

Health Teams' Defiance opinion towards Hand Hygiene Compliance

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Abstract:

Background: Hand hygiene has been found to minimize the incidence and spread of hospital-acquired infections when practiced consistently. **Aim:** To assess health teams' defiance opinion towards hand hygiene compliance. **Design:** Descriptive exploratory research design was used. **Setting:** It was conducted in General Surgery Department and Special Surgery (Plastic surgery & Burn department, Orthopedic Surgery and Vascular Surgery) at Main Assiut University Hospital, Egypt. **Sample:** 200 of health team members. **Tools:** One tool used for data collection; hand hygiene compliance audit questionnaire, it consisted of 3 parts; demographic data, health teams compliance with hand hygiene practice and the reasons for non-compliance. **Results:** The highest percent of them were females, married (70.5% and 65% respectively) and belong to age group from 26 to 40 years. Less than half (43%) of them was worked in general surgery. 57% of them had diploma degree and (63%) had ≥ 10 years of experience. The highest percentage of the studied subjects had a poor compliance level of hand hygiene, hand rub, and gloves wearing. **Conclusion:** level of non-compliance was high and the major reason for health team defiance to hand hygiene compliance was; staff did not aware with indications of hand hygiene. **Recommendations:** Apply developed program in the study setting for health teams regarding compliance to hand hygiene.

Keywords: *Compliance, Defiance, Hand hygiene, Health team & Opinion.*

Introduction

Hand hygiene (HH) is a preventive behavior that all members of the health teams must do as long as they are in touch with patients. Hand hygiene should be undertaken by health professionals at five crucial points when working with patients, before touching a patient, before a clean/aseptic treatment, after body fluid exposure risk, and after touching a patient and touching his / her surroundings, according to the WHO "Clean Care is Safer Care" Program: (McLaws et al., 2015).

Hand hygiene is an essential healthcare concern in all settings, from complex healthcare systems to primary care clinics, and it is the single most cost-effective and practical intervention for reducing the prevalence of healthcare-associated infections (HCAIs) and the spread of antibiotic resistance; these infections are the most prevalent adverse outcomes following a hospital stay, affecting about 5%–10% of hospitalized patients in affluent countries, with the burden being higher in developing countries (Meshesha et al., 2017).

Patients contract HCAIs that are not present or incubating at the time of admission to a hospital or other health-care facility. Infections contracted in a hospital or facility but not showing till later are also included. They extend hospital stays, cause long-term impairment, and raise antimicrobial resistance,

represent a massive additional financial burden for health care systems and cause unnecessary morbidity and mortality (World health organization, 2016). Healthcare-associated infections (HCAIs) affect hundreds of millions of patients each year all over the world. In Egypt, the national surveillance reported an incidence of HCAIs -in 28 hospitals in the period from 2012 to 2014- of 2 per 1000 patient days. In another study conducted in 11 hospitals during the period from April 2011 to March 2012, the incidence reached up to 5.2 per 1000 patient days (Talaat et al., 2016).

Hand hygiene is not as prevalent as it should be around the world right now. Only 0% to 34% of people wash their hands with soap before handling food or after using the restroom, according to the study. The Centers for Disease Control and Prevention (CDC) and the Association for Professionals in Infection Control and Epidemiology (APIC) have published hand washing guidelines. Furthermore, since 2008, UNICEF has designated October 15 as Global HH Day to underscore its significance (Elkhawaga & El-Masry, 2017).

As a result, in order to improve HH compliance, infection prevention initiatives around the world must continue to promote behavioral change.

These factors might be related to the nature of work such as work overload and insufficient time. Others include lack of knowledge among health teams, negative attitude and wrong beliefs about HH and Infection Control practices (Hammerschmidt & Manser, 2019).

Health teams defiance with hand hygiene have been extensively evaluated and most commonly reflect busy workflows, lack of product availability, inadequate knowledge of indications, and skin irritation from repeated product use. Others include improper supervision, lack of training and absence of role model. Thus, promotion of behavioral change for improved hand hygiene compliance remains an ongoing challenge for infection prevention programs globally (Talaat et al., 2016).

Furthermore, poor compliance may be the result of problems associated to the healthcare facility, such as a lack of resources for HH, incorrect supervision, a lack of training, and the absence of a role model (Atif et al., 2019).

