

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/323619050>

Personal hygiene and taking into account the preventive measures and safety among healthcare providers

Article · March 2018

DOI: 10.14419/ijans.v7i1.8712

CITATION

1

READS

113

3 authors, including:



Ghona Ali

Faculty of Nursing - Sohag University

41 PUBLICATIONS 13 CITATIONS

[SEE PROFILE](#)



Abeer Yahia Mahdy

Benha University

20 PUBLICATIONS 5 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



CV ghona [View project](#)



Evaluate the Effectiveness of Nurses' Professional Competence Approach on Their Productivity in Medical-Surgical Units [View project](#)

Personal hygiene and taking into account the preventive measures and safety among healthcare providers

Ghona Abd El-Nasser Ali ^{1*}, Nadia Mohamed ², Abeer Y. Mahdy ³

¹ Medical Surgical Nursing Dep. Faculty of Nursing, Sohag University

² Administration Nursing Dep, Faculty of Nursing, Sohag University

³ Medical Surgical Nursing Dep. Faculty of Nursing, Benha University

*Corresponding author E-mail: ghonaali@yahoo.com

Abstract

Negligence of personal hygiene and safety practices among healthcare personnel is not only a major risk factor in the spread of infection, but is in many instances an abuse of human rights.

Aim: the study aim was to assess the personal hygiene and taking into account the preventive measures and safety among healthcare providers.

Tools: An interview questionnaire sheet and personal hygiene and vaccination status.

Subject and methods: A descriptive design was used in the current study and all available doctors, nurses and housekeeper in the days of data collection.

Results: It was found that the majority of physicians (76.2%) were holders of a bachelor degree of medicine, while the majority of nurses were holders of a diploma /technical of nursing and the majority of housekeepers were holders of a basic education. There were highly statistical significant differences based on study groups, profession, and qualifications.

Conclusion: The adherence of the majority of healthcare provider with personal hygiene and safety measures were ranged from poor to fair. There was a relationship between availability of protective equipments barrier and personal hygiene practices and safety measures.

Recommendations: A significant efforts are needed to enhance universal precaution compliance among caregivers includes training, strict supervision with disciplinary measures for poor compliance with improve the facilities available and equipments for personal hygiene and safety.

Keywords: Health Care Providers; Personal Hygiene; Standard Precautions; Safety.

1. Introduction

Personal hygiene is the essential concept of cleaning, grooming and it is the initial step to good health. Besides that it is consider as one of the more important part of our daily lives at home and at workplace which assist us to protect ourselves and keep us with good health (Hassan, 2012). Personal cleanliness has a most importance to maintenance of health and to control of several diseases especially infectious diseases, for personal comfort and for psychological causes such as maintaining confidence and self-esteem (Hutt, 2003). Aiello et al. (2008) added that the personal cleanliness is refers to practices or conditions by which individuals protect or reinforces good health by keeping themselves and their climate clean.

Worldwide, among the 35 million healthcare providers (HCPs), nearly 3 million susceptible to percutaneous exposures to blood-borne viruses each year; 0.2 million of those to hepatitis B virus, 0.9 million to hepatitis C virus and 170 000 to HIV. These lesions may result in 15000 HCV, 70000 HBV and 500 HIV. Over ninety percent of these infections occur in developing countries, as estimated by the (WHO, 2003), nurses are the most susceptible healthcare workers (HCWs) at extremely high risk of exposure to occupational hazards by fifty percent through needle prick injuries (Mohammadi et al. 2011, Mbaisi et al. 2013, & Gorar et al. 2013), this hazards back to delivers of the vast majority of patient care

round the clock through performing different procedures and assisting physicians in various procedures (Alam & Alabdulaali 2016). Umar and Aisha (2017) determine the reasons of occupational hazards include unavailability of protective clothing and lack of proper training on safety measures and neglect of the staff with safety measures and accidental injuries among them.

In 1988, the center disease control (CDC) recommended to importance of applying standard precautions to prevent occupational hazards from both recognized and unrecognized sources from these measures hand hygiene before/after touching with each patient, use of protective barrier equipment in accordance with the standard precautions (SPs) policy and safe handling for contaminated equipment or surfaces in the surroundings patient (CDC1988). On the same line, the WHO emphasized on primary measures to prevent occupational hazards, particularly because the highest incidence of fatal occupational injuries occurs in healthcare institutions, compared to other occupational hazards (Occupational Safety and Health Administration, 2013).

Manyele et al. (2008) stated that to overcome the occupational health hazardous it must be do more efforts including training on universal precautions (UPs), exposure to information and creation of awareness are recommended for enhancing occupational health and safety measures in healthcare institutions. Awareness and practice of (SPs) and safety measures protocols is paramount for reducing health risk at work setting among healthcare providers (Sadoh 2006).

Several studies have been carried out throughout the world about healthcare personals (HCPs) adherence with universal precautions and safety measures which indicated that use of personal protective equipment (PPE) such as do not recapping or bend of needles, washing hands before/after patient care, or after contact with patient surroundings, avert of a used needles that is disjointed from a syringe and in application of precautions for all patients were suboptimal and inconsistent (Jawaid et al., 2009, McGaw et al. 2012, Alice et al. 2013).

In West Indies study by Vaz et al. (2010) reported that, the level of compliance and differences in knowledge with standard precautions (SPs) by healthcare personals may differ from one type of healthcare personals to another and may be influenced by their different type of training programmes conducted by the hospital. Another study conducted in India also indicated that health managers need to ensure that health care is harnessed toward assessment of hazards suffered by healthcare personals, their reasons, and do everything potential for prevention (Chhabra, 2016).

In Kenya study by Maingi, (2015) stated that, availability and accessibility of basic infection control infrastructure are key indicators of compliance with safety recommended guidelines and practices. In Egypt, in the study done by Abou El-enein & El Mahdy (2011) outlined that, the causes and barriers that influenced safety practice measures and that overlap with the safe practice of care included: absence of positive role models from supervisors, lack of experience in the work, and the increase workload or lack and inaccessibility of sinks.

So, the current study try to identifying the extent of commitment of healthcare personals at Sohag University Hospital by personal hygiene and taking into account the preventive measures and safety.

Significant of the study:

In light of the severe lack of resources and equipment at Sohag University Hospital and it has been found that, most of healthcare providers working in difficult conditions which expose them to several occupational hazards due to unavailability and inaccessibility of basic infection control infrastructure. This condition motivate the researchers to know the extent of healthcare providers commitment to personal hygiene and occupational safety and availability of protective measures during different medical procedures and develop recommendations for their work in hospital to protect them. Also, the results of this study will be as a baseline data for both policy makers in formulation of and for further researchers.

Aim of the study:

The current study aim to assess the personal hygiene and taking into account the preventive measures and safety among healthcare providers.

Research questions:

- 1) Do healthcare providers committed to personal hygiene and taking into account the preventive measures and safety during routine patients' care?
- 2) Are vaccination and protective barriers available among healthcare providers?

2. Materials and method

2.1. Research design

A descriptive design was used for achieving the study aim.

2.2. Setting

The study was carried out at Sohag University Hospital in the following departments; medical/surgical department, intensive care unit (ICU), coronary care unit (CCU), neurology, dialysis, urology, and operation ward.

2.3. Subjects

The study subjects were comprised of all (363) healthcare providers (nurses, physicians and housekeeping) who were available at the time of data collection in all wards mentioned previously.

2.4. Data collection tools

2.4.1. Tool I: an interview questionnaire sheet

It was designed by researchers to elicit data related to qualification, profession and departments.

