Increased Rate of Hand Hygiene Compliance During COVID -19 Pandemic: Myths and Facts

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Abstract

Introduction: Hand Hygiene is the cheapest, easiest and the single most effective measure to reduce cross-transmission of infection from one patient to another and from the healthcare workers to patients and vice versa. Multiple studies have shown a decrease in healthcare-associated infections (HCAIs) rates after improvement in hand-hygiene compliance. Despite being the simplest procedure adherence to the hand hygiene recommendations remains well below 50% and healthcare workers repeatedly observed as being poor compliers.

Objective: This study was planned to access the impact of covid-19 pandemic on the compliance of infection control practices at a tertiary health care centre in India.

Methods: Institution-based cross-sectional study was used to assess the impact of covid-19 pandemic on attitude, knowledge and on the compliance of hand hygiene practices at a tertiary health care centre in India.

Results: A marked difference was observed in the availability of resources for hand hygiene i.e., 48 (96%) locations and the display of instructions for hand hygiene 50 (100%). A significant difference was also observed among the knowledge of the steps of hand hygiene {2019: 16(32%; 2020: 33 (66%)} and of the moments of hand hygiene {2019: 27 (54%); 2020; 44 (88%)}. ($\varkappa 2 = 79.2$, df =1, p = 0). In 2020 (during COVID -19 pandemic) a significant increase in compliance was noted in most of the departments with highest compliance rate of ICUs (100%), followed by OTs (91.7%), paediatrics (95.8%) obstetrics and gynaecology (90.6%), surgery (86.5%), blood bank and laboratories (85.7%). However, unlike the other parameters, the compliance of hand hygiene during the previous year (2019) and during 2020 (COVID -19 pandemic, was poor with no significant difference in compliance of hand hygiene practices even during the pandemic. Of all the 5 moments suggested by WHO, maximum compliance (36% in 2019 and 60% in 2020 pandemic) was after body fluid exposure.

Conclusions: Hand Hygiene should be made a national priority. Active involvement by healthcare administrators, national and local governments should be committed to make hand hygiene a mandate for patient safety. Accessibility to hand hygiene products like soap and water and/or alcohol-based hand rubs and written and verbal reminders to staff are essential to improve the compliance of hand hygiene. Thrust should also be given to hand hygiene as a research subject.

Key Words: Hand Hygiene, COVID-19, compliance.

Received: 21/10/2021
Revised: 08/02/2022
Accepted: 28/02/2022

Introduction

In December 2019, the 2019 novel coronavirus disease (COVID-19) caused by SARSCoV-2 emerged in China and has since spread globally. WHO on 11 march 2020 characterized COVID-19 as a pandemic (WHO press release 11 march 2020). At the time of writing (26 March 2020) Covid-19 has spread to 196 countries and territories with 462,684 confirmed cases and 20,834 deaths (WHO, 2020) around the world since it was first identified. The case fatality rate may be as high as 3.4%.

Healthcare workers are always on the frontline dealing with these infectious cases and are at high risk getting the infection while treating their patients. Healthcare associated infections are transmitted in between the patients and to the healthcare workers, most commonly through the hands of the health care workers. (Allegranzi and Pittet, 2009). Hand hygiene using alcohol-based hand rub or soap and water is critically important to reduce the cross transmission of infection in the hospitals as well as community (WHO, 2020).

Transient pathogens colonise the patient's skin and are subsequently led to environmental contamination by shedding of microorganisms onto surfaces in the immediate patient surroundings (Pittet et al, 2006). Touching the environment or patients' skin by the HCWs during routine care activities, ultimately lead to contamination of their hands by, sometimes even despite glove use (Pittet et al, 2006). Following contamination, these organisms are capable of surviving on HCWs' hands for several minutes (Pittet et al, 2006). Thus, direct or indirect transmission through fomites can easily occur, through the hands of the HCWs, once the microbial colonisation establishes due to sub-optimal hand hygiene practices. (Pittet et al, 2006). Although infection prevention is a multipronged approach, but optimal hand hygiene behavior is considered the keystone of healthcare associated infection (HCAI) prevention (Pittet et al, 2006).

