ^[22]

- Provide universal access to public hand hygiene stations and make their use obligatory, and
- Improve access to and the practice of hand hygiene in HCFs.

To support the implementation of these recommendations, on June 26, 2020, the WHO and UNICEF launched the new hand hygiene for all initiative which aims to create a culture of hygiene Byfield^[23]

- Reinforcing the importance of hand hygiene to reduce the spread of COVID-19 and other communicable diseases – within the context of the pandemic and beyond – through policies, regulation, innovation, private sector engagement, and behavior change strategies
- Calling to action international partners, national governments, the public, and private sectors, civil society, donors, and financiers to accelerate progress on hand hygiene at the global, national, and community levels

Hand hygiene is at the heart of the core components of effective IPC programs.

Hand hygiene supplementing multimodal infection control mechanism

Multimodal means that multiple elements, all essential and complimentary, must be put in place as part of interventions to achieve outcome improvements and optimal hand hygiene behavioral change toward a health-promoting milieu (Table 1).

The multimodal improvement strategy (MMIS) has proven to be highly effective, leading to a significant improvement of key hand hygiene indicators, a reduction of health care-associated infections and antimicrobial resistance, and substantially helping to stop outbreaks. Multimodal strategies should be implemented to improve practices and reduce health care-associated infection. In a clinical workflow, the use of integrated multiple approaches will contribute to influencing the behavior of the target audience (usually health care workers) toward the necessary improvements that will impact the patient outcome and contribute to organizational culture change. Implementation of IPC multimodal strategies needs to be linked with the aims and initiatives of quality improvement

Table 1: Elements of multimodal improvement strategy^[24-33]

Element of the MMIS	Description
System change (build it)	Achievement of continuous availability of the necessary infrastructure, materials, and equipment to effectively perform hand hygiene at the point of care
Education (teach it)	Clinical staff, patients, and visitors should undergo tailored education and practical training about the importance of hand hygiene to better understand when and how it should be performed. Education should also address all other health workers, including hospital administrators, cleaning personnel, and community health workers
Monitoring and feedback of hand hygiene indicators (check it)	Regular monitoring and evaluation (ideally using standardized tools) of hand hygiene infrastructures (location of facilities at the point of care, consumption of soap and alcohol-based hand rubs), including knowledge of and compliance with best practices. Providing regular feedback to health workers and senior management using local data is a very powerful approach to raising awareness and achieving improvement of practices
Reminders in the workplace/communications (sell it)	Posters, stickers, visual and vocal prompts, etc., can continually prompt and remind health workers about the importance of hand hygiene and the indications of when to perform it. They also help to involve patients and their visitors and inform them of the level of care they should expect from health workers concerning hand hygiene
Institutional safety climate (live it)	Creating an organizational environment that prioritizes high compliance with hand hygiene to achieve patient and health worker safety. At the institutional level, this should include the allocation of resources for hand hygiene programs and clear messages of support for hand hygiene from leaders within the institution, setting benchmarks or targets, and having hand hygiene champions. At an individual level, the aim is to ensure that health workers identify hand hygiene as a priority that reflects their commitment to not harming patients

