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Knowledge and practices of hand hygiene among the health care providers of Jimma University Medical Center, Jimma, Oromia, Ethiopia

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ABSTRACT

Background: The term "nosocomial" refers to the connection between care and the subsequent emergence of infection. When a person enters a health care facility, he contacts nosocomial or hospital-acquired infections. They may happen in different areas of healthcare delivery system, such as in hospitals, long-term care facilities, and ambulatory setups, and may also emerge after discharge. To prevent this infection proper hand hygiene practice is one of the methods that play a vital role. *Objective:* The general goal of the present study is observe and evaluate the understanding the exercise of hand hygiene the various health care employees of Jimma University Medical Center. *Method:* Cross-sectional study design was conducted at Jimma University Medical Center among 375 health care providers which were available in the hospital were included in the study. For the data collection, pretested questionnaire was used for knowledge assessment, and a checklist was used for the practical assessment. *Result:* The study shows most 344 (91.7%) of the staff have good knowledge, 20(5.3%) have fair knowledge and 11(2.9%) have poor knowledge of hand hygiene practice. The study also shows from the 103(27.5%) noncompliant health care providers (HCW) 11(73.3%) have no training on hand hygiene and 92(25.6%) have training. *Conclusion:* Even though the knowledge on hand hygiene is good and exercising hand hygiene is adequate among the HCWs in JUMC. Continues training and updating posted general guidelines of hand hygiene is recommended.

Keywords: HCW Hand Hygiene, Health care providers, Nosocomial infections and CDC Center for disease control and prevention.

1. INTRODUCTION

Nosocomial or hospital-acquired infection is acquired by the person when he gets in the medical care facility (hospital). Nosocomial refers back to the affiliation among care and the following onset of infection, and are a significant problem throughout the world and are increasing (Saha, 2010;

Tietjen et al., 2005). In 1987, The Center for Disease Control and Prevention (CDC) evolved accepted precautions to assist guard each health care providers. In 1996, however, the CDC's Hospital Advisory Committee delivered the idea of precautions, which states that a single set of precautions be used for the care of all patients within side the health care setup irrespective of their presumed contamination status (O'Connell et al., 2004). Standard precautions integrate and expand the part of universal precautions into a typical of care designed to shield health care practitioners and patients from pathogens that may be unfold by blood or by the other body fluid, excretion, or secretion (Omolara Gbonjubola Uti et al., 2009).

Statement of the problem

Healthcare-associated infections (HAIs) are major public health issues in the world. According to a prevalence survey done in 55 hospitals in 14 developing countries, it was estimated that, at any point in time, over 1.4 million patients worldwide will have infectious complications from hospitals. Currently, this rate is expected to be higher because of emerging diseases and Covid 19 pandemic. HAIs are common healthcare problems of both advanced and under advanced countries although there is a big inequality of share of the burden. Developing countries have the bulk of the magnitude and result in the problem. It is estimated that, in developing countries of Africa, Latin America and Asia 5% to 10% of patients acquire one or more HAIs (Emori and Gaynes, 1993; Takahashi et al., 2009; Creedon, 2008).

Hand washing has been taken into practice as a sole and the most essential measures for decreasing the transmission of microorganisms and stopping contamination for greater than a hundred and fifty years. Equally well documented is the fact that good hand hygiene can avert the transmission of microorganisms and decrease the frequency of healthcare-associated infections. The continuing problem, however, is getting healthcare workers to follow recommended hand washing practices. In the US, hand washing compliance rates among healthcare workers range from only 25% to 50%, depending on the setting (i.e., better compliance in pediatric units than general medical services. Over the years, nurses and physicians have diligently studied and written about this problem. Numerous reports have documented the effectiveness of hand cleanse and other hand hygiene procedures and shown that hand cleanse and the uses of gloves are cost-effective ways to reduce infections.