Hand Hygiene is the single most important measure to prevent cross-transmission of microorganisms from one patient to another (Larson, 1995) and several studies (Shahid et al, 1996; Khan et al, 1982; Casewell et al, 1997; Doebbeling et al, 1992; Webster et al, 1994) have demonstrated a reduction in reducing healthcare-associated infections (HCAIs) rates after improvement in hand-hygiene practices, but despite being a simple procedure adherence to the hand hygiene recommendations remains well below 50% and healthcare workers repeatedly observed as being poor compliers (Pittet et al, 2000; Albert, 1981; Pittet et al, 1999).

Objective of this study was to access the impact of covid-19 pandemic on the compliance of infection control practices at a tertiary health care center in India.

Methodology

Study Area: The study was conducted in Jawaharlal Nehru Medical College Hospital (JNMCH), one of the largest teaching hospital and tertiary referral centre of North India. At present, more than 1500 health care workers including Doctors (teaching faculty and residents), nurses, laboratory technicians, pharmacy technicians, office staff etc are working in the hospital.

Study Design. Institution-based cross-sectional study was designed to evaluate the impact of covid-19 pandemic on attitude, knowledge and on the compliance of hand hygiene practices at a tertiary health care centre in India

Study Population: Hospital staff actively involved in patient care were included in the study.

Inclusion Criteria: Health professionals of JNMCH who were actively involved in patient care and interested in participating were included in the study.

Exclusion Criteria. Hospital staff not involved in patient care and who did not give consent for participation.

Data Collection: The study is a part of regular audits of infection control by the Hospital Infection Control Committee. Audit for hand hygiene knowledge was done based on one-to-one interview and for hand hygiene practices by 1) Consumption of hand sanitizers from the hospital inventory 2) WHO hand hygiene audit tool.

More than 90% of staff at a particular location, answering correctly was considered as full compliance, 50-90% giving correct answers was considered as partial compliance and less than 50% staff giving correct answers was taken as non-compliance. Availability of sanitizers and soap water was assessed by observation and staff interview and the display of hand hygiene instructions by observation. Full compliance/knowledge was given a score of 2, partial compliance/knowledge as 1 and no compliance/knowledge as.

During the ongoing COVID-19 pandemic most of the healthcare workers focussed on masks being the primary protective equipment for preventing infection. Taking this into consideration, during regular hand hygiene audits, we also observed the pattern of wearing masks by healthcare professionals.

Data Processing and Analysis. Data was collected and analysed using Epicollect 5 app, utilising its free mobile application.

Data Quality Assurance. Clarity, completeness, consistency, accuracy, and validity of the collected data was checked regularly.

Ethical Consideration: Before conducting the study, approval was taken from Jawaharlal Medical College Hospital administrators. Verbal informed consent was obtained from the health care workers included in the study. The participants were told that their inclusion was solely voluntary, and identity will remain confidential.

Results

The study was conducted at 50 different locations of the tertiary care hospital where healthcare workers are directly involved in patient care. To assess the impact of the COVID -19 pandemic on hand hygiene knowledge, awareness and practices a multipronged approach was applied, which included observation, staff interview and hand hygiene audits. During the previous year (2019) 34 (68%) locations had sufficient availability of resources i.e. sanitizers and soap and water and 14 (28%) locations had visible display of hand hygiene instructions; whereas during the COVID -19 pandemic (2020), a marked difference was observed in the availability of resources for hand hygiene i.e. 48 (96%) locations and the display of instructions for hand hygiene 50 (100%) (Figure 1). A significant difference was also observed among the knowledge of the steps of hand hygiene {2019: 16(32%; 2020: 33 (66%)} and of the moments of hand hygiene {2019: 27 (54%); 2020; 44 (88%)}. ($\varkappa 2 = 79.2$, df =1, p = 0).