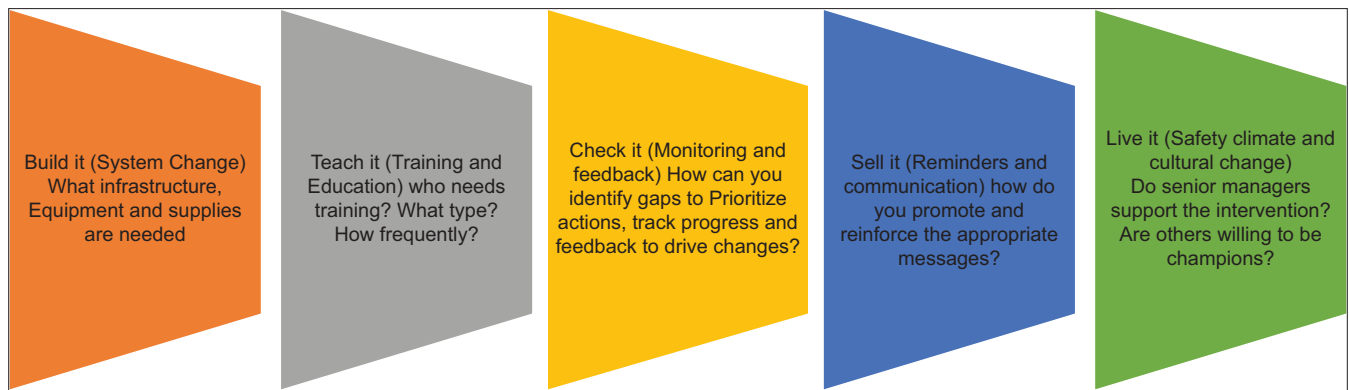


Figure 1: Elements of multimodal thinking^[34]

Table 2: My five moments for hand hygiene^[24,35]

2. Before clean/aseptic procedures	WHEN? Clean your hands immediately before performing a clean/aseptic procedure WHY? To protect the patient against harmful germs, including the patient's own, from entering his/her body
3. After body fluid exposure risk	WHEN? Clean your hands immediately after an exposure risk to body fluids (and after glove removal) WHY? To protect yourself and the health-care environment from harmful patient germs
4. After touching a patient	WHEN? Clean your hands after touching a patient and her/his immediate surroundings, when leaving the patient's side WHY? To protect yourself and the health-care environment from harmful patient germs
5. After touching the patient's surroundings	WHEN? Clean your hands after touching any object or furniture in the patient's immediate surroundings, when leaving – even if the patient has not been touched WHY? To protect yourself and the health-care environment from harmful patient germs

programs and accreditation bodies both at the national and facility levels (Figure 1).

WHO multimodal hand hygiene improvement strategy, the concept of “my five moments for hand hygiene”

Hand hygiene is a core element of patient safety for the prevention of healthcare-associated infections and the spread of antimicrobial resistance. Its promotion represents a challenge that requires a multi-modal strategy using a clear, robust, and simple conceptual framework. This innovative feature is conceptualized as ‘My five moments for hand hygiene’. It describes the fundamental reference points for healthcare workers (HCWs) in a time-space framework and designates the moments when hand hygiene is required to effectively interrupt microbial transmission during the care sequence. The concept applies to a wide range of patient care activities and healthcare settings. It proposes a unified vision for trainers, observers, and HCWs that should facilitate education, minimize inter-individual variation and resource use, and increase adherence. ‘My five moments for hand hygiene’ bridges the gap between scientific evidence and daily health practice and provides a solid basis to understand, teach, monitor, and report hand hygiene practices.

Reasons for neglecting hand hygiene have been investigated and include forgetfulness, fear of skin damage, lack of time due to other patient care priorities, and scarce or inconvenient access to hand rubs and sinks. However, one essential element is frequently overlooked.

When measured against these standards, the concept of hand hygiene has been poorly assessed from these perspectives until

now. Even infection control experts have difficulties in reaching a consensus on the relative risk levels of different care activities and how to best define key moments for hand hygiene action. My five moments for hand hygiene aim at:

- Foster positive outcome evaluation by linking specific hand hygiene actions to specific infectious outcomes in patients and health care workers (positive outcome beliefs); and
- Increase the sense of self-efficacy by giving health care workers clear advice on how to integrate hand hygiene in the complex task of care (positive control beliefs).^[21]

Furthermore, it reunites several of the attributes that are associated with an increased speed of diffusion of innovation such as

- Relative advantage by being practical and easy to remember
- Compatibility with the existing perception of microbiological risk
- Simplicity as it is straightforward
- Trial ability as it can experiment on a limited basis and
- Specifically tailored to be observable.

On the conceptual aspects of strategical components of the ongoing commitment to reduce HCAI, WHO imperatively developed revised guidelines for patient safety incorporating implementation and a series of tools to support healthcare workers in establishing and sustaining good hand hygiene practices by healthcare workers and reducing HCAI at healthcare facilities worldwide. This is part of the save lives: Clean your hands initiative.

The key features of the WHO Multimodal Hand Hygiene Improvement Strategy are System change, training/education, evaluation and feedback, reminders in the workplace, and institutional climate change.^[24-33] Where monitoring reinforcement and continuous live surveillance need to be the topmost priority.