2.4.2. Tool II: personal hygiene and vaccination status tool

This tool was developed by (Askaran et al. 2006) and consisted of two main parts:

Part I: Healthcare provider's observation checklist, it was used to assess the HCPs compliance with personal hygiene practice and protective measures and it included 16 items, 13 to assess nurses and doctors and 3 for housekeepers.

Part II: Healthcare provider questionnaire, this part was used to assess the availability of vaccinations and protective devices among HCPs, and it included 7 items. In addition to 3 questions were developed by researchers, one of them regarding the availability of copy from principle of occupational health and safety, the second one about the availability of safety boxes in work places and the last question about annual follow-up examination for healthcare workers.

Scoring system: the scoring system covers the two parts. In yes/no and available/ unavailable items, the proportion of positive answers was calculated and multiplied by 100, giving scores between 0 to 100. The results were analyzed according to job (physicians, nurses and housekeepers). The scores for compliance with personal hygiene practices were categorized into 80–100, 61–79 and ≤ 60 translating: good, fair and poor respectively. While in the score of available/unavailable of resources was categorized into low (available) and moderate (available), less than 60% was low and from $\geq 60\%$ was moderate.

3. Methods

3.1. Validity and reliability

The reliability of the modified Arabic version tool was measured, using Cronbach's alpha as a reliability test and factor analysis which yielded 0.76 that considered valid according to the researches. Also, the content validity was measured by 5 experts in the related field of the study to assess the coverage and clarity of questionnaire for the aim and purpose of the study. This phase took about two months from April to May 2016.

3.2. Pilot study

Once the tools were modified, a piloted tested was done in 3 different wards (10 physicians, 10 staff nurses and 3 housekeepers) to detect any ambiguity or problems of the tool and to estimate the time consumed to collect the data. Based on the pilot results analysis and feedback, the necessary modifications were made. The duration of this phase took about one month through June 2016. The pilot sample was excluded from the study sample.

3.4. Field work

After finalizing the study tools and prior to commencement of data collection, five instructors were trained appropriately in a workshop on how to administered the questionnaire, observe the HCPs and complete the observational checklists during routine patients care opportunities. The tools were prepared for recording observations for each HCP and availability /accessibility of materials. Data collection was done in two phases; the first in phase, the

trained instructors observed each person for three times and the mean of observations was taken and the observation was recorded with the time of the event without the names of health personnel. The observation periods were distributed randomly during the morning and afternoon shifts for three months in all departments, and the subjects were unaware that they were observed by the observers. Immediately after finishing the observation period, the second phase was started and the second part of questionnaire was distributed to all HCPs available in the days of data collection to record their observations about the availability and accessibility of resources at their wards. The HCPs occupation, level of education and rank were also recorded. Researchers were present alternately in most of time to answer any question that appeared in addition to the trained instructors. This phase took about three months from July to September 2016.

3.5. Ethical consideration

Ethical clearance was obtained prior to data collection from the concerned authority and the Institutional Ethical Committee after explanation of the aim and purpose of the study. Similarly, informed consent was obtained from each study participant after explanation of how they would take part in the study. Also, they were informed about a full right to refuse or withdraw from participation at any time if they felt uncomfortable.

4. Statistical analysis

The data was analyzed using Statistical Package for Social Sciences software (version 16 SPSS). The collected data were coded, classified, summarized and presented as figures and tables. Continuous variables were expressed as mean \pm standard deviation and categorical variables expressed as percentages. For comparison of categorical variables, the Chi-square test was used and independent student's t-test for continuous variables. A P-value was considered statistically significant at < 0.05 .

5. Results

Table (1): describes, the distribution of studied groups as regard to occupation. It was found that, majority of physicians (76.2%) were resident doctors, and (90.1%) of nurses were practical and technical nurses.

Table (2): shows the distribution of studied groups as regard to qualification. The high percentage of physicians (77.9%) they were holding a bachelor of medicine, and (90.1%) of nurses were holding a diploma of secondary school of nursing/technical institute. While, about half (55.2%) of workers were holding a basic education.

Figure (1): shows the distribution of studied groups as regard to departments, the high percentage for physicians were at ICU (23%), nurses were at dialysis department (24.5%); while the percentage of housekeepers at medical and operating departments were the same (24.1%).

Table (3): Describes the extent of compliance of physicians and nurses with personal hygiene and safety practices, it was found that the high percentage of physicians' and nurses respectively (90.2%, 98.6%) were wearing a uniform according to hospital policy while, only 33 (9.9%) of them their uniforms were clean, also the vast majority of them (82% & 91.5%) respectively cover the wounds to prevent contamination with statistical significant differences between both groups.

As well as, the current study revealed that a weak percentage of doctors and nurses (26.2%, 17.0%) respectively were committed to wash their hands after each step of working or after contact with patient's fluids or instruments with statistical significant differences between physicians and nurses. As for using the protective barrier equipments when contact with infectious patients or blood or other drainages were (21.3%, 13.2%) respectively while, wear protective clothes if draw blood it was found the same results

(32.8%, 34.4%) respectively but there wasn't any statistical significant differences.

Also, the present study showed that the physicians and nurses were wearing proper shoes, do not wearing jewelers, wearing a plastic apron when needed, and they wear gloves when contact with unclean dressing (69.7 %, 42.9 %; 16.4%, 33.0%; 36.9%, 36.8%; 59.0%, 67.9%) respectively but there wasn't statistical significant differences were found except in using proper shoes and do not wearing jewelers only. Also, it was found that, the use of the specific containers to disposal used syringes or other sharp items needles by physicians and nurses were (74.6%, 63.2%) with statistical significant differences, do not bend, break or recapping the used needles were (83.6%, 77.8%) but not meaningful differences between groups. While it was found that, the doctors were more compliance with short and clean fingernails than nurses (89.3%, 19.3%) respectively with statistical significant differences (< 0.05).

Figure (2): Presents the use of protective measures among housekeepers. It was found that about two thirds of hospital cleaners (72.4%) were use heavy gloves for cleaning of toilets, while the majority of them were not wearing rubber aprons when washing the ward and not wear boots easy to clean when washing the wards (79.3%, 55.2%) respectively.

Table (4): Summarizes the availability of preventive resources among studied groups. A high proportion of the respondents reported with unavailability of all the following resources: vaccinations for diphtheria and tetanus (3 shots and a booster dose every 10 years); vaccination for hepatitis complete (3 times); bath, soap, shampoo and towels to take a bath or wash hands when necessary ; two uniforms for health personnel annually; a plastic/rubber aprons for use when needed; suitable number of protective devices; make annual follow-up examination for workers; and copy from principles of occupational health and safety (97.5%; 95.9%; 82.4%; 86.5%; 72.5%; 89.3%; 96.4%; 98.9%) respectively; meanwhile about (97.8%) were reported of availability of special safety boxes to store the used needles and sharp items.

Also, about two thirds (74.4%) of housekeepers reported that availability of long boots/shoes with long neck with statistical significant differences were found only in availability of vaccinations for diphtheria, tetanus and hepatitis B, availability of two uniform annually and long boots with long neck (< 0.05).

Table (5): Shows the relationship between levels of personal hygiene practices with the professional categories, qualifications and departments of the studied groups. It was found the high percentage of both physicians and nurses were had poor hygiene practices (58.8%, 37.6%) respectively, most of them (26.7%) were resident doctor and they were holders of a bachelor of medicine (27.9%) while, nearly half of nurses (49.1%) were practical nurse, and they were holders of nursing school/institute (53.9%). Meanwhile, a significant percent of hospital cleaners (31.5%) were had good practices for personal hygiene, (18.5%) of them holders the basic education. Also, the current study revealed that highest precept of poor personal hygiene practices among the studied sample (22.4%) were working at dialysis department, while the highest percent of good hygiene practices among studied sample (25.9%) were working in operating room. And there were statistical significant differences for personal hygiene practices with all studied characteristics ($p = 0.001$).