Significance of the study

From the researcher's experience as a head nurse in Special Surgeries Department, it observed from the daily practice that; despite the simplicity of HH procedure in reducing infection among patients (Talaat et al., 2016). Health team didn't have compliance towards it. Therefore, this study undertook to assess the reasons of their defiance towards hand hygiene compliance.

Aim of the study

The present study was carried out:

To assess health teams' defiance opinion towards hand hygiene compliance through the following:

1. Assess compliance level towards hand hygiene among health team.
2. Assess reasons for non-compliance towards hand hygiene among health team.

Research questions:

1. What is the health team compliance level towards hand hygiene?
2. What are the health team defiance reasons towards hand hygiene compliance?

Operational definitions:

Defiance:

It defined as the act of standing up to an opponent or authority (Mayer & Bert 2017).

Compliance:

It is a state of being in accordance with established guidelines, specifications or legislations (Souto et al., 2020).

Subjects and Method

Research design:

Descriptive exploratory research design was conducted in this study.

Setting:

The study was conducted in the General Surgery Department and the Special Surgery (Plastic surgery & Burn department, Orthopedic Surgery, and Vascular Surgery) at the Main Assiut University Hospital.

Subject:-

All available health team members and who are willing to participate in the study in previously mentioned settings, their number were 200 physicians and nurses.

Category	No	
Physician	44	
Nurses	156	
Settings	Nurse	Physician
Burn	30	5
Orthopedic	40	15
Vascular	20	4
Surgeries (general)	66	20

Tool:

One tool was utilized to collect data for this study after reviewing relevant literature, and to achieve the study purpose.

Tool (I): Hand hygiene compliance audit questionnaire, adopted from WHO, (2012): it included three parts:

Part I: Demographic data: It included 8 items (gender, age groups, work place, educational level, years of experience, marital status, position, previous training program about infection control and hand washing, etc.....).

Part II: Health teams compliance with hand hygiene practice:

This part aimed to determine health teams compliance with hand hygiene practice. The observer/auditor recorded the occasions, they observed where a staff member carried out hand hygiene, called "opportunities." Examples of hand hygiene opportunities include:

Hand hygiene before touching patient, before clean/a septic procedures, after fluid exposure risk, after touching a patient, after touching his / her surroundings and before touching or handling patient food.

Calculating hand hygiene compliance rates (Actions/opportunities)

The observation tool compares hand hygiene opportunities (o) against hand.

Number of observed hand hygiene actions x100

Compliance rate%= -----
Number of hand hygiene opportunities

Scoring System adopted from, (Marra et al., 2008).

- Excellent: More than 90%
- Very good: 80 % to 90%

- Good: 65% to 80%
- Fair: 50% to 65%
- Poor: less than 50%

Part III: Health team's opinion regarding reasons for non-compliance with hand hygiene: This part was developed by the researcher to elicit health team opinion reasons for non-compliance with hand hygiene.

This part consisted of 16 questions covering three items

1. Environmental reasons (4 questions); the subtotal degrees ranged from (4 to 12 degrees).
2. The organizational reasons (6 questions for the subtotal degrees ranged from (6 to 18 degrees).
3. The individual reasons (6 questions the subtotal degrees ranged from (6 to 18 degrees).

Scoring system:

Each question scored according to a likert scale; strongly agree (2), agree (1), and disagree (0).

The total questions were 16.

The total score was ranged from 16 to 48 degree.

- The good level ranged from 32 degrees and more
- The Fair level ranged from 16 to < 32 degrees
- The poor level ranged from less than 16 degrees

Ethical approval:

Permission to carry out the study was obtained from the ethical committee of the Faculty of Nursing. Verbal consent was obtained from each health team prior to his/her contribution in the present study, after explaining the nature and purposes of the study. Confidentiality and anonymity assured. The researcher emphasized that the participation was voluntary and the right to refuse to participate in the study and can withdraw at any time.

Face validity:

Face validity was tested through a jury of (5) experts (3 professors in the field of medical - surgical nursing and 2 professors from the medical field) from Assiut University; their opinions were formulated as regards to the tool format layout, consistency, knowledge accuracy, relevance and competence.

Tool reliability:

Tool's reliability refers to the degree of consistency with which the instrument (the questionnaire) measured the thing it supposed to be measuring (health team' defiance toward hand hygiene compliance. Reliability of tool was confirmed by Alpha Cronbach test (0.95 and 0.87).