The fact that the concept uses the number 5 like the five fingers of the hand gives it a stickiness factor, that is, the capacity to “stick” in the minds of the target public and influence its future behavior, which could make it a carrier of the hand hygiene message and help it to achieve exponential popularity. Since, its development in the context of the Swiss National Hand Hygiene Campaign and its integration into the WHO Multimodal Hand Hygiene Improvement Strategy, the concept of “My five moments for hand hygiene” has been widely accepted (Table 2).

Behavioral aspects of hand hygiene

The inability over two decades to motivate health care workers’ compliance with hand cleansing suggests that modifying hand hygiene behavior is a complex task. Human health-related behavior is the consequence of multiple influences from our biology, environment, education, and culture. While these influences are usually interdependent, some have more effect than others; when the actions are unwise, they are usually the result of trade-offs with acknowledged or denied consequences. Thus, this complexity of the individual, institutional, and community factors must be considered and investigated when designing behavioral interventions.^[36]

Research into hand hygiene using behavioral theory has primarily focused on the individual, although this may be insufficient to affect sustained change.

Focus group data suggested that hand hygiene patterns are likely to be firmly established before the age of 9 or 10 years,^[33] probably beginning at the time of toilet training. They are patterns of ritualized behavior carried out to be, in the main, self-protective from infection. However, the drivers to practice hand cleansing both in the community and in the health care setting are not overtly microbiologically based and appear seriously influenced by the emotional concepts of “dirtiness” and “cleanliness.”

An individual’s hand hygiene behavior is not homogenous and can be classified into at least two types of practice.

- Inherent hand hygiene practice which drives the majority of community and health care worker hand hygiene behavior occurs when hands are visibly soiled, sticky, or gritty. This inherent practice appears to require subsequent hand washing with water or with soap and water and;
- Elective hand hygiene practice represents those opportunities for hand cleansing not encompassed in the inherent category. In health care workers, this component of hand hygiene behavior would include touching a patient such as taking a pulse or blood pressure or having contact with an inanimate object around a patient’s environment. This type of contact is similar to many common social interactions such as shaking

hands and touching for empathy. As such, it does not trigger an intrinsic need to cleanse hands, although it may lead to hand contamination in the health-care environment with the risk of cross-transmission of organisms. It, therefore, follows that it is this component of hand hygiene that is likely to be omitted by busy health care workers.^[33]

However, it is also well documented that doctors are usually less compliant with practices recommended for hand hygiene than are other health care workers.^[37] Behavioral modeling suggests that the major influence on nurses’ hand washing practices in hospitals is the translation of their community attitudes into the health-care setting. Thus, activities that would lead to inherent community hand washing similarly induce inherent hand washing in the healthcare setting. The perceived protective nature of this component of hand hygiene behavior means that it will be carried out whenever nurses believe that hands are physically or emotionally soiled, regardless

Table 3: Hand hygiene gestures in different religions and cultures^[33]

S. No.	Name of religion	Specific indications for hand hygiene
	Buddhism	• After each meal (H)* • To wash the hands of the deceased (S) • At New Year, young people pour water over elders’ hands (S)
	Christianity	• Before the consecration of bread and wine (R) • After handling holy oil (Catholics) (H)
	Hinduism	• During a worship ceremony (puja) (water) (R) • End of prayer (water) (R) • After any unclean act (toilet) (H) • Before and after any meal (H)
	Jainism	• During a worship ceremony (puja) (water) (R) • End of prayer (water) (R) • After any unclean act (toilet) (H) • Before and after any meal (H)
	Islam	• Repeating ablutions at least three times with running water before prayers (5 times a day) (R) • Before and after any meal (H) • After going to the toilet (H) • After touching a dog, shoes, or a cadaver (H) • After handling anything soiled (H)
	Judaism	• Immediately after waking in the morning (H) • Before and after each meal (H) • Before praying (R) • Before the beginning of Shabbat (R) • After going to the toilet (H)
	Orthodox Christianity	• After putting on liturgical vestments before beginning the ceremony (R) • Before the consecration of bread and wine (R)
	Sikhism	• Early in the morning (H) • Before every religious activity (R) • Before cooking and entering the community food hall (H) • After each meal (H) • After taking off or putting on shoes (H)