Table (6): Shows the relation between availability of resources with studied personal characteristic. The high percentage of physicians, nurses, and hospital cleaners were complained from unavailability of preventive resources (34.1%; 58.7%; & 7.3%) respectively, most of them were resident doctor (26%) and they were holding of a bachelor degree of medicine (26.5%), while, over half of nurses (53.2%) were practical nurse and they were holders of Nursing School/Institute (52.8%). And the high percentages of unavailability of preventive resources were at ICUs, dialysis department, and operation rooms (17.6%; 17.0%; & 15.6%) respectively, with highly statistical significant differences based on groups, professions, and qualifications (0.001).

Figure (3): Portrays the overall availability of preventive resources among studied groups. It was found that (98.6%) from study groups were reported unavailability of resources, while only (1.4%) only from them stated that personal protective barriers were available at work places.

Figure (4): shows the levels of compliance with hygiene practice. It was found that the majority of studied group were had a poor to fair level of hygiene practice (45.5%; 39.7%) respectively, while only one third (14.9%) were had a good level of practice for personal hygiene.

Table (7): Shows the relation between the level of personal hygiene practice, and the level of availability of resources. The present study revealed that, although the high percent of hygiene practices level among studied groups were poor and fair, and little percent were practices the personal hygiene by good level, no statistical significant difference was found between the levels of compliance (0.667).

Figure (5): shows the correlation between available of resources and personal hygiene and safety measures practice. It was found there was a positive correlation between availability of resources with personal hygiene and safety measures practice.

Figure (6): shows the majority of physician and nurses not done personal hygiene practices (88.9 %), while more than half of the housekeepers perform personal hygiene practices (85.6 %).

6. Discussion

Good personal hygiene is one of the very important practices to prevent the spreading of communicable diseases, and promote better health and well-being. Discussion of the current study was presented in the following parts:

Table 1: Frequency Distribution of Studied Groups as Regards Occupation

Profession	N.	%
1) Physicians:		
Resident doctor	93	76.2
Demonstrator	2	1.6
Assistant Lecturer	24	19.7
Lecturer	3	2.5
Total	122	100.0
2) Nurses:		
Professional nurses	21	9.9
Practical /Technical nurses	191	90.1
Total	212	100.0
3) Workers:		
Hospital cleaners	29	100.0
Total	29	100.0

Table 2: Distribution of Studied Groups as Regards Qualification Category

Qualification	Number	Percentage
Physicians		
PhD	3	2.5
Master	24	19.7
Bachelor of Medicine	95	77.9
Total	122	100.0
Staff Nurses		
Nursing school/ institute	191	90.1
Bachelor of nursing	21	9.9
Total	212	100.0
Hospital cleaners		
Diploma	4	13.8
Basic education	16	55.2
Uneducated	9	31.0
Total	29	100.0

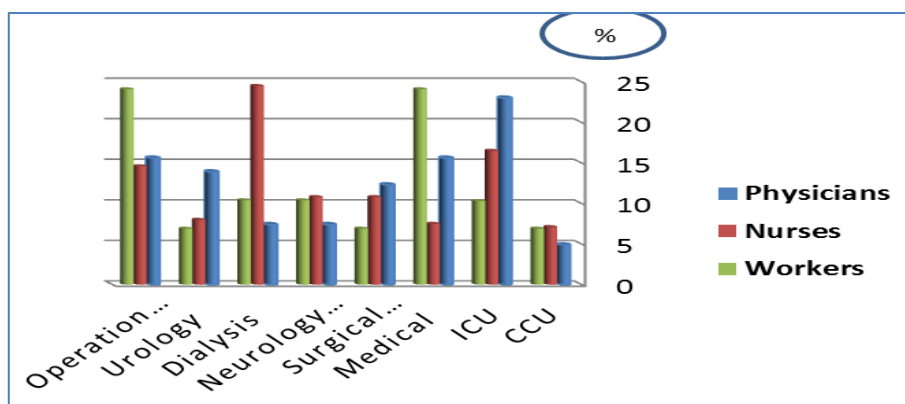


Fig. 1: Distribution of Studied Groups as Regards Department.

Table 3: The Distribution of the Personal Hygiene and Safety Practices among Physicians and Nurses

Items	Physicians (n=122)		Nurses (n=212)		Total (n=334)		P. value
	Yes N (%)	No N (%)	Yes N (%)	No N (%)	Yes N (%)	No N (%)	
1) Use uniform according to hospital policy.	110(90.2)	12(9.8)	209(98.6)	3(1.4)	319(95.5)	15(4.5)	(S)
2) Uniforms are clean.	3(2.5)	119(97.5)	30(14.2)	182(85.8)	33(9.9)	301(90.1)	(S)
3) Use proper shoes (not slippers).	85(69.7)	37(30.3)	91(42.9)	121(57.1)	176(52.7)	158(47.3)	(S)
4) Have short and clean fingernails.	109(89.3)	13(10.7)	41(19.3)	171(80.7)	280(83.8)	54(16.2)	(S)
5) Do not wear jewelry (rings/bracelets).	20(16.4)	102(83.6)	70(33.0)	142(67.0)	90(26.9)	244(73.1)	(S)
6) Use needle-cutter or specific container to discard syringes & sharp items.	91(74.6)	31(25.4)	134(63.2)	78(36.8)	225(67.4)	109(32.6)	(S)
7) Do not bend, break, recap or use of one hand technique for cover needles	102(83.6)	20(16.4)	165(77.8)	47(22.2)	267(79.9)	67(20.1)	(NS)
8) Wash hands after each step of working or after contact with patients.	32(26.2)	90(73.8)	36(17.0)	176(83.0)	68(20.4)	266(79.6)	(S)
9) Use protective devices when in contact with patients or if there is possibility of splashing blood or other drainages.	26(21.3)	96(78.7)	28(13.2)	184(86.8)	54(16.2)	280(83.8)	(NS)
10) Wear a plastic apron when needed	45(36.9)	77(63.1)	78(36.8)	134(63.2)	123(36.8)	211(63.2)	(NS)
11) Use protective measures as (gloves, masks and goggles) if draw blood.	40(32.8)	82(67.2)	73(34.4)	139(65.6)	113(33.8)	221(66.2)	(NS)
12) Wear gloves when contact with unclean dressing or when needed	72(59.0)	50(41.0)	144(67.9)	68(32.1)	216(64.7)	118(35.3)	(NS)
13) Cover the wound to prevent contamination	100(82.0)	22(18.0)	194(91.5)	18(8.5)	294(88.0)	40(12.0)	(S)

*S= statistically significant difference ($p < 0.01$), *NS= statistically significant difference ($p > 0.01$).

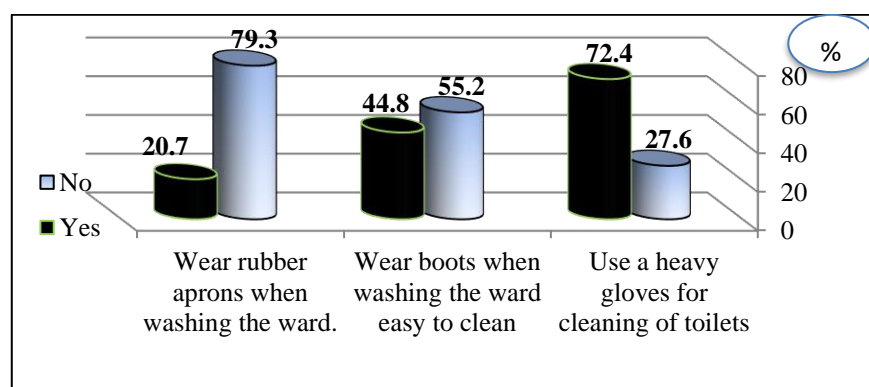
**Fig. 2:** Distributions of the Protective Measures among Hospital Cleaners.