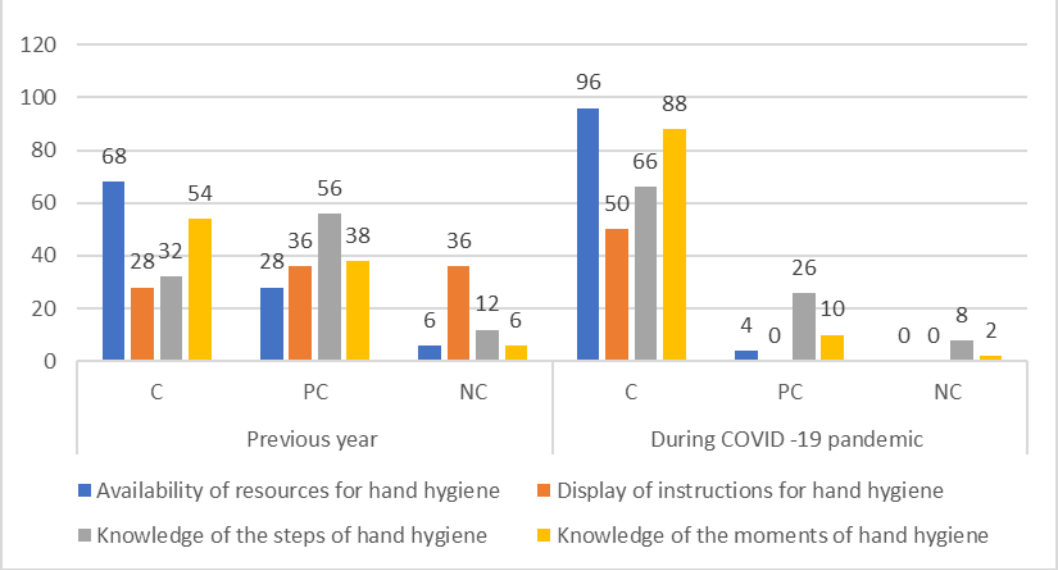

Figure 1. Hand hygiene resources and knowledge among healthcare workers at various locations (N=50) during previous year (2019) and COVID-19 pandemic (2020)

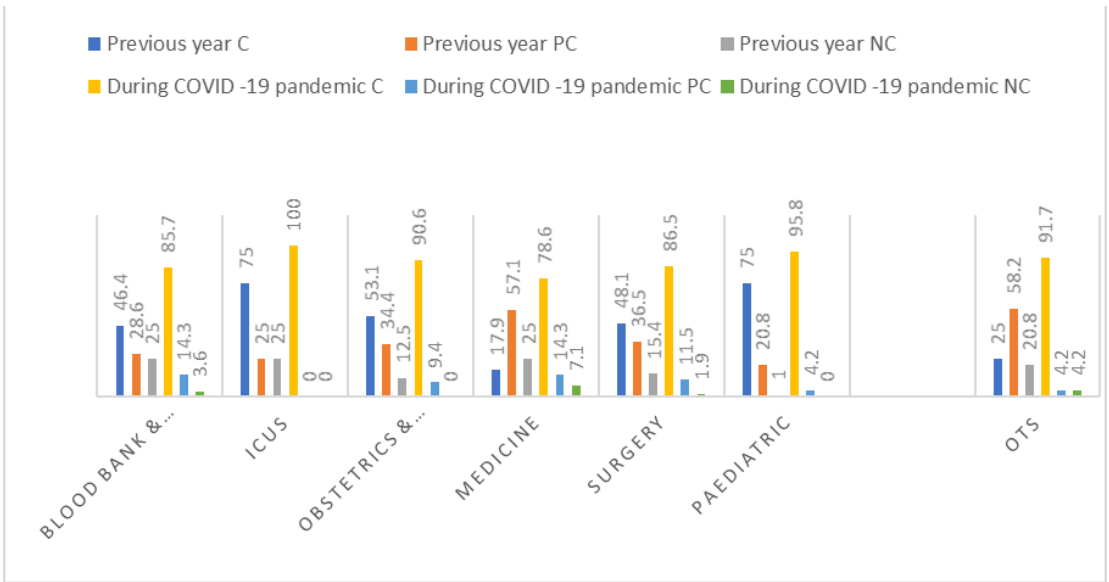

Figure 2. Department/unit wise distribution of hand hygiene resources and knowledge among healthcare workers at different locations before and during COVID-19 pandemic (N=50)

On analysing the pattern of hand hygiene awareness and knowledge department and unit wise, it was observed that during 2019, overall compliance (including availability, display and knowledge) was highest in ICUs and in the paediatric units (75% in both) followed by the units of obstetrics and gynaecology, surgery, blood bank and laboratories and ICU.

