

## HAND HYGIENE: WEAPON AGAINST COVID - 19 AND HEALTH CARE-ASSOCIATED INFECTIONS

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### ABSTRACT

**Objective:** To evaluate knowledge of hand cleanliness among medical services providers at the institute.

**Study Design:** KAP Survey.

**Place and Duration of Study:** Tertiary Care Institute, Rawalpindi from Feb 2020 to May 2020.

**Methodology:** Methodology constituted of a web and paper-based questionnaire based on relevant studies and World Health Organization (WHO) Guidelines. A pilot study carried out at 15-20 participants for questionnaire validation and reviewed by independent experts for face validity, a final questionnaire comprised of 10 questions in addition to information on demographic profile and professional overview.

**Results:** Total 780 participants participated in the study and data extracted from their responses. Out of 780, 200 (25.6%) were doctors while 580 (74.4%) were nursing staff, assistants and paramedical staff. 612 (78.5%) participants were aware of the significance of hand hygiene. 192 (24.6%) participants preferred alcohol rub whereas 588 (75.4%) used soap & water.

**Conclusion:** Appropriate hand hygiene knowledge persuaded among healthcare professionals and paramedical staff, ensuring patient safety and prevention of infections. Behavioural modification and constant surveillance are critical to the successful implementation

**Keywords:** Alcohol-based rub, Hand Hygiene, Infection.

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### INTRODUCTION

After the advent of healthcare associated infections, multidrug-resistant diseases, increased burden of illness, complexity of treatments and financial burden due to increased ailments, emphasis is being paid to basics of good hygiene 'Hand hygiene'. This simple measure can result in infection control and better health outcome of the patient. If proper protocols followed there are evidence-based proofs that risk of cross-contamination can be controlled significantly<sup>1</sup>.

Hand hygiene dates back its history in the 19<sup>th</sup> century when Labarraque established hand hygiene to be elementary in reducing the incidence of puerperal fever and decrease in maternal mortality<sup>2</sup>.

In 1975 and 1985, the Centers for Disease Control and Prevention issued a protocol for handwashing practices in healthcare institutes,

elaborating use of non-antimicrobial soaps after handling contaminated and invasive procedures. They recommended alcohol rubs only where handwashing facility was not available<sup>3</sup>.

In 2005, World health organization to increase Patient Safety raised global slogan 'Clean Care is Safer Care'<sup>15</sup>. October was first dedicated as global handwashing day in 2008. On May 5, 2009, the World Health Organization launched another campaign intending to enhance Patient safety with the slogan Save Lives: Clean Your Hands<sup>4,5</sup>.

December 2019 China reported the World Health Organization pneumonia caused by a newer organism in their province Wuhan. On 11<sup>th</sup> Mar World Health Organization Chief doctor Tedros Adhanom Ghebreyesus announced COVID - 19 to be a pandemic involving multiple countries. On 26<sup>th</sup> February first case of COVID-19 was reported in Pakistan. 27<sup>th</sup> February World Health Organization issued simple low-cost measures for prevention of disease spread in

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which handwashing with soap and water or alcohol sanitizers was most important element<sup>6</sup>.

Common pathogens responsible for spread of infection through hands of health care workers are methicillin-resistant staphylococcus aureus, multi-drug resistant gram-negative bacteria and clostridium difficile. Hand-carried pathogens are responsible for hospital acquired infections as bacteria and viruses are shed on gowns, instruments and other surfaces in a hospital environment becoming an imminent threat for the patient. This acquisition and spread of germs can occur merely touching the patient and even performing simple noninvasive procedures such as blood pressure monitoring<sup>7</sup>.

Low-cost patient safety measures such as hand hygiene are particularly important for third world countries as we have limited health care and financial resources as widespread diseases and infections pose a constant burden on economy and health care facilities.

Alcohol-based hand rubs can significantly be effective in promoting hand hygiene and due to its ease of use, it can be frequently used before contact with the patient, before and after using gloves, for performing injections, cannulas, urinary catheters, pulse and blood pressure monitoring. It is even effective after having contact with secretions, blood and body fluids<sup>8,9</sup>.