Table 4: Availabilities of Preventive Resources among Studied Groups

Items	Physicians (N %)	Nurses (N %)	Workers (N %)	Total (N %)	P. value
1) Availability of required vaccinations for diphtheria and tetanus(3 shots and a booster dose every 10 years)					
No	122(100.0)	206(97.2)	26(89.7)	354(97.5)	S
Yes	0(0.0)	6(2.8)	3(10.3)	9(2.5)	
2) Availability of vaccination for Hepatitis B complete(3 times)					
No	121(99.2)	198(93.4)	29(100.0)	348(95.9)	S
Yes	1(0.8)	14(6.6)	0(0.0)	15(4.1)	
3) Availability of bath, soap, shampoo and towels to take a bath or wash hands when necessary					
No	94(77.0)	181(85.4)	24(82.8)	299(82.4)	NS
Yes	28(23.0)	31(14.6)	5(17.2)	64(17.6)	
4) Availability of two uniforms for health personnel annually					
No	114(93.4)	175(82.5)	25(86.2)	314(86.5)	S
Yes	8(6.6)	37(17.5)	4(13.8)	49(13.5)	
5) Availability of plastic or rubber aprons for use when needed					
No	94(77.0)	146(68.9)	23(79.3)	263(72.5)	NS
Yes	28(23.0)	66(31.1)	6(20.7)	100(27.5)	
6) Availability of long boots or shoes with long neck					
No	99(81.1)	165(77.8)	6(20.7)	270(74.4)	(S)
Yes	23(18.9)	47(22.2)	23(79.3)	93(25.6)	
7) Availability suitable number of protective devices as gown, mask, gloves & goggles for use when needed					
No	114(93.4)	185(87.3)	25(86.2)	324(89.3)	NS
Yes	8(6.6)	27(12.7)	4(13.8)	39(10.7)	
8) Make annual follow-up examination for workers:					
No	120(98.4)	201(94.8)	29(100.0)	350(96.4)	NS
Yes	2(1.6)	11(5.2)	0(0.0)	13(3.6)	
9) Availability of copy from principles of occupational health and safety					
No	122(100.0)	208(98.1)	29(100.0)	359(98.9)	NS
Yes	0(0.0)	4(1.9)	0(0.0)	4(1.1)	
10) Availability of safety boxes for needles and sharp equipment:					
No	3(2.5)	4(1.9)	1(3.4)	8(2.2)	NS
Yes	119(97.5)	208(98.1)	28(96.6)	355(97.8)	
Total	122(100.0)	212(100.0)	29(100.0)	363((100.0)	

*S= statistically significant difference ($p < 0.01$), *NS= statistically significant difference ($p > 0.01$).

Table 5: Relation between Levels of Personal Hygiene Practices, with Different Variables (Professional Categories, Qualification and Departments)

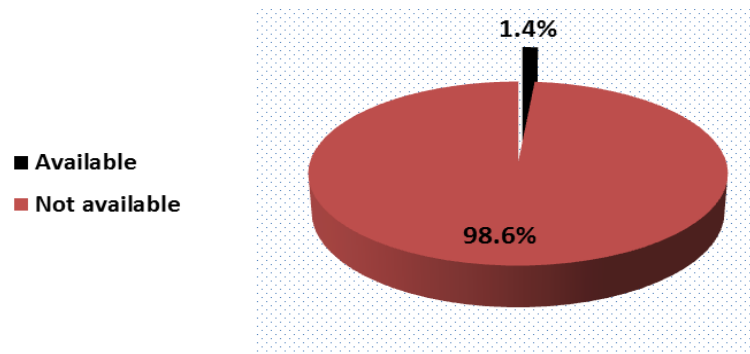
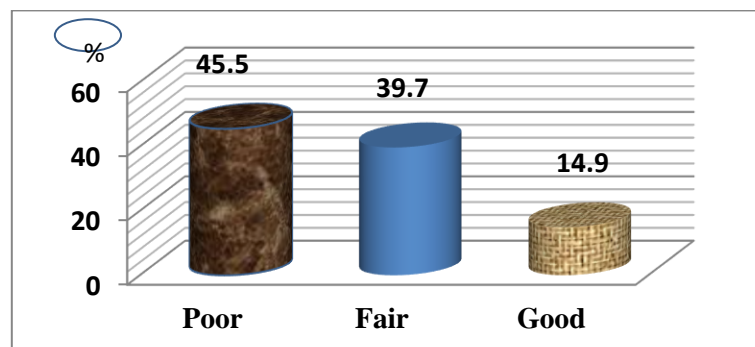
Items	Levels of personal hygiene practice						P. value
	Poor ≤ 60 (n=165)		Fair (61-79) (n=144)		Good (80-100) (n=54)		
	No.	%	No.	%	No.	%	
Groups							
Physicians	62	37.6	50	34.7	10	18.5	(S)
Staff Nurses	97	58.8	88	61.1	27	50.0	
Hospital cleaner	6	3.6	6	4.2	17	31.5	
Profession categories							
Lecturer	3	1.8	0	0.0	0	0.0	(S)
Assistance lecturer	13	7.9	9	6.3	2	3.7	
Demonstrator	2	1.2	0	0.0	0	0.0	
Resident doctor	44	26.7	41	28.5	8	14.8	
Professional nurse	16	9.7	4	2.7	2	3.8	
Practical nurses	81	49.1	84	58.3	25	46.2	
Hospital cleaner	6	3.6	6	4.2	17	31.5	
Qualifications							
1-Physicians							
PhD medicine	3	1.8	0	0.0	0	0.0	(S)
Master medicine	13	7.9	9	6.3	2	3.7	
Bachelor of Medicine	46	27.9	41	28.5	8	14.8	
2-Staff Nurses							
Bachelor of nursing	8	4.8	5	3.5	8	14.8	(S)
Nursing school/ institute	89	53.9	83	57.6	19	35.2	
3-Hospital cleaners							
Diploma	0	0.0	1	0.7	3	5.6	(S)
Basic education	1	0.6	5	3.5	10	18.5	
Uneducated	5	3	0	0.0	4	7.4	
Departments							
CCU	12	7.3	8	5.6	3	5.6	(S)
ICU	8	4.8	49	34.0	6	11.1	
Medical departments	19	11.5	16	11.1	10	18.5	
Surgical departments	23	13.9	14	9.7	3	5.6	
Neurology	6	3.6	19	13.2	10	18.5	
Dialysis	37	22.4	23	16.0	4	7.4	
Urology	25	15.2	7	4.9	4	7.4	
Operating room	35	21.2	8	5.6	14	25.9	
Total score of personal hygiene compliance	165	45.45	144	39.66	54	14.87	

*S= statistically significant difference ($p < 0.01$), *NS= statistically significant difference ($p > 0.01$)

Table 6: Relation between Availability of Resources and Studied Groups (Physicians, Nurses, & Workers)