Despite this, compliance remains poor and the problem of HAIs infections transmitted by healthcare workers continues to increase globally. Exercising hand cleanse is the main and most effective in preventing healthcare related infections and develops antimicrobial resistance. However, it has been shown that healthcare workers encounter difficulties in complying with hand hygiene indications at different levels (Ikuko Takahashi et al., 2009; Creedon, 2008). According to Suoud Jemal (2018) study demonstrated that only 43.2% of the nursing staff practices ample hand washing while 56.8% of them practice inadequate hand washing. As the appropriate hand hygiene practice has of paramount importance to prevent hospital acquired infections, it is important that all health care providers have sufficient expertise and exercise of hand hygiene. In JUMC so far, no research on expertise and exercise of hand hygiene was conducted. Therefore, present study is aimed at the following objectives.

Objectives

The general purpose of this study is to evaluate the knowledge and exercise of hand-hygiene among the health care workers of Jimma university medical Center.

Specific objective

1. To evaluate the understanding of health care providers of Jimma university medical Center on hand hygiene.
2. To determine the compliance to hand cleanse practice among the health care providers at Jimma university medical Center
3. To recognize factors connected with the health care workers of Jimma university medical Center compliance with hand hygiene practice.

2. METHODOLOGY

Study area and period

The study was undertaken from August to September 2021 in Jimma Medical Center, Jimma zone, Oromia regional state South West Ethiopia. Jimma town is found 345 km away from Addis Ababa. Average elevation is 1700m above sea level and has 12 kebeles. The total population of Jimma town is estimated to be 120,960 of whom 60,824 are men and 60,136 women

Study design

Cross-sectional study design was employed to rate the knowledge and exercise of hand cleanse among health care givers in JUMC

Population.

Source population

Target population for this study is all health care givers of Jimma university medical Center.

Study population

Sampled healthcare workers working in Jimma Medical Center will be the study population

Study variables

Independent variables

Age category

Sex

Profession

Year of service

Dependent variables

Understanding of hand Cleanse

Exercise of hand cleanse

Compliance of hand hygiene

Inclusion criteria

Health care providers working at Jimma Medical Center present at the time of study period.

Exclusion criteria

Following group of people was excluded: Non-medical workers such as Porters, Biomedical, Guards, Accountant, Administrative Workers, Clerical Workers, Drivers, and Medical Waste Handlers working in Jimma Medical center.

Sample size

The sample size is determined based on single population formula by considering the following assumption;

Assumption- a 95% confidence level margining error (0.05) proportion of hand washing practice among health care givers in Ethiopia (p=57.8%) is substituted in the following single population section formula.

$$n = \frac{(z\alpha/2)2\, p(1-p)}{d2}$$

$$= \frac{1.96^2\ 0.578(1-0.578)}{(0.05)2}$$

$$= 375$$

Where n=required sample size

Z=is the critical value for normal distribution at 95% confidence level which equals to 1.96 (z value at a=0.05).

P= proportion of hand washing practice among health care givers in Ethiopia (p=57.8%); (16)

D= 0.05(5% margin of error) and 10% non-response rate

Since my N is less than 10,000, population correction formula used to determine final sample size by using the following formula:

$$NF = \frac{n}{1+(n|N)}$$

Where NF is my final no of respondents, and N is total no of respondents, which is 2502

$$\frac{375}{1+(375|2502)} = 326$$

By adding ten percent of non-response rate on the above figure (326) the sample size will be, $\frac{10}{100} \times 326 = 32.6$, 32.6+ 326≅359

Sampling techniques

Stratified random sampling was used; there are 28 anesthetists, 1492 doctors, 688 nurses and midwives, 141 laboratory technicians, 138 pharmacists, 15 radiologists. With proportionate Stratified sampling calculation

(N/2502) x 375 N= Number of HCWs in a specific field

(28/2502) x375 = 4 anesthetists

(1492/2502) x 375 = 223 doctors

(688/2502) x 375 = 103 nurses and midwives

(141/2502) x 375 = 21 laboratory technicians

(138/2502) x 375 = 20 pharmacists

(15/2502) x 375= 2 radiologists will be enrolled in this study.

Data collection procedure and tools

An organized self-administered pre-tested questionnaire was administered for knowledge assessment and check list was used for observation of hand hygiene practice.

Quality control

Pretest

The data collection tool was pre-tested two days before launching the final data collection on 5 percent of the target population and necessary changes were made. These 5% individuals were excluded.