Least compliance was noted in the units of the department of medicine. However, in 2020 (during COVID -19 pandemic) a significant increase in compliance was noted in most of the departments with highest compliance rate of ICUs (100%), followed by OTs (91.7%), paediatrics (95.8%) obstetrics and gynaecology (90.6%), surgery (86.5%), blood bank and laboratories (85.7%) (Table 1). Although the compliance rate in the units of the department of Medicine was still the least i.e., 78.6% but it was significantly higher than the previous year (17.9%).

Table 1. Department / Unit wise distribution of Hand hygiene resources and knowledge among healthcare workers at different locations during the previous year and during COVID -19 (N=50)

Department / Unit		Previous year			During COVID -19 pandemic		
		C	**PC**	**NC**	**C**	**PC**	**NC**
Blood Bank & Laboratories (n=7)	Availability of resources for hand hygiene	6	1	0	6	1	0
	Display of instructions for hand hygiene	0	1	6	7	0	0
	Knowledge of the steps of hand hygiene	0	6	1	4	3	1
	Knowledge of the moments of hand hygiene	7	0	0	7	0	0
	Total (28)	**13 (46.4)**	**8 (28.6)**	**7 (25)**	**24 (85.7)**	**4 (14.3)**	**1 (3.6)**
ICUs (n=2)	Availability of resources for hand hygiene	2	0	0	2	0	0
	Display of instructions for hand hygiene	2	0	0	2	0	0
	Knowledge of the steps of hand hygiene	1	1	0	2	0	0
	Knowledge of the moments of hand hygiene	1	1	0	2	0	0
	Total (8)	**6 (75)**	**2 (25)**	**0 (0)**	**8 (100)**	**0 (0)**	**0 (0)**
Obstetrics & Gynaecology (n=8)	Availability of resources for hand hygiene	6	2	0	8	0	0
	Display of instructions for hand hygiene	2	4	2	8	0	0
	Knowledge of the steps of hand hygiene	3	5	0	6	2	0
	Knowledge of the moments of hand hygiene	6	0	2	7	1	0
	Total (32)	**17 (53.1)**	**11 (34.4)**	**4 (12.5)**	**29 (90.6)**	**3 (9.4)**	**0 (0)**
Medicine (n=7)	Availability of resources for hand hygiene	1	4	2	6	1	0
	Display of instructions for hand hygiene	1	3	3	7	0	0
	Knowledge of the steps of hand hygiene	1	5	1	4	2	1
	Knowledge of the moments of hand hygiene	2	4	1	5	1	1
	Total (28)	**5 (17.9)**	**16 (57.1)**	**7 (25)**	**22 (78.6)**	**4 (14.3)**	**2 (7.1)**

Surgery (n=13)	Availability of resources for hand hygiene	9	3	1	13	0	0
	Display of instructions for hand hygiene	4	6	3	13	0	0
	Knowledge of the steps of hand hygiene	6	5	2	9	3	1
	Knowledge of the moments of hand hygiene	6	5	2	10	3	0
	Total (52)	**25 (48.1)**	**19 (36.5)**	**8 (15.4)**	**45 (86.5)**	**6 (11.5)**	**1 (1.9)**
Paediatrics (n=6)	Availability of resources for hand hygiene	4	2	0	6	0	0
	Display of instructions for hand hygiene	4	1	1	6	0	0
	Knowledge of the steps of hand hygiene	5	1	0	5	1	0
	Knowledge of the moments of hand hygiene	5	1	0	6	0	0
	Total (24)	**18 (75)**	**5 (20.8)**	**1 (4.2)**	**23 (95.8)**	**1 (4.2)**	**0 (0)**
OTs (n=6)	Availability of resources for hand hygiene	4	2	0	6	0	0
	Display of instructions for hand hygiene	1	3	2	6	0	0
	Knowledge of the steps of hand hygiene	0	4	2	4	2	1
	Knowledge of the moments of hand hygiene	1	5	0	6	0	0
	Total (24)	**6 (25)**	**14 (58.2)**	**5 20.8)**	**22 (91.7)**	**1 (4.2)**	**1 (4.2)**

C: compliance, PC: partial compliance; NC: Non-compliance

On calculating the consumption of hand sanitizer from the hospital inventory a uniform pattern of consumption was noted during 2019 in all the three months included in the study (Figure 3). On comparing the pattern of consumption of the three months of both the years, there was no significant difference in the consumption of sanitizer during January and February. However, a significantly high volume of sanitizer was utilized in March 2020 1.7 times higher than previous year march and 1.8 times higher than the average being utilized in January and February 2020.