Items	Preventive Resources				Total		P. value
	Available N	%	Not available N	%	N	%	
Group							
Physicians	0	0.0	122	34.1	122	33.6	(S)
Staff Nurses	2	40.0	210	58.7	212	58.4	
House keeping	3	60.0	26	7.3	29	8.0	
Profession category							
Lecturer	0	0.0	3	0.8	3	0.8	(S)
Assistance lecturer	0	0.0	24	6.7	24	6.6	
Demonstrator	0	0.0	2	0.6	2	0.6	
Resident doctor	0	0.0	93	26.0	93	25.6	
Professional nurse	2	40.0	19	5.3	21	5.8	
Practical nurses	0	0.0	191	53.3	179	52.6	(S)
Hospital cleaners	3	60.0	26	7.3	29	8.0	
Qualifications							
PhD medicine	0	0.0	3	0.8	3	0.8	(S)
Master medicine	0	0.0	24	6.7	24	6.6	
Bachelor of Medicine	0	0.0	95	26.5	95	26.2	
Bachelor of nursing	0	0.0	21	5.9	21	5.8	
Nursing school/institute	2	40.0	189	52.8	191	52.6	
Diploma	0	0.0	4	1.1	4	1.1	
Basic education	1	20.0	15	4.2	16	4.4	
Uneducated	2	40.0	7	2.0	9	2.5	
Departments							
CCU	0	0.0	23	6.4	23	6.3	(NS)
ICU	0	0.0	63	17.6	63	17.4	
Medical departments	0	0.0	45	12.6	45	12.4	
Surgical departments	0	0.0	40	11.2	40	11.0	
Neurology	0	0.0	35	9.8	35	9.6	
Dialysis	3	60.0	61	17.0	64	17.6	
Urology	1	20.0	35	9.8	36	9.9	
Operating department	1	20.0	56	15.6	57	15.7	
Total	5	100.0	358	100.0	363	100.0	

*S= statistically significant difference ($p < 0.01$), *NS= statistically significant difference ($p > 0.01$)

**Fig. 3:** The Overall Availability of Preventive Resources among Studied Group.**Fig. 4:** The Level of Compliance with Personal Hygiene Practices.**Table 7:** The Relation between Levels of Personal Hygiene Practices and Level of Availability of Preventive Resources among Studied Groups

Practices	Availability of resources				P. value
	Low		Moderate		
	N	%	N	%	
Poor	53	14.8	1	20.0	(NS)
Fair	143	39.9	1	20.0	
Good	162	45.3	3	60.0	

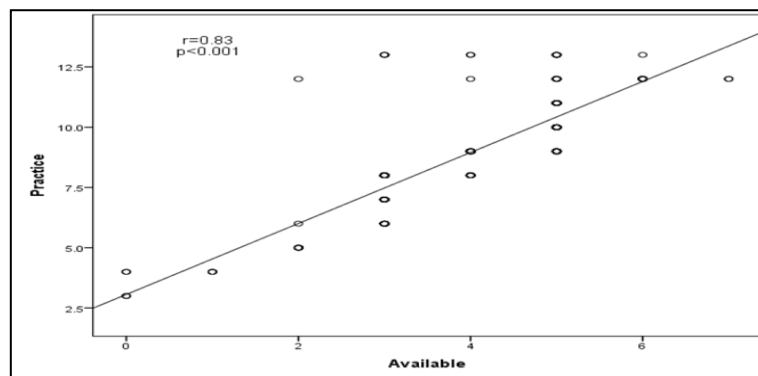


Fig. 5: Correlation between Available of Resources and Personal Hygiene and Safety Measures Practices.

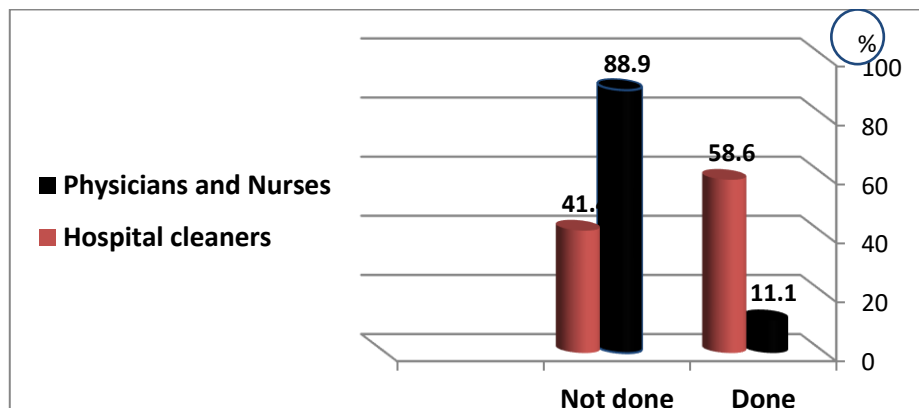


Fig. 6: Personal Hygiene Practices among Studied Group.

7.1. Part I: personal characteristics of study sample

As regard to occupation, the majority of physicians were resident doctors and their qualification were bachelors of medicine, and nurses have nursing school, and high percentages of workers (more than half) have a basic education. This may be due to impending physician specialty and high nurse shortage because of their refuse to employee in University hospital due to workload, comparison between their work and who working in Ministry of Health also, this is may be due to motivation of their family to employee in practical nursing and medical failed. These results were incompatible with finding of (Sadoh et al.2006) who found the high proportion for HCPs were nurses while less than one quarter from HCPs were physician.

According to the level of education of nurses it was found that the majority of nurses had diploma of nursing secondary school and technical nursing institute graduates while, the minority of the nurses (one fifth) had a bachelor degree. This agree with Yassi et al.(2007)results who found that the majority of studied sample were holding a diploma degree or certificate from a post-secondary institution and slightly more than one fifth of the nurses have bachelor degree in nursing.

As regard to their departments, the high percentage for physicians were at ICU, for nurses were at dialysis department, and for housekeepers were at medical department. This may be because of the need of ICU to multi specialty of physicians, but dialyses unit need more nursing care delivery system, while, large unit medical word need more worker.

7.2. Part II: regarding to personal hygiene and safety practice among physicians and nurses

According to regular hand washing practice among doctors and nurses before and after handling patients. The current study revealed that less than one quarter of doctors and nurses were practice hand washing regularly after each procedure or after contact with patients; perhaps because unavailability of or lesser availability of basic materials for hand washing as sinks, antiseptic soaps, and towels which affected on their adherence with the UPs.

Nazarko,(2009) rationalized that HCPs often neglect to practice hand hygiene because they are busy and they feel hand hygiene takes up precious time, in addition poor facilities, unsuitable clothing, hand adornments and often perceive that gloves can be used as a vicarious to hand hygiene. They usually tend to obliterate the gloves without washing their hands or use the same gloves to deliver intended care to multiple patients. Ibrahim et al.(2013)added that, hand hygiene is the only more important preventive measures for decreasing HAIs however; nurses frequently do not wash their hands in health institution due to absence of an enabling climate in health facilities such as lack of convenient washing facilities, electrical dryers, low staff to patients ratios and allergies to hand hygiene soaps, which lead to non adherence with UPs.

According to use of physical protective barriers when contact with infectious patients, blood, drainages or when needed. The present study found that, less than only one quarter of nurses and physicians were using the personal protective barrier during contact with infectious patient or blood with non statistical significant differences were found. This result was inconsistent with finding obtained from (Solanky et al. 2016 & Abu Salam et al.2017) studies who found that, about one hundred percent of HCPs used personal protective measures such as gloves, gown, cap and face masks in day to day practice during dealing with blood or body fluids of the patients.