Jewellery and watches are a source of pathogens accumulation therefore should preferably be taken off. Hands should be thoroughly washed with soap and running water as per protocol followed by drying with a disposable towel or air dryer. Rubbing is to be avoided as sore and cracked skin can lead to colonization of pathogens, therefore, promoting spread. Alcohol rub is to be used with a minimum of 20 seconds with the adequate amount and to be dried at its own<sup>10</sup>.

Our exploration depended on goal to survey hand cleanliness awareness at our foundation in urge to advocate feeble territories and enlighten issues related to misappropriate hand hygiene.

## METHODOLOGY

This KAP survey conducted at Tertiary Care Institue, Rawalpindi from February 2020 to May 2020, after taking approval from the ethical research committee (ERC approval number - 222/ERC).

Methodology constituted of a web and paper (English and Urdu) based questionnaire based on relevant studies and World Health Organization (WHO) Guidelines. A pilot study carried out at 15-20 participants for questionnaire validation and reviewed by independent experts for face validity. The questionnaire comprised of ten questions in total, two questions were structured multiple-choice questions (close-ended) with a variable number of stems and for rest of the questions, Dichotomous Scale adopted (Cronbach's Alpha 0.9)] in addition to information on the demographic and professional profile. After reliability and authenticity establishment via cross-validation with the pilot study and experts' overview, moreover obtaining verbal consent and explaining the significance of subject as a single most effective preventive measure against COVID-19 and hospital-acquired infections to participants, web and paper (English and Urdu) based survey launched among participants to achieve a significant number of responses within a stipulated time. All questions aimed to detect knowledge about hand hygiene under explicit scenarios.

The minimum sample size required for this cross-sectional study was 360 with 5% margin of error and 95% confidence level where the prevalence of awareness of hand hygiene in healthcare workers was considered to be 62.73% as reported Ahmed *et al*<sup>11</sup>.

A non-probability purposive sampling methodology was employed and the questionnaire was distributed among (n=780) participants. Conscriptio measures for the study were healthcare workers incorporating doctors, nursing staff, assistants, paramedical staff and reception staff to survey their knowledge for the

subject. However we excluded clerical staff. Feedback was received from (100%) participants.

Questionnaire focused on the prime reason of infection transmission and most frequent source and spread of infection. Comparative efficacy of washing hands with soap & water and alcohol rub, furthermore comparison of skin

**Table-I: Knowledge of hand hygiene.**

Study Questions	Responses (n=780) n (%)
Whether unsatisfactory Hand Hygiene of healthcare worker is the prime reason for the transmission of Germs between patient and healthcare worker	
Yes	717 (91.9%)
No	63 (8.1%)
Whether germs associated with the patient are the most frequent source of infection for healthcare-associated infections	
Yes	612 (78.5%)
No	168 (21.5%)
Can Cleaning Hands after patient interaction prevent the spread of germs from healthcare worker	
Yes	694 (89%)
No	86 (11%)
Whether hand rubbing causes more skin dryness compared with handwashing	
Yes	500 (64.1%)
No	280 (35.9%)
Whether handwashing compulsory after taking off gloves	
Yes	580 (74.4%)
No	200 (25.6%)
Whether hand washing necessary before administration of injection	
Yes	644 (82.6%)
No	136 (17.4%)
Whether wearing jewellery is a source of spread of infection	
Yes	512 (78.5%)
No	168 (21.5%)
Whether damaged skin can lead to spread of germs	
Yes	708 (90.8%)
No	72 (9.2%)

\*Cumulative Cronbach's Alpha value 0.9 [Dichotomous Scale]

dryness effects with soap & water with alcohol rub also inquired. Participant's knowledge regarding the minimum time required for effective cleansing, hand washing importance after taking off gloves & before injection administration, ornaments and watches to be

the source of infection and excoriation of skin being increased risk of spreading infection also assessed.

Data entered and analyzed by using data management software IBM SPSS (version 23.0). The descriptive statistics of continuous variables were presented as mean and standard deviation, while for categorical data frequencies and percentages were used. Categorical grouped data was analyzed by either Cronbach's Alpha, and Spearman's Co-relation as applicable.