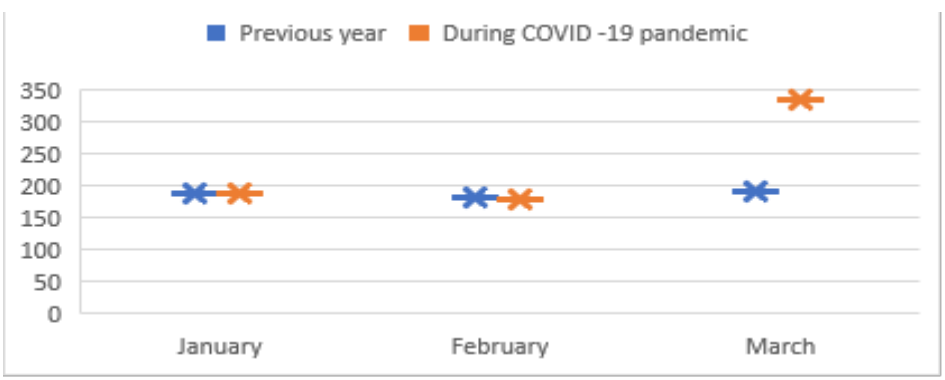

Figure 3. Consumption of hand rub from hospital inventory

The final parameter of the multipronged approach which was utilized to analyse the compliance of hand hygiene among the healthcare workers was audit of the actual practice of hand hygiene at the 5 moments suggested by WHO. However, unlike the other parameters, the compliance of hand hygiene during the previous year (2019) and during 2020 (COVID -19 pandemic, was poor with no significant difference in compliance of hand hygiene practices even during the pandemic. Of all the 5 moments suggested by WHO, maximum compliance (36% in 2019 and 60% in 2020 pandemic) was after body fluid exposure (Table 2).

Table 2. Hand Hygiene Audit Analysis before and during COVID -19 pandemic

	Previous year						**During COVID -19 pandemic**					
Moments	Before touching	Before any aseptic procedure	After body fluid exposure	After touching	After touching patient's surrounding	**Total**	Before touching	Before any aseptic procedure	After body fluid exposure	After touching	After touching patient's surrounding	**Total**
Hand hygiene performed	30 (25)	07 (28)	09 (36)	20 (32.2)	1 (2.6)	**67 (24.8)**	35 (33.6)	15 (57.6)	12 (60)	10 (15.1)	00 (00)	**72 (28.6)**
Missed	90 (75)	18 (72)	16 (64)	42 (67.8)	37 (97.4)	**154 (75.2)**	69 (63.4)	11 (42.2)	8 (40)	56 (84.9)	36 (100)	**149 (71.4)**
Total no. of opportunities	120 (100)	25 (100)	25 (100)	62 (100)	38	**270**	104	26	20	66	36	**252**

$\varkappa 2 = 0.26$, df =1, p = 0.61

Discussion

Droplet transmission is the main mode of transmission of COVID -19 and other respiratory viruses (WHO, CDC). These droplets may also settle on surfaces and are later transmitted through fomites by the hands of the health care workers and in between the patients. Hand hygiene is thus, one of the most important ways by which we can prevent this transmission. It remains one of the easiest, cheapest and the simplest ways to prevent the transmission of infection. Despite this, compliance for hand hygiene remains poor amongst all the cadres the health care workers as reported by many studies (Pittet et al, 2000; Albert et al, 1981, Pitted D et al, 1999). Many reports and news articles have claimed increased compliance of hand hygiene among the health-care workers and the general population during the COVID-19 pandemic. We, therefore, planned this study to evaluate the change in compliance rate of hand hygiene attitude, knowledge and practices among healthcare workers in a tertiary care teaching hospital during the COVID -19 pandemic. To the best of our knowledge, this is the first study of comparing the compliance rate for hand hygiene before and during the COVID -19 pandemic utilizing a multidimensional analysis.