As regard to the use needles-cutter or specific container for proper discarding of the used syringes and other sharp equipment, the study revealed that about two-thirds of the nurses and doctors dispose the sharp items and used syringes into puncture-proof container at point of use with statistical significant difference was found between the two groups, this finding was inconsistent with (Peethala and Garapati, 2017) who reported that proper disposal of used sharps items and needles were not in practices of most participants. Chhabra, (2016) reported that, although potential for exposure to different hazards, many HCWs lack awareness about prevention. Due to, the system is not enthuases, obscurity of prevention policies or inapproachable, or there is attitude problem. Hence, HCWs continue to suffer more in developing countries. On other hand, the current study raveled that more than three quarters of the doctors and nurses do not bend, break, recap or used of one

hand technique to cover needles. These finding is in accordance with (Kaphle et al. 2014) who found that most of nurses were practicing recapping, disassembly, and only very few percent reported that they never practiced it. Also it was found that some nurses were practicing reuse of same syringe and needles for the subsequent use of same patient and about half of them were practicing bending the needles. Uchenna et al.(2015) added that, recapping of used needles which are known to pose a great risk of needle-prick injuries were practiced by the sizeable majority of the HCPs.

Concerning to compliance of the HCPs by using clean uniforms according to hospital policies and use of appropriate footwear. The study showed that the majority of nurses and physicians were wearing work uniform but, the highest percent of their uniforms were not clean, this may be due to the importance to follow the hospital policy so they wear uniform. But not assertive in cleaning it especially coworker. Cooke, (2014) stated that the professional image presented by staff is an important component in, the way we are perceived by colleagues, patients and the public. A professional image is one that is smart and simplified. Uniforms make a professional recognizable which in turn promotes trust and confidence. Health services providers should comes work having attended to their personal hygiene each day with clean attires and hair and free from bad odors. Clean uniform should be worn each day and replaced if it becomes dirtied during the shift. In the same line, the present study noticed that the doctors were more compliant with short and clean fingernails than nurses with statistical significant differences, perhaps because doctors' were more aware of the danger of unsafe behavior than nurses. Also, doctors and nurses were covering the wound with water proof dressing to prevent contamination was actually practiced by the majority. This finding is agreed with results listed by Chopra et al. (2008) who stated that, nearly seventy percent of the respondents covering the open cuts, broken skin with waterproof dressing during clinical work.

The current study shows that substantial proportion of the nurses and doctors were wearing jewelers as bracelets/rings during clinical work. This finding was congruent with the study conducted by Mahmood et al. (2015) who found that more than half of nurses wear jewelers during job, and this could lead to the bacterial harboring or colonization underneath of the skin.

As for personal hygiene practices among housekeepers. The high percentage of them reported using heavy gloves for cleaning of toilets; and nearly half of them wear washable shoes when washing the wards; while, less than one quarter of them were not wearing rubber aprons when washing the wards, this may be due to their fairness on their health and nasty of bath room. Manuel et al. (2015) stated that, every workers must be trained to know the location and proper use of the available personal protective barriers and equipment and the supervisor is responsible for providing information about both physical and health hazards present in the hospital wards, and what is to be done if a hazards occurs.

7.3. Part III: resources

According to availability of protective barriers and vaccinations among studied groups. The vast majority of HCPs complained from, unavailability of required vaccinations for diphtheria and tetanus 3 shots and a booster dose every 10 years and hepatitis vaccinations in complete doses (3times). These results were conformed with Hussain et al. (2010) who noticed that the proportion of HCPs vaccinated was low and the main reason responsible was lack of awareness and attitude towards issue and unavailability of immunizations by the authority responsible has been identified as the second most important factor for non vaccination. Dorgahm & Obied, (2016) stated that more than two thirds of respondents reported that there were unavailable of PPBs, or even no cost HBV vaccination for HCPs. The inadequate vaccination for nurses might be due to; the vaccinations were not available all the time at hospital, also the infection control staff not oriented about the importance of vaccination for HCPs.

Present study showed that the majority of the studied groups reported that facilities to practices personal hygiene as bath, soap, shampoo and towels in their units were not readily available. These results were compatible with study result by Ariyaratne et al. (2013) who reported that the majority of the HCPs were dissatisfied with the infection control infrastructure available for hygiene. Dorgahm and Obied (2016) added that, in addition to shortage in infection control infrastructure for hygiene, the training on infection control by the hospital upon their appointing were not available also. This finding was contradictory with Abd Elaziz & Bakr, (2008) who reported that most of the wards had available sinks, soap, and shampoo by about eighty percent.

As regard to availability of personal protective barriers among studied groups. It was found that the result of current study is far from what can be acknowledged as standers practice of UPs where, the high percent of studied groups reported unavailability of suitable number of personal protective equipment such as gown, masks, gloves, aprons and goggles. This finding was congruent with the study conducted by Efstathiou et al. (2011) who stated that, the most important factor to non-adherence of HCPs with protective barrier was the lack of protective equipment available. Haile et al. (2017) added that, frequent unavailability of PPE could decrease the impulse of active staff and could be a reason for nonadherence.

This finding goes in the same line with Hussain et al.(2010), who reported that in relation to annual follow-up examination during the work for HCPs, it was found that the majority of the studied subjects were not done medical examination before working, while one fifth of the studied subject were done medical examination during work, thus there is increase the risk of spread of infection, absenteeism and disability. Also the majority of the studied subjects were not done serological screening for viral hepatitis.

As for the availability of a copy from principle of occupational health and safety administration (OSHA). The current study showed that, most of studied groups reported unavailability of a copy from (OSHA) guidelines in the work places. El-Sayed et al. (2015) recommended that, international written guidelines, and infection control manual should be available in the departments to be known for all HCPs in sufficient quantities in places and accessible to all. In other side, the current study found that most of studied groups stated of availability of special safety receptacles to discard the used needles and sharp items. The findings of the present study was in agreement with Chopra et al.(2008) who reported that around sixty percent of respondents stated the available of designated containers to dispose sharps material were always been present.

Current study revealed that, there was a relation between the availability of resources and compliance of HCPs with personal hygiene practices. Results of current study are in agreement with Dorgahm and Obied, (2016) who concluded that about forty percent of HCPs were noncompliance with UPs due to lack in supplies and equipment.

As regard to the degree of compliance of studied group with personal hygiene. It was found that, the vast majority of respondents level of hygiene practices have a poor to faire levels while the least percentage of them had a good level of practices hygiene and this difference was statistically significant($p < 0.05$). Dorgahm and Obied, (2016) pointed out, there were several factors for noncompliance to SPs among HCPs. From these factors were lack in equipment and supplies, forgetfulness to use PPEs, and using PPEs was time wasting. This may be due to excessive work overload results from inappropriate nurse/patient ratio, and shortage of hospitals resources as these hospitals provide services for a wide range of clients semi-free and its budget derived from governmental bodies or ministry of financial. Adding to that the stressful environment of critical departments where nurses work, lack of hospital rules and regulations that protect HCPs from exposure, personal habits, carelessness and discomfort.

7.4. Part IV: relation between levels of personal hygiene practices with profession, qualifications and departments of studied groups

Concerning to relation between levels of hygiene practices and personal characteristic of respondents. The present study found that, there was relation between the hygiene practices and profession categories. These finding was in agreement with Alice et al. (2013) who found that a significant positive correlations were demonstrated between career categories and personal hygiene compliance.