*H: Hygienic, R: Ritual, S: Symbolic

of barriers, and will require washing with water. This model indicates that other factors including the perceived behavior of peers and other influential social groups, together with a nurse's attitude toward hand hygiene, have much less effect on inherent hand hygiene behavioral intent.^[3]

Elective community behavior has been shown to have a major impact on the health-care workforce regarding their intention to undertake elective in-hospital hand cleansing. Other important facilitators to practice hand hygiene are attitude and an expectation of compliance not by their peers, but by doctors and administrators. Nurses and doctors were more likely to report high levels of compliance if they believed that their peer group also complied. Reduction in effort required to undertake hand hygiene has no influence on inherent hand hygiene behavior and only minimal impact on elective hand hygiene intent. Yet, the strongest predictor of self-reported compliance by nurses and doctors who had previously been exposed to hand hygiene campaigns was the belief that the practice was relatively easy to perform. Hand hygiene behavior considered as being relatively easy to perform is likely to be an elective hand hygiene opportunity. Irrespective of being elective or inherent, the primary motivator for hand hygiene opportunities is self-protection for the healthcare worker. Therefore, future cognitive programs aiming to modify health care workers' hand hygiene behavior should consider adjusting the benefits to include self-protection and patient protection^[3,38-40]

Results of behavior modification at an organizational level further support these conclusions. Larson and colleagues described a significant increase in hand washing compliance in a teaching hospital sustained over 14 months. The focus of this behavior-based program was directed to induce an organizational cultural change toward optimal hand washing with senior clinical and administrative staff overtly supporting and promoting the intervention.^[41,42]

Dynamic behavioral change is a complex and multifaceted process. It involves a combination of education, motivation, and system change. The wide dissemination of hand hygiene guidelines alone is not enough to introduce a change in hand hygiene behavior. With our current knowledge, it can be suggested that programs to improve hand hygiene compliance in health care workers cannot rely solely on awareness, but must take into account the major barriers to altering an individual's pre-existing hand hygiene behavior.^[43]

Factors influencing behavior

Patterns of hand hygiene behavior are developed and established in early life. As most health care worker do not begin their careers until their early twenties, improving compliance means modifying a behavior pattern that has already been practiced for decades and continues to be reinforced in community situations.

Self-protection

This is not invoked on a true microbiological basis, but emotive sensations including feelings of unpleasantness, discomfort,

and disgust. These sensations are not normally associated with the majority of patient contacts within the health-care setting. Thus, intrinsic motivation to cleanse hands does not occur on these occasions.

Religious and cultural aspects of hand hygiene

Personal hygiene is a key component of human well-being regardless of religion, culture, place of origin, and human health-related behavior. However, this result from the influence of multiple factors affected as the environment, education, and culture.^[44,45]

According to behavioral theory, hand cleansing patterns are most likely to be established in the first 10 years of life. This imprinting subsequently affects the attitude to hand cleansing throughout life, in particular, regarding the practice called "inherent hand hygiene which reflects the instinctive need to remove dirt from the skin." The attitude toward hand washing in more specific opportunities is called "elective hand washing practice" and may much more frequently correspond to some of the indications for hand hygiene during health-care delivery (Table 3).

DISCUSSION

In a diversified country such as India, where the health care delivery system is vast and robust, Primary, secondary, and tertiary care levels in a state and the national echelon intervene at Individual, professional community as well as institutional, and organizational levels. Healthcare monitoring and surveillance both in the public and private sectors have been recognized. Authoritarian protocols from the grass root to the pinnacle of basic hand hygiene maintenance are ideal requisites for a simple, solitary measure to attain a healthful environment. On significant and intensive exploration of effective primordial prevention of infection, hand hygiene stands as a stupendous single most beneficial cost-effective mechanism. All the available literature follow the advantageous aspects of maintaining clean hands – saves life campaign.

In a systematic review, on infection control and prevention^[46] exploring and identifying different kinds of behavior-modifying mechanisms to be adopted to effectively increase hand hygiene compliance. Goals and planning (to achieve specific ends), comparison of behavior (to peers or some ideal), and feedback and monitoring (observing and providing feedback about behavior or outcomes) were the most frequently used behavior change technique used across studies vividly on hand washing conventions.