Reliability and validity of data

The sureness of the data was maintained to maximum possible. To make certain the reliability and validity of data specialists at the concern matter were contacted and the questionnaire was examined to get the desired variables. Further, the interveners were not permitted to take home the questionnaires so that no testimonial will be used and intervener's actual knowledge at the time of the study was assessed to avoid bias.

Data analysis and presentation

The required data was categorized and recorded. The data was compiled and the variables were calculated and analyzed using manual hand calculators and Microsoft Excel. After analysis the results was presented in tabular, figures or graphic forms.

Operational definition

Adequate understanding about the topic to which the person reacts is termed as knowledge, evidenced by earning scores of 75% or more in the questions provided regarding respective topic.

Good Knowledge: Earning Score of 75% and above on the proficiency questions.

Fair knowledge: Earning 50-75% on knowledge questions.

Poor knowledge: Earning score less than 50% on the proficiency questions.

Practice is defined as to perform (a particular activity or custom) regularly in order to acquire, improve or maintain proficiency in it.

Adequate practice: Earning score of 75 and more on the practice questions.

Inadequate practice: Earning score less than 50 on the practice questions.

3. RESULTS

From the sample size 195 (52%) of the HCWs are males and 180 (48%) are females. Majority 253 (67.5%) of them are in the age group of <30 years. About 225 (60%) of the respondents are Medical Doctors by profession and 257 (68.5%) of the respondents have less than 5 years of service (table 1). From the figure 1, most (78.2%) of the JUMC HCWs have fair knowledge of hand cleanse. About 13.6% have fair knowledge and 8.6% have fair knowledge of hand cleanse.

Table 1 Socio demographic characteristics of HCWs in JUMC

Socio demographic characteristics	Frequency	Percent
Sex		
Male	195	52
Female	180	48
Profession		
MD	225	60
Nurse/Midwifes	103	27.5
Laboratory Technologist/technician	21	5.6
Pharmacist/pharmacy technician	20	5.3
Anesthetist/Anesthesiologist	4	1.1
Radiologist	2	0.5
Age category:		
<30 Years	253	67.5
≥30 Years	122	32.5
Service year: <5	257	68.5
5-10	101	27
Above 10	17	4.5