A pilot study:

It was conducted on 10% of the sample (20 health team members) to evaluate the applicability and clarity of tool was done. Based on the results of the pilot study, needed refinements and no modifications were done. Health team selected for the pilot study were not included in the main study. This pilot study was conducted two months before collection of data.

Methods

The study was carried out in the following steps:

- The dean of the faculty of nursing and the ethics committee signed an official approval letter.
- The administrators of the selected hospitals gave their official clearance for data collecting.
- Using text books, journals, and scientific publications, the researcher reviewed the relevant local and international literature for the current investigation.
- At the outset of the interview, the researcher introduced herself in order to establish a line of communication.
- The goal and scope of the study were described to the health team, and they agreed to participate voluntarily.
- Time of data collection decided according to the studied sample time in the morning shift after coordination between the managers of the departments.
- Data collection (part I and III) were conducted in the physicians and nursing rooms in wards of General Surgery Department and Special surgery (Plastic surgery & burn department, Orthopedic Surgery, and Vascular Surgery) at Main Assiut University Hospital barrel in the same time.
- The researcher obtained the base line data from the health team using part (I)
- Assessment of health team compliance with hand hygiene practice using part (II). This was used for hand washing, hand rub and wearing gloves or missing one of them.
- every studied subjects assessed four times along the study (hand rub, HH, and gloves waring)
- The total period for data collection was (24 weeks) about 6 months period, it were collected during the period from 1/9 /2019 to 28/2/2020.
- The research was conducted throughout the morning and afternoon shifts.
- The researcher looked at hand hygiene in five different situations: before handling a patient, before clean / aseptic procedures, after body fluid exposure risk, after touching a patient, and after touching the patient's surroundings. Researcher started data collection from the studied sample about (4-5) health team five days per week.
- The researcher interviewed each member individually for half an hour to fill demographic data part. While, all health team were on their duty time, as well as the observation checklist filled by the researcher, it took 2 hours.
- The health team were unaware of the fact that they were being observed since the awareness of observation could affect their practices resulting in false data and incorrect results.

- Upon completion of the observations of all health team during their practice, the researcher interviewed each health team personnel individually for assessment of the health team' opinion through mention the range of strongly agree\ agree\ disagree with the following reasons for non-compliance with hand hygiene using (part 3) which filled by the researcher. It took about 10 minutes for filling this part.

Statistical design

SPSS version 23 for Windows was used to enter and analyse the data. The compliance rate for hand

hygiene was estimated using the formula: Compliance (percentage) = Number of actions/ Number of opportunities x 100. A p-value of < 0.05 was utilized to establish statistical significance of differences between hand hygiene compliance and demographic and other characteristics using Chi-square analysis using Pearson's formula. Using a reference compliance rate of 38%, a variability of 5%, and an alpha value of 5%, a post hoc power calculation revealed that the study had a power of 90%.

Results:

Table (1): Frequency and percentage distribution of the studied health team as regard their demographic data (n=200)

Items	F. (n=200)	%
Gender:		
Male	62	31.0
Female	138	69.0
Age group:		
20 < 25	49	24.5
25 < 40	130	65.0
> 40	21	10.5
Mean ± SD	31.46 ± 6.9	
Work place :		
Burn	35	17.5
Orthopedic	55	27.5
Vascular	24	12
General Surgeries	86	43.0
Education level:		
Physician	44	22
Bachelor in nursing	42	21
Diploma in nursing	114	57
Experience years:		
1 < 5 years	50	25.0
5 < 10 years	24	12.0
≥ 10 years	126	63.0
Mean ± SD	11.34 ± 8.1	
Marital status:		
Single	57	28.5
Married	141	70.5
Widow	2	1.0
Position :		
Physician	44	22
Nurses	156	78
Previous training about Infection control:		
Yes	156	78
No	44	22
Previous training about Hand washing:		
Yes	162	81
No	38	19