## RESULTS

Total 780 participants with mean age 34.02 ± 6.6 and range of 22-54 years participated in the study and data was extracted from their

**Table-II: Comparison of alcohol rub and soap & water.**

Study Questions	Responses (n=780) n (%)	Significance (p-value)
Which of the following is an effective technique of handwashing		<0.001*
Alcohol-Based Hand Rub	192 (24.6%)	
Soap & Water	588 (75.4%)	
What will be the minimum time required for alcohol-based hand rub for elimination of germs		<0.001*
20 s	628 (80.5%)	
30 s	128 (16.4%)	
40 s	24 (3.1%)	

\*Significant p-value derived by Spearman's test

responses. 516 (66.2%) were males whereas 264 (33.8%) were females. Among total participants, 200 (25.6%) were doctors while 580 (74.4%) were nursing staff, assistants and paramedical staff. 612 (78.5%) participants were aware of the significance of hand hygiene. 717 (91.9%) was of opinion that germs carried with the patient are most frequently spread as a source of infection by healthcare workers. 192 (24.6%) participants preferred alcohol rub whereas 588 (75.4%) used soap & water. Results were summarized as under (table-I & II).

## DISCUSSION

Data analysis of our study demonstrated that participants have adequate knowledge of hand

hygiene practices at our set up (91.9%) but there is the paucity of basic concepts which way to opt for among alcohol rubs (24.6%) and soap and water (75.4%).

Santosaningsih *et al* evaluated healthcare workers' hand hygiene compliance, knowledge, and perception in a randomized controlled trial. They analysed 2,766 hand hygiene elements and concluded compliance to be (19.5%). They

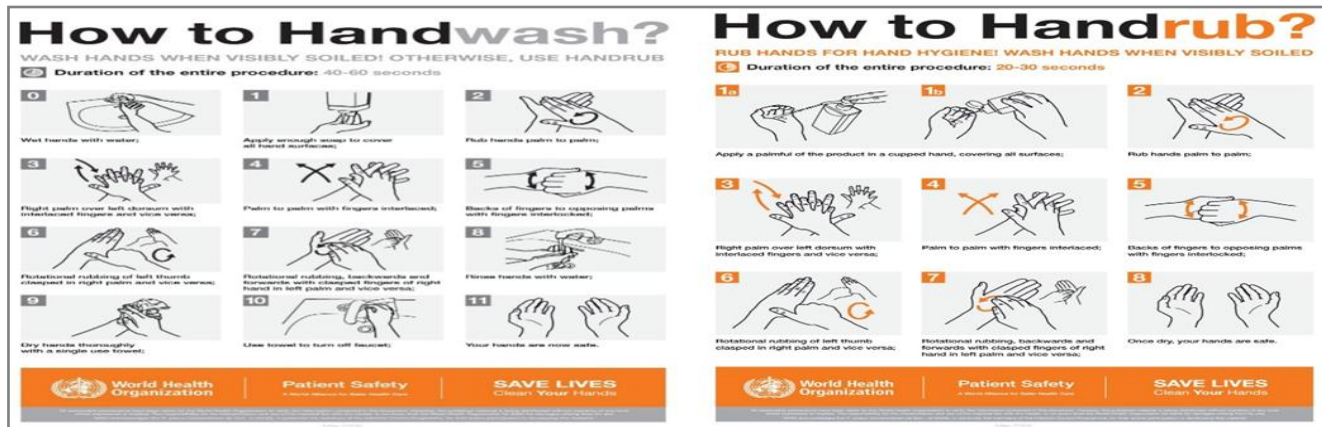


Figure-1: Hand hygiene steps<sup>17</sup>.

Ahmed *et al* analyzed compliance and knowledge of healthcare workers regarding hand



Figure-2: Five Moments of Hand Hygiene - World Health Organization<sup>17</sup>.

hygiene and use of disinfectants. As per their results staff who meticulously followed hand hygiene practices before and after patient interaction were nearly (12.3%) (62.26%) of the respondents were aware of the significance of hand hygiene in the prevention of mortality and morbidity caused by improper hand hygiene adding to the burden of fatality. This awareness level was (89%) in our staff therefore elaborating better compliance with guidelines<sup>11</sup>.

elaborated results as per departments in with and without intervention. (16.1%) to (27.1%) Obstetrics and Gynecology. They declared that doctors represented better assimilation of intervention when compared with students ( $p < 0.001$ ) and ( $p = 0.840$ ) respectively. (70.6%) preferred hand rub and (29.6%) washed their hands which is exactly contradictory to our results as our respondents preferred soap and water (75.4%). When they analyzed clothing and ornaments (17%) of the nursing staff wore jewellery, (31%) of the nurses preferred long-sleeved scrubs and (33%) used a combination of the above mentioned. Therefore (81%) had inappropriate clothing practices. (78.5%) if our staff was well versed with this fact that watches and jewellery serves as a source of bacterial colonization and spread<sup>12</sup>.