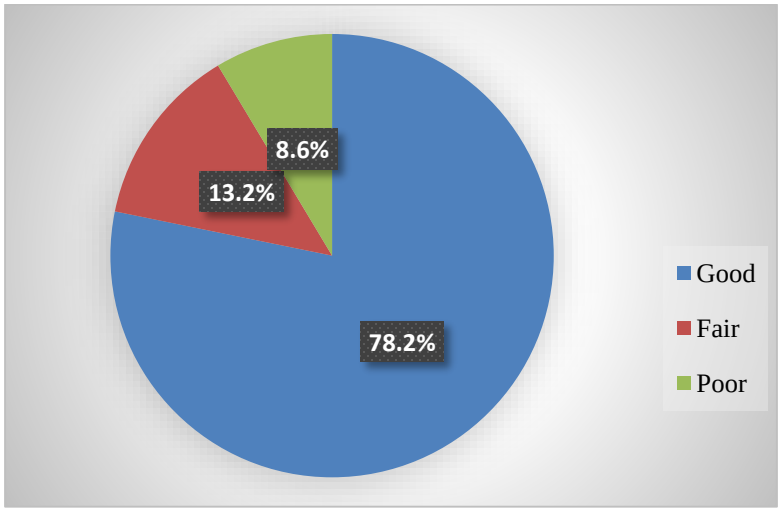

Figure 1 Understanding of hand cleanse of health care providers in JUMC

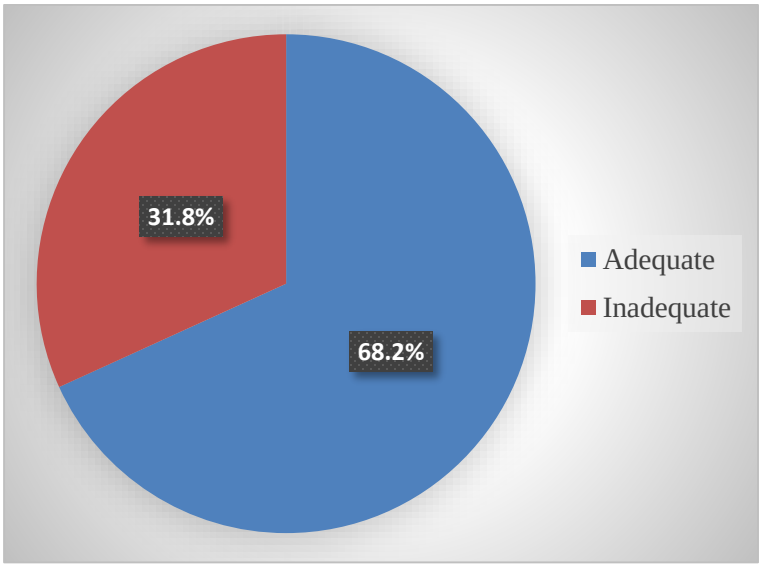

Figure 2 Hand hygiene exercise of health care giver in JUMC, 2021.

The figure 2 shows that most 68.2% of the JUMCHCWs have adequate hand hygiene practice and 31.8% have inadequate hand hygiene practice. Table 2 shows that 359 (95.7%) of JUMC HCG have been given training on hand cleanse and 16 (4.3%) have given no training on hand hygiene. Table 3 shows that year of service and age has statistical association with awareness of hand cleanse whereas sex, profession and have no statistical association with awareness of hand cleanse.

Table 2 Frequency of training of hand hygiene given for HCWs of JUMC

Professionals Trained on Hand Hygiene	Frequency	Percentage
Yes	360	96
No	15	4

Table 3 Cross tabulation of Socio demographic characteristics and knowledge of hand hygiene of the study subjects in JUMC

Socio demographic characteristics	Awareness of hand hygiene			PV
	Good	Fair	Poor	
	No (percentage)	No (%)	No (percentage)	
Sex: Male Female	181(92.8) 163(2.8)	8(4.1) 12(6.7)	6(3.1) 5(2.8)	0.634
Age category: <30 Years ≥30 Years	232(92.1) 112(91.1)	15(6) 5(4.1)	5(2) 11(2.9)	0.046
Profession MD Nurse/Midwifes Laboratory Technologist/technician Pharmacist Anesthetist/Anesthesiologist Radiologist	 224 (99.6) 93 (90.3) 21(100) 1(5) 4(100) 1(50)	 1(.4) 10(9.7) 0 8(40) 0 1(50)	 0 0 0 11(55) 0 0	0.558
Year of service: <5 5-10 Above 10	257(93.8) 101(89.1) 17(76.5%)	241(5.1) 90(4.0) 13(17.6%)	13(1.2) 4(6.9) 3(5.9%)	.003

Table 4 cross tabulation of knowledge and training of hand cleanse among health staff of JUMC

Training	Awareness of hand cleanse			Total	PV=0.000
	Good	Fair	Poor		
	No (%)	No (%)	No (%)	No (%)	
Yes	340(94.4)	16(4.4)	4(1.1)	360(96)	
No	7(46.7%)	4(26.7%)	4(46.7%)	15(4)	
Total	344(91.7)	20(5.3)	11(2.9)	375(100)	

Table 4 shows most 15(4%) of the interviewee are not given training on hand hygiene of which 7(46.7%) have good knowledge, 4(26.7%) have fair knowledge and 4(46.7%) have poor knowledge on hand hygiene. About 360(96%) of the interviewee are given training on hand hygiene of which 340(94.4%) of them have good knowledge, 16(4.4%) have fair knowledge and 4(1.1%) of them has poor awareness on hand hygiene. Awareness has statistical association with training (p=0.000).