As regard to relation between personal hygiene and safety measures practices with work units, the current study revealed that, the largest percent of respondents had a poor and fair level of compliance with personal hygiene and they most working in the dialysis and ICU units, while the highest precept of good personal hygiene practices level were working in operating room, this may due to fair from supervisor and like to be in good appearance, with statistical significant difference were found bases on work unit. These results in accordance with (Maingi,2015), reported that there was no statistically significant correlation was found between the type of work unit and compliance with hygiene guidelines among HCPs. Maingi, (2015) indicated that, there are numerous factors that have been shown to influence compliance with hygiene practices among HCPs. From these reasons the influence of personal characteristic, individual health providers beliefs and attitudes towards personal cleanliness and affordability of sufficient materials and facilities on adherence.

The current study found that, the good adherences with personal hygiene who were holders of a Bachelor of medicine, nursing school/Institute than other groups with statistical significant difference were found. Maingi, (2015) reported that HCPs had holders Master's degree and Bachelor's degree were higher compliance rates compared to other studied groups.

Correlation between available of resources and hygiene practices and safety measures. There was a positive correlation between availability of personal preventive resources with hygiene practices and safety measures. And the high percentages of unavailability of preventive resources were at ICUs, dialysis department, and operation rooms. This finding coincides with Amoran & Onwube, (2013) who mentioned that unavailability of infection control equipment considered the major factor for non-adherence with UPs among HCPs. Solanky et al. (2016) and Afolaranmi et al.(2017) stated that proper and mandatory training must be regularly provided to HCPs to develop and refresh their knowledge about SPs. Training should includes hand washing, use of various protective barriers, prevention and managing of needles prick injury and proper handling of hazards waste. Information can be spread in the form of brochures, posters and stickers and should be place in noticeable areas in the hospital departments. Proper vaccination of HCPs against HBV should be done annually and pre-employment (Sadoh et al.2006).

7. Conclusion

The current study concluded that adherence of the majority of HCPs at Sohag University Hospital with personal hygiene and safety measures are still suboptimal and inconsistent and ranged from poor to fair and this back to, shortage in the availability of recourses or lesser availability and unavailability of instructions of occupational health and safety administration in all wards in sufficient amount and easily accessible. Also, the hospital workers were more obedience for personal hygiene practices than other groups. As well as, there was a relationship between availability of protective barrier and personal hygiene practices and safety measures.

8. Recommendation

- 1) There is a need to develop strategies to encourage the use of SPs to control infection and take into account preventive measures through the holding of mandatory training programme, seminars/workshops targeting all caregivers including leaders to be good role models and to support personal hygiene and safety protocols.
- 2) Nurses should be advertent regarding practice of UPs to prevent infections and use all PPEs to enhance the safety for patients and HCPs.
- 3) The authorities of Sohag University hospital should develop specific policies/operational guidelines on the practice of SPs and should ensure regular provision of adequate human and material resources
- 4) Provision of written copies of the (OSHA) guidelines for universal safety precaution on healthcare facilities to remind HCPs with safety precautions comply, in sufficient quantities and can be placed in noticeable areas to all in form of posters.
- 5) Further studies should be extended to include other HCPs and all relevant to patients to ascertain from their compliance to the occupational safety and health instructions recommended by (OSHA) organization.

References

- [1] Alam, A. Y. and Alabdulaali, M. K. (2016): Awareness to Implementation on Select Quality and Patient Safety Indicators among Nursing Staff. *J Comm Pub Health Nursing*. 2(1): 1-5. <https://doi.org/10.4172/2471-9846.1000111>.
- [2] Aiello AE, Larson EL, and Sedlak R, (2008): Personal health. Bringing good hygiene home. *Am J Infect Control*.36:152-165? <https://doi.org/10.1016/j.ajic.2008.09.009>.
- [3] Alice, T., E., Akhere, A., D., Ikponwonsa, O., and Grace. E. (2013): Knowledge and practice of infection control among health workers in a tertiary hospital in Edo state, Nigeria, *Direct Research Journal of Health and Pharmacology*.1 (2): 20-27.
- [4] Abou El-enein, N. El Mahdy, H. (2011): Standard precautions: a KAP study among nurses in the dialysis unit in a University Hospital in Alexandria, Egypt. *Journal of Egyptian Public Health Association*. 86, 3-10. <https://doi.org/10.1097/01.EPX.0000395430.92943.69>.
- [5] Askarian, M., Khaloee, A., and Nakhaee, N. (2006): Personal hygiene and safety of governmental hospital staff in Shiraz, Islamic Republic of Iran. *Eastern Mediterranean Health Journal*. 12 (6): 768-74.
- [6] Abu Salama, M., E., El-Shazly, H., M., A., and Dewidarb, M., A.,A.(2017): Infection control awareness among healthcare providers in family health settings in Shebin El-kom district, Menoufia Governorate, Egypt *Menoufia Medical Journal*. 27:840-846.
- [7] Ariyaratne, M., Gunasekara, T., Weerasekara, M., M., J., Kottahachchi, J., B., P., Kudavidanage, B., P., and Fernando, S., S. (2013): Knowledge, attitudes and practices of hand hygiene among final year medical and nursing students at the University of Sri Jayewardenepura. *Sri Lankan Journal of Infectious Diseases*. 3(1); 15-25. <https://doi.org/10.4038/sljid.v3i1.4761>.
- [8] Abd Elaziz, K., M., and Bakr, I., M.(2008): Assessment of knowledge, attitude and practice of hand washing among health care workers in Ain Shams University hospitals in Cairo. *The Egyptian Journal of Community Medicine* 26 (2):1-12.
- [9] Al-Khawaldeh, O., A., Al-Hussami, M., and Muhammad Darawad, M. (2015): Influence of Nursing Students Hand washing Knowledge, Beliefs, and Attitudes on Their Hand washing Compliance. *Health*. (7): 572-579. <https://doi.org/10.4236/health.2015.75068>.
- [10] Amoran, O., E., and Onwube, O., O. (2013): Infection control and practice of standard precautions among healthcare workers in Northern Nigeria. *Journal of Global Infectious Diseases*. 5(4): 156-63. <https://doi.org/10.4103/0974-777X.122010>.
- [11] Afolaranmi, T., O., Hassan, Z., I., Bello, D., A., Oyeboode, T., and Chingle, M., P., (2017): Assessment of knowledge and practice of standard safety precautions among primary health care workers in Plateau State North Central Nigeria. *International Journal of Biomedical Research*. 8 (4): 187-193.