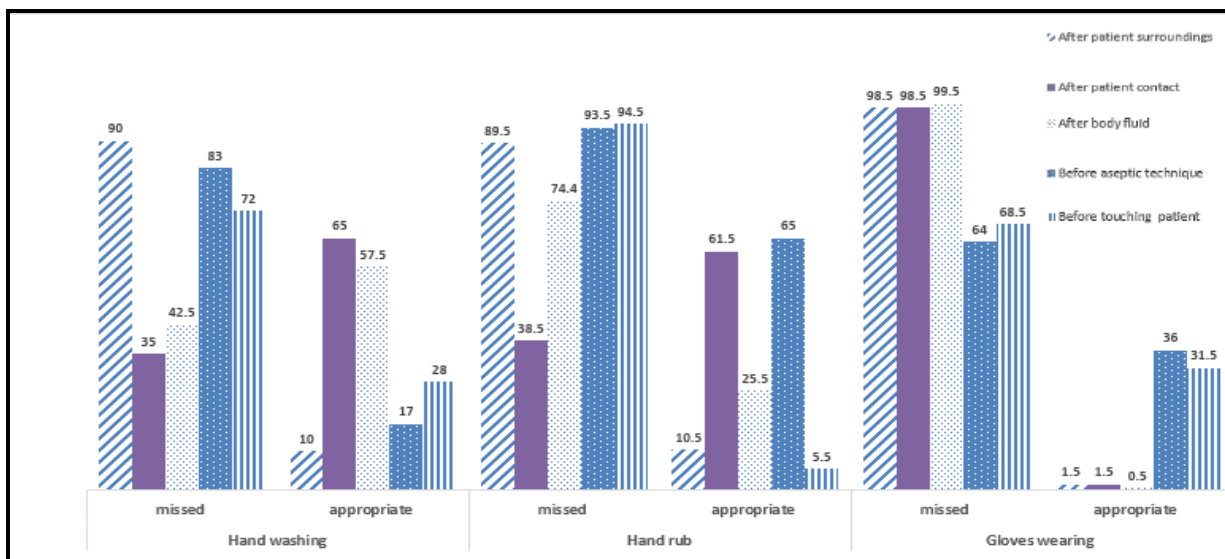


Figure (1): Percentage distribution of the studied health team as regard hand hygiene action (5 Moments) by indications (n =200)

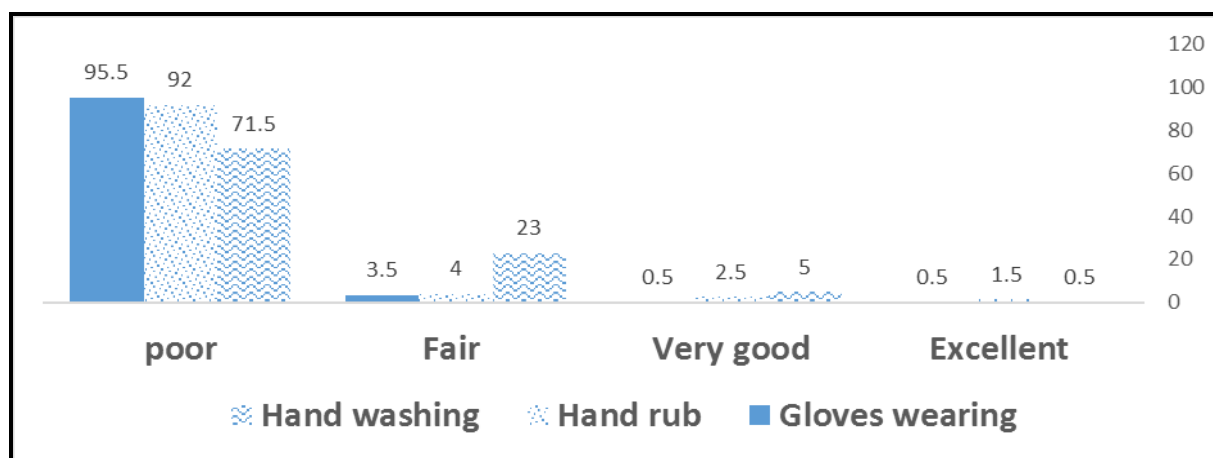


Figure (2): Percentage distribution of the studied health team as regard total hand hygiene compliance level (n= 200)

Table (2): Frequency and percentage distribution of the studied health team's opinions as regard reasons for non-compliance with hand hygiene (n= 200)