Table 5 Cross tabulation of Socio demographic characteristics and practice of hand cleanse of the study subjects in JUMC

Socio demographic characteristics	Exercise of hand hygiene		PV
	Adequate	Inadequate	
Sex: Male	181(92.8%)	14(7.2%)	.428
Female	163(90.6%)	17(9.4%)	

Age category: <30 Years	232(92.1%)	20(7.9%)	.740
≥30 Years	112(91.1%)	11(8.9%)	
Profession	224(99.6%)	1(0.4%)	.000
MD	93(90.3%)	10(9.7%)	
Nurse/Midwifes	21(100.0%)	0(0.0%)	
Laboratory Technologist /technician	1(5.0%)	19(95.0%)	
Pharmacist	4(100.0%)	0(0.0%)	
Anesthetist/Anesthesiologist Radiologist	1(50.0%)	1(50.0%)	
Year of service: <5	241(93.8%)	16(6.2%)	.009
5-10	90(89.1%)	11(10.9%)	
Above 10	13(76.5%)	4(23.5%)	

From the table 5 most 31(8.3%) HCWS have inadequate hand hygiene exercise of which 19(95.0%) are Pharmacist's and 10(9.7%) are Nurse/Midwifes and out of which 4(23.5%) are those with year of service above 10 years. profession and year of service has association with exercise of hand cleanse (PV=.000 and .009 respectively) while Sex and age category has no association with practice of hand hygiene (PV=0.428 and 0.740).

Table 6 Cross tabulation of exercise of hand hygiene and training on subject matter among HCWs of JUMC.

Training on hand hygiene	Exercise of hand hygiene		Total	PV
	Adequate	Inadequate		
	No (percentage)	No (%)	No (percentage)	
Yes	340(94.4%)	20(5.6%)	360(96.0%)	0.000
No	4(26.7%)	11(73.3%)	15(4.0%)	
Total	344(91.7%)	31(8.3%)	375(100.0%)	

Table 6 shows about 344 (91.7%) of the respondents have adequate exercise on hand hygiene, of which 340 (94.4%) are given training and 4 (26.7%) have no training on hand hygiene. Also, it shows that practice has strong association with training (PV=0.000). Table 7 shows that compliance to recommend exercise of hand washing has association with age, year of service and profession while sex has no association.

Table 7 Cross tabulation of Socio demographic characteristics and compliance to recommended hand hygiene exercise of the study subjects in JUMC, 021.

Socio demographic characteristics	Compliance to recommended hand hygiene exercise		PV
	Complied	Not complied	
Sex: Male	154(79.0%)	41(21.0%	.150
Female	118(65.6%)	62(34.4%)	
Age category: <30 Years	183(72.6%)	69(27.4%)	.004
≥30 Years	89(72.4%)	34(27.6%)	
Profession	214(95.1%)	11(4.9%)	.000
MD	33(32%)	70(68%)	
Nurse/Midwifes	21(100.0%)	0(0.0%)	
Laboratory Technologist/technician	0(0.0%)	20(100.0%)	
Pharmacist	4(100.0%)	0(0.0%)	
Anesthetist/Anesthesiologist Radiologist	0(0.0%)	2(100.0%)	
Year of service: <5	200(77.8%)	57(22.2%)	.000
5-10	65(64.4%)	36(35.6%)	
Above 10	7(41.2%)	10(58.8%)	

Table 8 Cross tabulation of compliance and training of hand cleanse among health professionals of JUMC, 2021.

Training on hand hygiene	Compliance to recommended hand hygiene practice		Total	
	Complied	Not complied		
	No (Percentage)	No (%)	No (Percentage)	PV=0.000
Yes	268(74.4)	92(25.6)	360(96)	
No	4(26.7)	11(73.3)	15(4)	
Total	272(72.5)	103(27.5)	375(100)	

Table 8 shows from the 103 (27.5%) noncompliant HCWs, 11 (73.3%) have no training on hand cleanse and 92 (25.6%) have training According to the present study, compliance to recommended hand hygiene. From the figure 3 most 85.9% of the respondent's wash their hands, while about 14.1% of respondents don't wash.