- [12] Centers for Disease Control. (1988): Update, Universal Precautions for prevention of transmission of human immunodeficiency virus, hepatitis B virus, and other blood borne pathogens in health-care settings. *MMWR*, 37, 377-388.
- [13] Chhabra, S., A. (2017): Health hazards among health care personnel. *Journal of Mahatma Gandhi Institute of Medical Sciences*.21 (1):19-24. <https://doi.org/10.4103/0971-9903.178074>.
- [14] Cooke, K. (2014): Dress code, personal hygiene and uniform/work wear mandatory policy for staff. *Ashford & St. Peter's Hospital NHS Foundation Trust*.2 (4):15-23.
- [15] Chopra, S., Walia, I., Verma, P., Vati, J. (2008): Knowledge and practices related to compliance with universal precautions: A Study among Staff Nurses of PGIMER, Chandigarh. *Nursing and Midwifery Research Journal*, 4(2): 59-67.
- [16] Chou, T., Kerridge, J., Kulkarni, M., Wickman, K., & Malow, J. (2010): Changing the culture of Hand Hygiene compliance using a bundle that includes a violation letter. *American Journal of Infection Control* September 2010; 38(7): 575-8. <https://doi.org/10.1016/j.ajic.2010.01.016>.
- [17] Dorgahm, S., R., and Obied, H., K. (2016): Factors affecting nurse interns' compliance with standard precautions for preventing stick injury. *Journal of Nursing Education and Practice*. 6(12): 121- 130. <https://doi.org/10.5430/jnep.v6n12p121>.
- [18] Efstathiou, G., Papastavrou, E., Raftopoulos, V., and Merkouris, A.(2011): Factors influencing nurses' compliance with standard precautions in order to avoid occupational exposure to microorganisms: A focus group study. *BMC Nursing*. 10(1): 1-12. <https://doi.org/10.1186/1472-6955-10-1>.
- [19] El-Sayed, Z., M., Gomaa, A., and Abdel-Aziz, M. (2015): nurses' knowledge and practice for prevention of infection in burn unit at a University Hospital: Suggested Nursing Guidelines. *Journal of Nursing and Health Science*. 4, (1): 62-69.
- [20] Gorar, Z., A. Butt, Z., A., and Aziz, I. (2014): Risk factors for bloodborne viral hepatitis in healthcare workers of Pakistan: a population based case-control study. *BMJ Open*. 4: e004767. <https://doi.org/10.1136/bmjopen-2013-004767>.
- [21] Hassan, B., A., R. (2012): Importance of Personal Hygiene. *Pharmaceut Anal Acta*. 3(8): 3-8.
- [22] Hutt, J. (2003): Fundamentals of Care, Guidance for Health and Social Care Staff Improving the quality of fundamental aspects of health and social care for adults. 1-67.
- [23] Hussain, S., Patrick, N., A., and Shams, R., (2010): Hepatitis B and C prevalence and prevention awareness among health care workers in a Tertiary Care Hospital. *International Journal of Pathology*. 8(1): 16-21.
- [24] Haile, T., G., Engeda, E., H., and Abdo, A. (2017): Compliance with Standard Precautions and Associated Factors among Healthcare Workers in Gondar University Comprehensive Specialized Hospital, Northwest Ethiopia. *Journal of Environmental and Public Health*.1-8. <https://doi.org/10.1155/2017/2050635>.
- [25] Ibrahim, Y., Ali, H., S., and Mohamed, E., E. (2013): Perception of Knowledge, Attitude, and Behavior of Hand Hygiene among Nurses in the Emergency Department at King Abdul-Aziz Hospital in Makkah Al Mukaramah. *Journal of American Science*. 9(6): 299-509.
- [26] Jawaid, M., Iqbal, M., and Shahbaz. S. (2009): Compliance with standard precautions: a long way ahead," *Iranian Journal of Public Health*.vol. 38(1): 85-88.
- [27] Kaphle, H., P., Poudel, S., Subedi, S., Gupta, N., Jain, V., and Paudel, P. (2015): Awareness and Practices on Injection Safety among Nurses Working in Hospitals of Pokhara, Nepal. *Int J Med Health Sci*. 3(4): 301-307.
- [28] Mohammadi N., Allami, A., and MalekMohamadi,R.(2011): Percutaneous exposure incidents in nurses Knowledge, practice and exposure to hepatitis B infection: Percutaneous exposure incidents in nurses. *Hepat Mon*; 11: 186-190.
- [29] Mbaisi, E., M., Ng'ang'a, Z., Wanzala, P., and Omolo, j. (2013): Prevalence and factors associated with percutaneous injuries and splash exposures among health-care workers in a provincial hospital, Kenya, 2010. *Pan Afr Med J*. 14(10):1-8. <https://doi.org/10.11604/pamj.2013.14.10.1373>.
- [30] Manyele, S., V., Ngonyani, H., A., M., and Eliakimu, E. (2008): The status of occupational safety among health serviceproviders in hospitals in Tanzania. *Tanzania Journal of Health Researc*. 10, (3): 159-165. <https://doi.org/10.4314/thrb.v10i3.14356>.
- [31] McGaw C., Tennant I., Harding, H., E., Cawich, S., O., Crandon, I., W., and Walters C.,A., (2012): Healthcare workers' attitudes to and compliance with infection control guidelines in the operating department at the University Hospital of the West Indies Jamaica, International Journal of Infection Control.8(3): 1-9. <https://doi.org/10.3396/ijic.v8i3.023.12>.
- [32] Maingi, S., M. (2015): Factors influencing compliance with hand hygiene guidelines among healthcare providers In Kenya: A Case of Embu Level Five Hospital, Embu County. Published Master. University of Nairobi. 1-71.
- [33] Mahmood, S., E., Verma, R., and Khan, M., B. (2015): Hand hygiene practices among nursing students: importance of improving current training programs. *Int J Community Med Public Health*. 2(4):466-471. <https://doi.org/10.18203/2394-6040.ijcmph20151031>.
- [34] Manuel, M., Daphnie, L., D'cunha, S., and Suresh, S. (2017): A study to assess the awareness regarding occupational health hazards among the employees in the laundry department of a selected hospital. *Muller Journal of Medical Sciences and Research*. 6 (1): 40-44. <https://doi.org/10.4103/0975-9727.146423>.
- [35] Occupational Safety and Health Administration (OSHA) (2013): Caring for our caregivers. Facts about hospital worker safety. Available from www.osha.gov/dsg/hospitals.
- [36] Peethala S., and Garapati,S.(2017):A study on assessment of safe injection practices among internees in government general hospital, Kakinada, Andhra Pradesh, India. *International Journal of Community Medicine and Public Health*. 4(11):4321-4325. <https://doi.org/10.18203/2394-6040.ijcmph20174852>.
- [37] Nazarko, L. (2009): Potential pitfalls in adherence to hand washing in the community, *British Journal of Community Nursing*. 14(2): 64-68. <https://doi.org/10.12968/bjcn.2009.14.2.38762>.
- [38] Sadoh, W., E., Fawole, A., O., Sadoh, A., E., Oladimeji, A., O., Sotiloye, O., S., (2006): Practice of universal precautions among healthcare workers. *Journal of the National Medical Association*. 98(5):722-726.
- [39] Solanky, P., Baria, H., Nerulkar, A., and Chavda, N. (2016): Knowledge and practice of universal precautions among nursing staff at a tertiary care hospital in South Gujarat, India. *Int J Community Med Public Health*. 3(9):2373-2376. <https://doi.org/10.18203/2394-6040.ijcmph20162890>.
- [40] Umar, A., G., and Aisha, A. (2017): Common occupational health hazards amongst Health care workers in a Tertiary Health Institution in Bida, North-central Nigeria. *International Journal of Biomedical Research*, 8(01):01-06.
- [41] Uchenna, A., P., Johnbull, O., S., Chinonye, E., E., Christopher, O., T., and Nonye, A., P. (2015): The knowledge, attitude, and practice of universal precaution among rural primary health care workers in enugu southeast Nigeria. *World Journal of Pharmacy and Pharmaceutical Sciences*. 4(9): 109-125
- [42] Vaz K., McGrowder D., Alexander-Lindo R., Gordon L., Brown, P., and Irving, R.(2010): Knowledge, awareness and compliance with universal precautions among health care workers at the University Hospital of the West Indies, Jamaica. *International Journal of occupational and environmental Medicine*.1 (4): 171-181.
- [43] Yassi, A., Lockhart, K., Copes, R., Kerr, M., Corbiere, M., Bryce, E., Patrick, D., Bigelow,P., and Saunders, S.(2007): Determinants of healthcare workers' compliance with infection control procedures. *Healthcare Quarterly*.10 (1): 44-52. <https://doi.org/10.12927/hcq.2007.18648>.
- [44] World health organization (2003). AIDE-MEMOIRE for a strategy to protect health workers from infection with blood borne viruses. www.injectionsafety.org and on the Safe Injection Global Network internet forum at sign@who.int.