Items	Health team reasons for non-compliance with hand hygiene					
	Strongly agree(3)		Agree(2)		Disagree(1)	
	n	%	n	%	n	%
Personal reasons						
1. Insufficient knowledge about importance of hand hygiene	6	3	82	41	112	56
2. Hang hygiene agents cause irritation and dryness of hand skin	3	1.5	96	48	101	50.5
3. Staff not aware about (5 MOMENT'S) indication of hand hygiene	25	12.5	150	75	25	12.5
4. Too busy	9	4.5	128	64	63	31.5
5. Belief that the use of gloves obviates the need for hand hygiene	7	3.5	81	40.5	112	56
6. Lack of knowledge about hand hygiene guidelines.	3	1.5	50	25	147	73.5

Items	Health team reasons for non-compliance with hand hygiene					
	Strongly agree(3)		Agree(2)		Disagree(1)	
	n	%	n	%	n	%
Organizational reasons						
1. Lack of role models for superiors	58	29	34	17	108	54
2. Absence of punishment for those who do not follow universal precautions special hand hygiene	14	7	129	64.5	57	28.5
3. Work load makes it difficult to follow hand hygiene	23	11.5	105	52.5	72	36
4. Lack of rewards\ encouragement	72	36	103	51.5	25	12.5
Environment reasons						
1. Unavailability of hand hygiene sink inside patient room	129	64.5	51	25.5	20	10
2. Lack of supplies e. g. soap alcohol, and others supplies use in hand	76	38	77	38.5	47	23.5
3. Unavailability of paper towel for drying the hands after hand hygiene	72	36	80	40	48	24
4. Unavailability of booklets in unit about hand hygiene compliance	117	58.5	63	31.5	20	10
5. Overcrowded in patient room in visiting time	126	63	57	28.5	17	8.5
6. Other reasons	121	60.5	59	29.5	20	10

Table (3): Relation between reasons of non-compliance and hand hygiene compliance level of the studied health team (n =200)

Hand hygiene compliance level		Reasons of non-compliance						P. value
		Strongly agreed		Agreed		disagreed		
		n.=200	%	n.=200	%	n.=200	%	
Total of hand washing	Excellent	0	0.0	0	0.0	1	0.5	0.033*
	Very good	0	0.0	1	0.5	9	4.5	
	Fair	1	0.5	29	14.5	16	8.0	
	Poor	1	0.5	81	40.5	61	30.5	
Total of hand rub	Excellent	0	0.0	0	0.0	3	1.5	0.001*
	Very good	0	0.0	1	0.5	4	2.0	
	Fair	0	0.0	1	0.5	7	3.5	
	Poor	2	1.0	109	54.5	73	36.5	
Total of wearing gloves	Excellent	0	0.0	1	0.5	0	0.0	0.289
	Very good	0	0.0	0	0.0	1	0.5	
	Fair	0	0.0	1	0.5	6	3.0	
	Poor	2	1.0	109	54.5	80	40.0	

Chi- square test statistically significant $p. < 0.05$

Table (4): Relation between the studied health team's opinion as regard reasons of noncompliance with hand hygiene and their demographic data (n=200)

Demographic		Reasons of Non compliance			P. value
		Strongly agreed	Agreed	Disagreed	
Age group	20<25	0	11	38	0.001*
	25 < 40	2	94	34	
	>40	0	6	15	
Gender	Male	0	22	40	0.001*
	Female	2	89	47	
Marital Status	Single	0	21	36	0.019*
	Married	2	89	50	
	Widow	0	1	0	
	Divorce	0	0	1	
Specialty	Physician	0	11	33	0.001*
	Nurse	2	100	54	

Demographic		Reasons of Non compliance			P. value
		Strongly agreed	Agreed	Disagreed	
Education level	Physician	0	11	33	0.001*
	Bachelor in nursing	1	19	22	
	Diploma in nursing	1	81	32	
Years of experience	1 to < 5	0	19	31	0.001*
	5 to <10	0	7	17	
	≥10	2	85	39	
Work place	Burn	0	28	7	0.001*
	Ortho	1	43	11	
	Vascular	0	14	10	
	Surgeries	1	26	59	
Previous training program	Yes	2	102	52	0.001*
	No	0	9	35	

Chi- square test statistically significant $p. < 0.05$

Table (1): Showed that; more than half (69%, 70.5% and 65% respectively) of the studied participants were, females, married and belong to age group from 25 to < 40 years old with mean \pm Sd (31.46 \pm 6.9). Less than half (43%) of them were worked in the general surgery. Greater than half (57%) of them had diploma degree in nursing and 63% had \geq 10 years of experience with mean \pm Sd (11.34 \pm 8.1). Regarding attending both infection control and hand washing training courses, the highest percentage of them were attended (78% and 81% respectively).