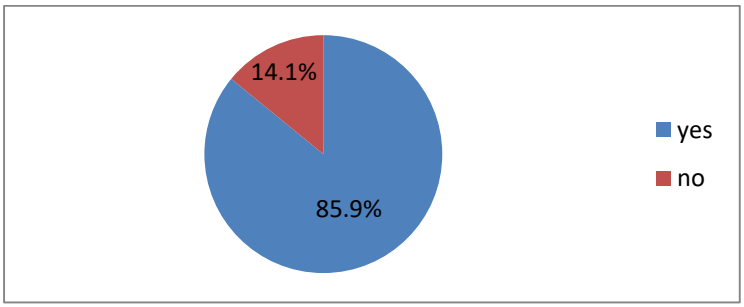

Figure 3 Frequency of hand cleaning among JUMC HCWs during their health care, 2021

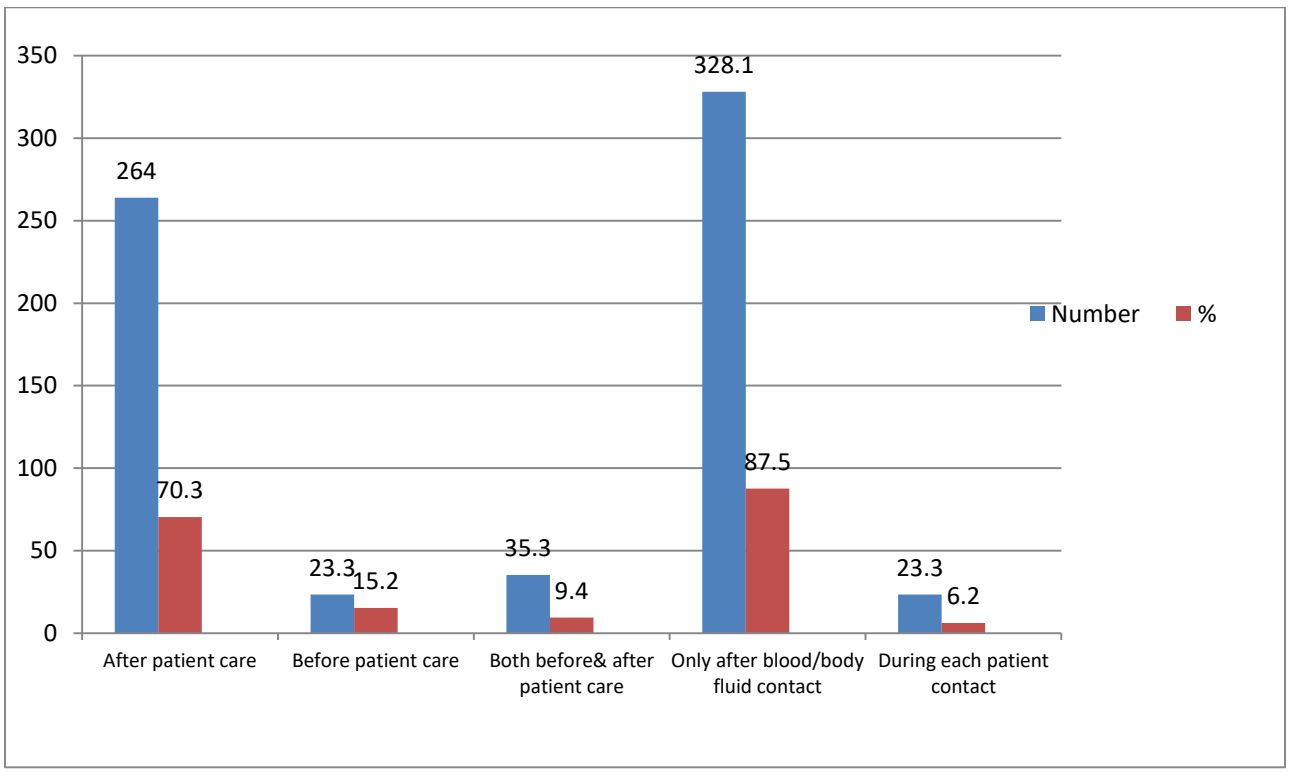

Figure 4 Time of hand cleaning of JUMC HCWs during their patient care, 2021.

The figure 4 shows most 87.5% of the JUMCHCWs wash their hand only after blood/body fluid contact and only a few 6.2% wash their hand prior to and during each patient contact. From the figure 5 the most reason not to wash hand among JUMCHCWs is lack of supply 73.8% followed by forgetfulness 60.9%. Regarding common antiseptic used, alcohol is the most 27 (77.1%) commonly used by JUMC HCWs (figure 6).