The behavior model predicts a positive influence by senior administrators and doctors on hand hygiene compliance but, surprisingly, there was no influence by administration and senior health care workers on mandatory appraisal monitoring and feedback. Lankford and colleagues found that poor hand hygiene practices in senior medical and nursing staff could provide a negative influence on others, while Pittet and colleagues reported that doctors' perception of being role

models to other colleagues had a positive influence on their compliance, independent of system constraints, and hand hygiene knowledge.

Pada *et al.* in 2019:^[47] Using ward-level accountability for hand hygiene is possible and can be successful in improving hand hygiene rates, possibly reducing transmission of MDROs. Realistic targets need to be set and adequate rewards and incentives provided to ensure continuous improvement.^[48-52]

Engdaw *et al.*, 2019:^[53] The overall level of hand hygiene compliance among healthcare providers was poor. Training, availability of adequate soap and water, availability of alcohol-based hand rub, knowledge of hand hygiene, and attitude of health-care providers were significantly associated with hand hygiene compliance.

Roshan *et al.* in 2020:^[54] One of the limitations of these findings even with the strict protocol of hand hygiene is that there was a decrease in both the planned and unplanned hospital admissions during the COVID-19 outbreak and this may have affected the incidence and prevalence of primary and secondary infections. Future research should be directed to assess the potential impact of several unexamined factors that could influence hand hygiene compliance among health care workers. Furthermore, it would be interesting to study how previous pandemics and epidemics have influenced the practices of health care workers. More important, randomized controlled trials, before and after study design, and other rigorous evaluation techniques could be used to see the long-term effect of hand hygiene practices on health care-associated infections.

All influences in the model on hand hygiene among health care workforce behavior act independently for implementation following a mandate in a structured format and predesigned guidelines. This suggests that the effective component of the Geneva program, which has demonstrated significantly improved and sustained hand hygiene compliance over several years was not only the introduction of an alcohol-based hand rub but was those components of the program that directly promoted the desired behavior: Peer support from high-level hospital administrators and clinicians and the perception that one's colleagues' adherence behavior was welcome to approach in the health-care field^[49,55-57]

Hence, reliable data support better decision-making and stronger accountability on hand hygiene is a strong foundation in the prevention of disseminated infection.

CONCLUSION

Evidence-based hierarchy related to hand hygiene has proved that this is the only panacea and infallible approach to preventing the spread of infection. As in the COVID-19 pandemic unprecedented condition, hand hygiene maintenance is the furthestmost domineering response efforts in strategies created a window of opportunity in curbing the incidence of infection. The advancement in technology, methodology, and

digitalization in the various fields of IPC continues but good hand hygiene is still a simple, cost-effective way to save lives and transform the quality of health care at all levels.

Thus, the time to accelerate progress on hand hygiene is now – before the next health crisis is upon us.

RECOMMENDATIONS

In the WHO guidelines, there are two well-fortified recommendations:

- From core component 8 of IPC: Prompt availability of materials and types of equipment required to perform appropriate hand hygiene measures at the point of care. Moreover, infrastructure should provide access to safe water and sanitation facilities according to international and national standards^[58]
- From core component 6 of IPC: Hand hygiene monitoring and feedback should be a key performance indicator at the national level. To fill the lacunae readily and to endorse ideal behavioral change concerning hand hygiene in health-care providers^[58]
- In addition to these two strong recommendations, reinforcing the importance of hand hygiene to reduce the spread of communicable diseases within the context of pandemics and beyond through policy regulations, innovations, private sector engagement, and behavior change strategies with the support of international partners
- For the entire workforce related to the health-care system. Hand hygiene measures are monitored and refresher training, updating for reinforcement, and adoption of hand hygiene behavior is required to be mandated in the protocol and guidelines
- On the national level, comprehensive hand hygiene promotion programs should be instilled in other relevant programs and professional organizations
- With collaborative efforts at all levels, the WHO MMIS can escalate the conducive change in health-care facilities focusing on hand hygiene
- All stakeholders are to take the responsibility for establishing the fact behind the control of infection through hand hygiene. NGOs, social media, social groups, and leaders highlight the importance of meticulous hand hygiene as a solitary imperative element for the health of all
- The evidence shows that hand hygiene is a highly cost-effective investment, providing outsized health benefits for relatively little cost. Both citizens and governments have a role to play. Governments should show leadership and make hand hygiene a public policy issue.

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