As expected, a significant rise in the availability of hand hygiene products (from 68% in previous year to 96% during the COVID -19 pandemic) and display of instructions (28%

vis a vis 100%) was noted during the COVID 19 pandemic as compared to the similar period during the previous year. Non-availability of hand hygiene products is one of the major reasons of reduced compliance of hand hygiene as reported by many studies. (Pittet et al, 2004) Increase in the availability of products and display of instructions/ signages shows the role of administrative commitment. More than 50% increase (32% during 2019 / 66% COVID) was noted in the knowledge of the health-care workers about the steps and a significant difference (54% 2019 / 88% COVID) about the knowledge of the five golden moments of hand hygiene. Although, the staff is given regular trainings for infection control practices by the Hospital Infection Control Committee of the Hospital but sudden increase in the advertisements and awareness memos on televisions and newspaper about hand hygiene practices might have played a role in increase in the knowledge. Also, the rise in the signages and displays as noted in our study, acts as a regular booster for the knowledge gained.

On assessing change in the pattern of hand hygiene awareness and knowledge department and unit wise, the highest rise (4.6 times) in the compliance rate was noted in the department of medicine, which increase from just 17 % in 2019 to 78.6% during COVID -19. This may be since this is the department/unit which is the first contact of fever/flu patients most of the times.

As indicated in the study, no significant change in the pattern of consumption of hand sanitizers was noted in the first two months of both the years. However, on comparing the consumption pattern of March of both the years a significant difference was noted. There was a sudden rise in the consumption of sanitizer from the hospital inventory during March 20020. This was the time, when COVID-19 cases started appearing in India, which may be the reason of this marked increase in the demand of the sanitizers.

The major challenge that came up in the present study was that despite the increase in the level of knowledge and surplus availability of resources there was only a minor change (24.8% in 2019 / 28.6% COVID 19) in the actual practice of hand hygiene among the health care workers. Amongst the 5 golden moments given by WHO for performing hand hygiene, highest compliance for hand hygiene was noted after body fluid exposure followed by performing hand hygiene before any aseptic procedure. Hand hygiene was almost nil after touching the patient's surrounding. Compliance was better after touching the patient as compared to before touching the patient. This signifies that the healthcare workers are more concerned about their own health than that of the patients.

Healthcare workers are always on the front line dealing with the infectious diseases. As recommended by WHO and CDC, standard precautions are to be always followed for all patients. Hand hygiene is the primary tool for preventing transmission of infection to the patients and from the patients. However, as noted in our study, despite the increase in knowledge and awareness and availability of resources, there was a paucity in practice of hand hygiene. Behavioural change is slow and the most difficult to achieve. But we hope during this fight with the COVID 19, by the time we win, behavioural change would have come, because that is the only thing by which the healthcare workers can prevent Conclusion transmission of infection.

Hand Hygiene should be made a national priority. Active involvement by healthcare administrators, national and local governments should be committed to make hand hygiene a mandate for patient safety. Accessibility to hand hygiene products like soap and water and/or alcohol-based hand rubs and written and verbal reminders to staff are

essential to improve the compliance of hand hygiene. Thrust should also be given to hand hygiene as a research subject.

What all the awareness on antimicrobial resistance and infection control practices could not do, COVID 19 has done. Teaching perfect hand hygiene and its immeasurable value not only in the healthcare workers across the professions but also in public. We hope to have more agile and compliant healthcare workforce in future and may see less multidrug resistant bugs. So dark clouds do have silver linings.

Acknowledgement

We thank Mr. Soyab Khan, Infection Control Nurse, JNMCH, who actively took part in the audits and the healthcare workers of Jawaharlal Nehru medical college and Hospital, who made time in their busy schedules to contribute in this study.