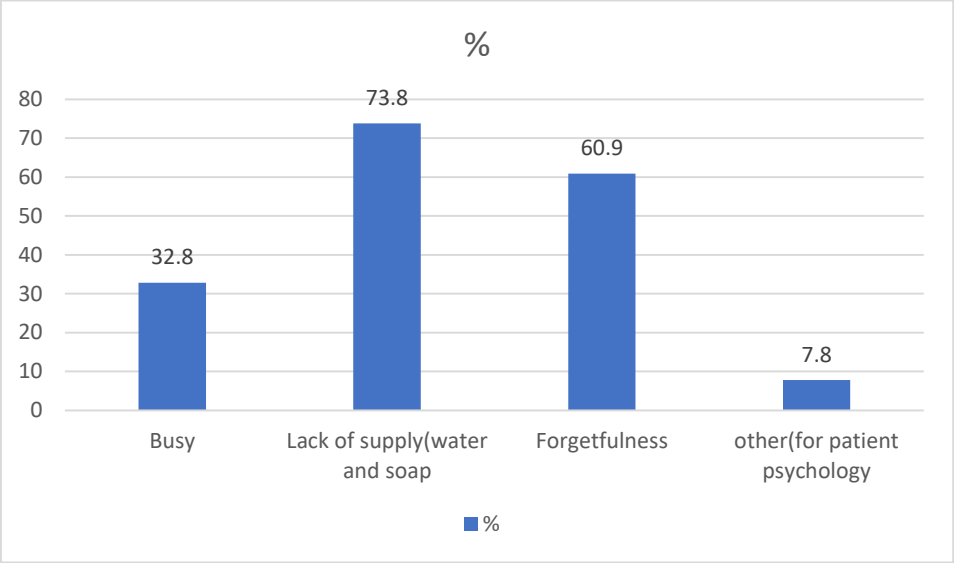

Figure 5 Reason not to wash hand among HCWs of JUMC, 2021.

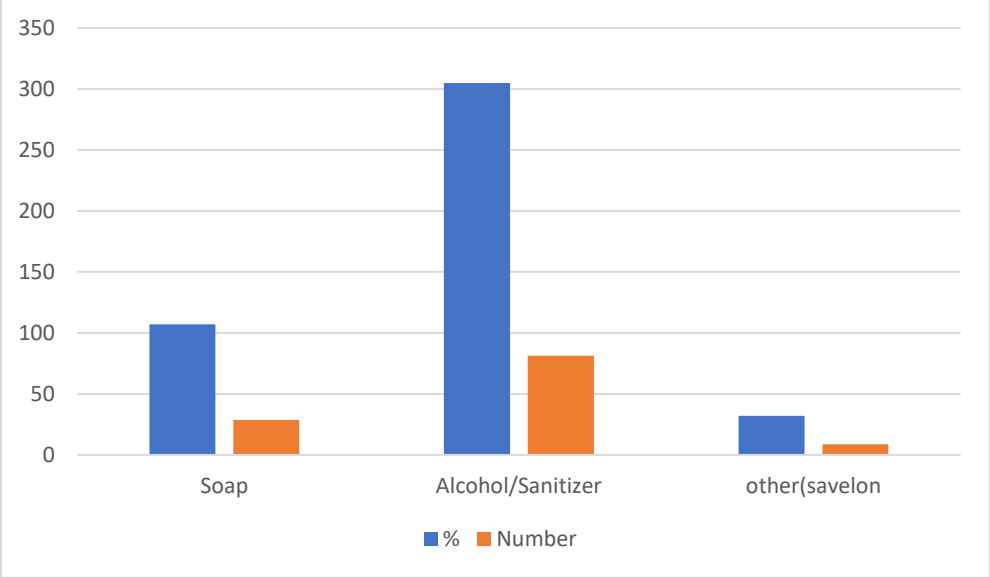

Figure 6 Common antiseptic used among JUMC HCWs, 2021.