It is of immense importance to realize that germs colonized on patient and health care professionals is a prime source of contamination and cross-contamination. Hand hygiene can be improved easily with ease of availability of hand rubs as it requires less time, more effective against microbes when compared with soap and water. Soap and water can cause more irritation and drying of skin than alcohol and excoriated skin increases susceptibility of colonization of

microbes. However multi-modal approach is preferred one<sup>13,14</sup>. At least 15 seconds should be given to rubbing and 1-2 minutes to washing to ensure maximum possible decontamination with special attention to areas in between fingers, fingertips and thumb<sup>15</sup>. It is pertinent to mention that washing hands is important even after taking off gloves as wearing gloves does not exclude the risk of contamination<sup>16</sup>. World Health Organization program " Save Lives - Clean Your Hands" with proper technique (fig-1) and five moments of hand hygiene (fig-2) states that health care workers must clean their hands before and after touching patient and their surroundings, before performing sterile procedures, after contact with body fluids<sup>17</sup>.

Zakeri *et al* estimated knowledge of hand hygiene among the healthcare workers of two teaching hospitals in Mashhad via cross-sectional study. Only (10.6%) expressed sound knowledge on the subject (i.e. the score  $\geq 75\%$ ). No fruitful impact of intervention and training was also observed ( $p=0.68$ ). No significant co-relation of knowledge was derived between age ( $p=0.12$ ), gender ( $p=0.84$ ), department ( $p=0.96$ ) or profession ( $p=0.43$ )<sup>18</sup>.

Mithra *et al* performed a cross-sectional study across 176 dental and medical graduates to assess the knowledge, attitudes, and practices on hand hygiene. (72%) of the respondents exhibited adequate awareness level about hand hygiene and (76.2%) knowledge about the risk factors. (85%) blamed lack of time for inappropriate practices. Willingness to undertake a modular course on hand hygiene was (90.0%)<sup>19</sup>.

Parveen *et al* evaluated the knowledge and compliance of hand hygiene standards among healthcare workers in the Armed Forces Institute of Cardiology/National Institute of Heart Diseases. (42.2%) participants exhibited familiarity with the guidelines of hand hygiene were familiar with the hand hygiene guidelines. (56.9%) of health care workers were adherent to their traditional protocols and were not ready to adapt to evolutions in the subject<sup>20</sup>.

Consequences of our investigation uncovered that suitable hand cleanliness rehearses knowledge pervasive at our foundation among specialists, nursing staff and partners, along these lines, guaranteeing quiet security and anticipation of contaminations. Training on handwashing ought to be viewed as a need as this fundamental measure can ensure emergency clinic procured contaminations and pandemics, for example, COVID-19. Consistent accentuation ought to be given on reality that hands of medical services providers are contaminated with patient contact, hence, could turn into a main source of the spread of diseases. Alcohol rubs can be set at different focuses in medical clinic and foundations which is a viable and simple method of hand cleansing. Hospital Infection control advisory group represented by ranking staff ought to give consistent reconnaissance and do endeavours for the continuum of training in expanding familiarity with hand cleanliness techniques and significance. Input from specialists, assistants and staff ought to be urged to improve facilities. Doctors need to impart this training specifically with the purpose so that they can lead by example. Staff should constantly be motivated, educated and trained along with the provision of fundamental facilities and resources. Behavioural modification and constant surveillance are critical to the successful implementation.

## CONCLUSION

Appropriate hand hygiene knowledge persuaded among healthcare professionals and paramedical staff, ensuring patient safety and prevention of infections. Behavioural modification and constant surveillance are critical to the successful implementation.

## CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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