Figures (1): Revealed that the main moments for appropriate HH technique were after patient contact, and after touching body fluids (65% and 57.5% respectively). While, hand rub performed probably after patients contact and before aseptic technique (61.5% and 65% respectively). However, less than one third of the studied health team worn gloves before patient contact and before aseptic technique (36% and 31.5% respectively).

Figure (2): Showed that the highest percentage of the studied health team had a poor compliance level of HH, hand rub, and gloving wearing (71.5%, 92% and 95.5% respectively)

Table (2): Revealed regarding the organizational reasons the table revealed that more than half of the health team agreed that absence of punishment for those who did not follow universal precautions specially HH was the organizational reason. While more than, half of them strongly agreed that Unavailability of HH sink inside patient room was the environmental reason (64.5 and 25.5% respectively).

Table (3): Revealed that; there was a statistically significance relation between total HH and hand rub compliance level and reasons of non-compliance (P. =0.033 and 0.001). Also, the table showed that there was no statistically significance relation between the total wearing gloves and reasons of non-compliance (P.= 0.289).

Table (4): Showed that there was a statistically significance relation between the studied health team's opinion regarding the reason of noncompliance with HH and their demographic data (age, gender, marital status, specialty, educational level, years of experience, work places and previous training) (P. = 0.001) for each item.

Discussion:

Hand hygiene is the most important and most basic technique in preventing and controlling transmission of infection since it reduces the risk of transmission of diseases at the rate of fifteen percentage (Sahoo et al., 2018). It is widely known the compliance with HH recommendations is poor (Musu et al., 2017).

Hand hygiene is an important healthcare issue worldwide, and it is the single most cost-effective and practical measure to reduce the incidence of HCAs and the spread of antimicrobial resistance across all settings, from advanced healthcare systems to primary healthcare centers; these infections are the most common adverse events resulting from a hospital stay (Meshesha et al., 2017).

The aim of the present study was to assess health teams' defiance opinion towards hand hygiene compliance.

Based on the results of the present study; more than half of them were females and their ages belong to age group from 26 to 40 years old with mean \pm SD (31.46 \pm 6.9). This is in the line with Lusignani et al., (2017) findings that reported the majority of the nurses working in the surgical departments were females with nursing diploma. While, Yilmaz et al., (2017) revealed that the three thirds of the nurses' experience ranged from 10 to 20 years.

The researchers' opinion said that the older health team will be able to perform the main procedure more competence than younger ones especially in the critical units as surgery departments.

Regarding work place; it was found that, less than half of them worked in surgical departments. Regarding the educational level, the result revealed that greater than half of the studied health team had diploma degree and they had more than 10 years of experience with mean± SD (11.34±8.1).

Regarding attaining both infection control and hand washing training courses, the majority of them were attained. In this line, **Labrague & De los Santos, (2020)** stated that nurses with less years of experience may require maximum additional instruction before they were ready to take a patient assignment, and nurses working in one clinical specialty may need amount of instructions to acquire training program.

Zhang & Cui, (2018) also stated that it could be because the administrators chose older age nurses to be able to fulfil primarily jobs in surgical units successfully.

Both infection control and hand washing training sessions were conducted. This, according to the study findings, could be related to the hospital's staff development program. **McCaughan et al., (2018)** who added that the nurses working in surgical settings require more training in order to deliver appropriate patient care.

In the present study the highest percentage of the study participants had a poor compliance level of HH, hand rub and gloves wearing. this agreed with **Gilbert & Kerridge, (2019)** who pointed that previous research revealed that health care workers were often dissatisfied with infection prevention and control standards, particularly when it came to hand washing.

According to **Caris et al., (2018)**, health teams had the highest rate of noncompliance, while in other research, only a third of physicians believed hand cleanliness was important before patient contact and just over half believed it was necessary after patient contact. It's possible that doctors have a particular culture related with power levels, making them "difficult."

The current study showed that the main moments for appropriate HH technique were after patient contact and after touching body fluids. While, hand rub performed probably after patient contact and before a septic technique. However, less than one third of the studied health team were worn gloves before patient contact and before aseptic technique. This may be due to protect self rather than hand contamination.