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زيادة معدل الامتثال لنظافة اليدين أثناء جائحة COVID-19: أساطير وحقائق

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المُستَخلَص

تاريخ استلام البحث: 2021/10/03
تاريخ تعديل البحث: 2021/11/11
تاريخ قبول البحث: 2021/12/28

الغرض من الدراسة: إن نظافة اليدين هي الإجراء الأرخص والأسهل، والأكثر فعالية للحد من انتقال العدوى من مريض إلى آخر ومن العاملين في مجال الرعاية الصحية إلى المرضى والعكس صحيح. ولقد أظهرت دراسات متعددة انخفاضًا في معدلات العدوى المرتبطة بالرعاية الصحية (HCAIs) بعد التحسن في الامتثال لنظافة اليدين. على الرغم من كونه أبسط إجراء، إلا أن الالتزام بتوصيات نظافة اليدين يظل أقل بكثير من 50٪، وقد لوحظ مرارًا وتكرارًا أن العاملون في مجال الرعاية الصحية لديهم تقصير في الامتثال لهذا الأمر.

الهدف: تم التخطيط لهذه الدراسة للوصول إلى تأثير جائحة كوفيد 19- على امتثال ممارسات مكافحة العدوى في مركز الرعاية الصحية من المستوى الثالث في الهند.

منهج البحث: تم استخدام دراسة التقاطع العرضي المستندة إلى المؤسسات لتقييم تأثير جائحة كوفيد 19- على الموقف والمعرفة والامتثال لممارسات نظافة اليدين في مركز الرعاية الصحية امن المستوى الثالث في الهند.

النتائج: تبين من الدراسة اختلاف ملحوظ في توافر الموارد الخاصة بنظافة اليدين، والذي مثل 48 موقعًا (96٪)، بينما مثل توافر وسائل عرض التعليمات الخاصة بنظافة اليدين 50 موقعا (100٪). ولوحظ أيضًا اختلافا كبيرا في مدى الإحاطة بمعرفة خطوات نظافة اليدين بين السنتين 2019 والذي مثل 16 (32٪)، و2020، والذي مثل 33 (66٪). وكذلك اختلفت الفترة الزمنية للمدة المستغرقة لنظافة اليدين فكانت في عام 2019 تعادل 27 (54٪)، وأصبحت في عام 2020 تعادل 44 (88٪)، وذلك بدالة إحصائية ($\chi 2$ = 79.2، مدافع = 1، ص= 0). ولوحظت زيادة كبيرة في الامتثال للوائح في عام 2020 (خلال جائحة COVID -19) في معظم الأقسام. وكانت أعلى نسبة لمعدل امتثال لوحدات العناية المركزة (100٪)، تليها 91.7٪ (OTs)، طب الأطفال (95.8٪) التوليد وأمراض النساء (90.6٪)، الجراحة (86.5٪)، بنك الدم والمختبرات (85.7٪). ومع ذلك، وعلى عكس المعايير الأخرى، فقد كان الامتثال لنظافة اليدين خلال العام السابق (2019) وخلال عام 2020 (جائحة COVID -19) ضعيفًا، مع عدم وجود تباين ملحوظ في الامتثال لممارسات نظافة اليدين حتى أثناء الوباء. ومع ما اقترحته منظمة الصحة العالمية، من رفع الفترة الزمنية المعطاه لتنظيف اليدين، فأن الحد الأقصى للامتثال والذي يمثل 36٪ في عام 2019 و60٪ خلال جائحة 2020، كان بعد التعرض لسوائل الجسم.

الخاتمة: يجب جعل نظافة اليدين أولوية وطنية. فينبغي أن يلتزم مسؤولي الرعاية الصحية والحكومات الوطنية والمحلية بالمشاركة الفعالة، لجعل موضوع نظافة اليدين أمرا إلزاميا لسلامة المرضى. وتعد إمكانية الوصول إلى منتجات نظافة اليدين مثل الصابون والماء و/ أو معقمات اليدين المحتوية على الكحول، وكذلك التذكير الكتابي والشفهي للموظفين أمرا ضروريا لتحسين الامتثال لنظافة اليدين. كما ويجب أيضًا، الالتفات لأهمية نظافة اليدين وجعله موضوعا من مواضيع البحث.

الكلمات المفتاحية: نظافة اليدين، كوفيد- 19، الامتثال.