In this study, each of the five WHO-defined HH indications was considered an HH opportunity. This aligns with **Hilt et al., (2020)**, who stressed the importance of teaching programs as well as greater surveillance to ensure that both patients and HCWs are not exposed to hazardous pathogens or transporting them to other locations.

Abuosi et al., (2020) concluded that HCWs were more likely to comply with hand washing after patient contact than before, which they believe reflected a preference for protecting themselves from the patient's bodily fluids above protecting the patient.

This was in contrast to **Woodard et al., (2019)**, who discovered that the majority of health car participants did not wash their hands at practically every opportunity to do so, such as before patient contact, before gloving, after every procedure performed on the same patient, and before hand rub.

This was not matched with **Pereira et al., (2020)** who said that the HCWs considered adherence to all five indicators to be tedious. This begs the question of whether these criteria should be prioritized, with a focus on just three: before patient contact, after patient contact, and before a sterile treatment. So, **Von Lengerke et al., (2017)** recommended that if effective microbiological transmission interruption is to be achieved, healthcare staff must be convinced of the need of following all instructions.

On the other hand, **Musu et al., (2017)** reported that none of the nurses in all ICUs washed their hands at the beginning of the shift, before every procedures even invasive procedure and between the different procedures carried out on the same or different patients.

Ahmed et al., (2020) also, reported in their study of hand washing frequencies that the rates were lower than expected among surgical patients particularly among physicians. This is in agreement with **Boyce, (2017)** study which revealed an unacceptable low base line rate of hand washing compliance by health care personnel.

Regarding wearing gloves. **Vikke et al., (2019)** reported that compliance with gloves helps to prevent the transmission of pathogens by direct and indirect contacts. **CDC, (2019)** recommended that when handling blood, body fluids, and contaminated things, as well as before and after touching patients, clean non-sterile gloves should be worn.

Totally, the researcher's opinion that health team did not always comply with a septic technique it may be attributed to lack of knowledge, the multi- procedures implemented and lack of supplies. Furthermore, they spent a long time to do hand washing steps on all opportunities. That match with **Anedda et al., (2020)** who reported that, staff would not have time to protect themselves when facing with life threatening situations. Furthermore, they reported that when staff was very busy, gloving was inadequately practiced or neglected.

In accordance to these findings, a study conducted in India to assess knowledge, attitude and practice of nursing students at a tertiary care center showed that around half of the nurses had poor HH practices and

only five percentage had good practice (Nair et al., 2016).

As well, Manomenidis et al., (2019) pointed that the surgical wards' HH compliance was found to be unsatisfactory, which is consistent with the international literature, which reports a compliance rate of roughly one-third.

Similarly, in a recent study by Iversen et al., (2020), inaccessibility of sinks, heavy workload or lack of suitable staffing, and interference with the practice of care were cited as the most important hurdles.

Another study in a surgical department found that none of the medical staff washed their hands before and after doing the various activities that needed hand washing (Salama et al., 2017).

In another study conducted in Ethiopia 2014, only one quarter of participants scored more than 50% in the observation checklist for compliance with HH (Rahman et al., 2021).

This was evident in Houghton et al., (2020) study as one third of studied workers considered wearing gloves enough to prevent transmission of infection. Also, one of the common reported misconceptions among health team was that wearing gloves replaced washing hands or alcohol based hand rubbing (Salama et al., 2017).

The present study showed that about two thirds of the studied health team members reported reasons for non-compliance with HH regarding the personal reasons were the staff did not aware with (5 MOMENT'S) indication of HH, too busy and about three quarters disagreed that lack of knowledge about HH guidelines was a reason. The researcher's point of view that the surgical settings consider a very crowded settings so this consider a great reason for non-compliance with HH.

Similar to the findings of the current study, Bayleyegn et al., (2021) who found that factors such as age and years of experience had no bearing on the development of knowledge regarding universal precautions.

Regarding the organizational reasons the present study revealed that more than half of the health team agreed that absence of punishment for those who did not follow universal precautions specially HH was the organizational reason. While more than half of them strongly agreed that Unavailability of HH sink inside patient room was the environmental reason.

Whereas the main restriction was a lack of personal protective equipment (PPE), which was comparable to findings in a study in North East Nigeria, where the majority of respondents indicated non-compliance due to a lack of equipment (Kio et al., 2016).

In certain research, hospital management's lack of commitment for providing basic hospital amenities and personal protective gear has been identified as an

obstacle for using universal precautions (Ndu & Arinze-Onyia, 2017).

According to Yilmaz et al., (2017) who concluded that based on findings of the physical facility survey, the lack of alcohol-based gels (and occasionally other materials needed for HH), the location of sinks, and the lack of consistent reminders in the form of posters or signs were all possible factors contributing to non-compliance with HH. They stated that when the HH method is simple, accessible, comfortable, and short in duration; HCWs are sensitized to the high level of impact of HH; and appropriate reminders are offered, compliance rates should be optimized.

Kiersnowska et al., (2018) added that, The location of the sinks on one side of the ward, away from the patient's beds, has an obvious impact on total compliance. Despite its simplicity, the HH process may be regarded as a disruption in the HCW's routine. Regular HH can be easily overlooked when the job is heavy, unless efficient reminders are in place.

Scurati et al., (2019) found that Only a few wards had reminders in the form of HH posters, which were frequently faded and had lost their effectiveness.

This finding was not true for residents and this might be attributed to the fact that the majority of resident physicians finished their undergraduate courses recently and retained knowledge regardless of receiving formal training.

The current study result found that there was a statistically significance relation between the studied health team's opinion regarding reasons of HH noncompliance with their all demographic data (age, gender, marital status, specialty, educational level, years of experience, work places and previous training).

Other study conducted by Santosaningsih et al., (2017) who investigated the impact of role models on hand hygiene adherence. The study performed by Hammerschmidt & Manser (2019) who discovered that senior practitioners' HH behavior had a significant impact on junior workers.

Similarly, Lee et al., (2020) proposed that focusing on consultants as a strategy to increase compliance levels is the way to go.

Except for the studied health teams' years of experience, specialty, and degree of education, there was no statistically significant relation between HH opportunities and their demographic features in the current study.

In this regard, Bayleyegn et al., (2021) discovered that age and years of experience had no bearing on the development of universal precautionary practice. According to Brown et al., (2017), there was no statistically significant difference in knowledge and practice ratings across age groups and years of experience.

This study finding contradicted the results of study conducted by **Ryandini & Nursalam, (2018)** who found opinion and attitude of nurses was significantly better than young physicians regarding the importance of training, supervision and reminders in improving HH compliance. This difference could be explained by the difference in the duration of working experience between both studied groups.

In a study conducted at a chosen Egyptian cancer hospital, **Refeai et al. (2020)** discovered that HCWs' age and years of experience were negatively correlated with their practice of infection control. In this context, **Muthuri et al. (2020)** found that older age was a significant predictor of lower performance levels. Their findings could be explained by a loss of motivation, insufficient supervision, and a lack of ongoing training.

The current research finding found no statistically significance relation between reasons of non-compliance and HH opportunities compliance level except their total level of hand wash and hand rub.

This study result may be due to Assiut university Hospitals with low nurse staffing levels and patient overcrowding, usually have poor compliance with HH as time to complete patient care duties competes with time needed for hand washing. This matched with **Houghton et al., (2020)** who reported that HCWs perceived it to be more important to perform their patient care task quickly rather than taking time to clean their hands.

Moreover, **Pollock et al., (2020)** who stated that health care workers (HCWs) feel that training should be made available to all employees. Furthermore, HCWs perceive that managerial support and resources are sometimes limited, limiting their ability to follow best practices, according to the synthesis. Another qualitative analysis of nurses' readiness for epidemics of infectious diseases.

Conclusion:

Based on the results of the current study, it can be concluded that:

The highest percentage of the studied health team had a poor compliance level of hand hygiene, hand rub, and gloves wearing. Also, major reason for non-compliance of the studied health teams' opinion with HH was staff did not aware with (5 MOMENT'S) indication of HH. Additionally, there was a statistically significance relation between the studied health team opinion regarding reasons of non-compliance with hand hygiene and their demographic data. Moreover, there were statistical significances relation between reasons of non-compliance with total HH and hand rub opportunities compliance level except total gloves wearing opportunities.

Recommendations:

1. Adequate and appropriate supplies for compliance with universal infection control mainly hand hygiene supplies should be ensured for all health team at all time.
2. Reasons for non-compliance with hand hygiene among health team should be considered by infection control committee, supervisors administrators and routine assessment of health team' compliance must be applied to hand hygiene each shift.

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