4. DISCUSSION

Present study was done in JUMC to assess the knowledge and exercise of hand hygiene of health care givers. The hospital has 2502 health care givers of which a sample size of 375 was taken and majority 1493(60%) are Medical Doctors. About 195 (52%) of the interviewee are males and 180 (42%) are females. About 253 (67.5%) of the interviewee are in the age bracket of <30 and 257 (68.5%) have <5 years of service (Table 1-8, Figure 1-6). Hand cleanse is the lone and most effective infection-control behavior that stops the spread of infection (Legese and Hurissa, 2016; Jenkins and Barker, 1990; Gedamua et al., 2011). However, this simple behavior remains stubbornly difficult to rise to acceptable levels nationally (Creedon, et al., 2008; Creedon, 2005; Naing et al., 2001; Boyce and Didier, 2002; Dineen, 1966). Regarding understanding of hand cleanse, the study shows most 344 (91.7%) of the staff have good knowledge, 20(5.3%) have fair knowledge and 11(2.9%) have poor understanding of hand cleanse. Study also shows understanding of hand cleanse has association with age category and year of service, but has no association with sex, profession.

From the study, most 344 (91.7%) of HCWS have adequate hand hygiene exercise, of which 181(92.8%) are males and 163 (90.6%) are females. profession and year of service has association with exercise of hand hygiene (PV=.000 and .009 respectively) while Sex and age category has no association with exercise of hand hygiene (PV=0.428 and 0.740) (Table 1-8, Figure 1-6). Number of underlying factors appears to affect healthcare provider's compliance with hand-hygiene guidelines. Insight of and motivation

for compliance with guidance varies between different professions. Study shows that nurses have a higher acquiescence rate than doctors (Randle et al., 2006; Eckmanns et al., 2006) identified the highest rate of hand-hygiene acquiescence. This study also shows that acquiescence with hand cleanse recommendations has association with profession (PV=0.000).

Research done in four hospitals in Ireland shows males (irrespective of discipline) has less compliance than women (Creedon, 2008). This study shows that males have more compliance rate than females: 77 vs. 51. Pittet et al., (1999) advocated non-compliance was higher before high-risk procedures, while found that full acquiescence with hand hygiene when care activity posed an excessive risk of cross-infection was below par. This study shows compliance decreases with year of services (<5-year compliance rate 77.8%), 5-10 acquiescence rate 64.4%, Above 10 compliance rate 41.2%. This possibility is due to high ignorance of hand hygiene importance among those having many years of service. Training is one of factors that can affect the compliance of hand hygiene, as trained HCWs got initiation, refresh their skill and learn more on the importance of compliance to hand hygiene. This study supports this issue as in the study subjects; compliance has strong association with training (PV 0.000). Hand-hygiene behavior was measured by product usage (soap).

The Geneva program (Pittet et al., 2000) reported a sustained surge in hand hygiene and reduced infection rates encompassed a number of interventions likely to affect hand-hygiene behavior, for example provision of alcohol hand rub, posters and feedback on practice. However, the effective component may have been support from high-level administrators and clinicians, which led healthcare workers to actively identify with, and participate in, optimal hand-hygiene behavior. Hand washing is sole components of hand cleanse practice, and it is the simplest and cost-effective means of reduction of health facility acquired infection (Suoud Jemal, 2018) in his study demonstrated that only 43.2% of the nursing staff practices ample hand washing while 56.8% of them practice inadequate hand washing. In this study 91.7% of the HCWs have adequate hand hygiene practice.

5. CONCLUSION

In this research the sample size taken most of the HCW are male in sex and Medical Doctors in profession. Understanding of hand cleanse exercise of HCWs of JUMC is generally good hand cleanse exercise and compliance to recommend hand cleanse exercise of the hospital HCWs is good. Majority of the HCW have had training on hand hygiene practice in the past 23 month due to covid 19 pandemic. Training is important for both hand hygiene practice and compliance to recommended hand hygiene practice. This study shows compliance decreases with year of services. Exercise of hand washing of HCWs of JUMC is good. Alcohol and sanitizers is the commonly used antiseptic in that hospital.

Ethical consideration

Ethical clearance was obtained from the ERB of Jimma University Institute of Health, School of Medicine. Ethical Clearance Letter Number: Med/2120/13/JU. Informed consents were secured from each participant by explaining the purposes and the importance of the study. Respondents have the right to refuse or withdraw from participation at any time. Confidentiality of information collected from each study participant was maintained.

Acknowledgement

We are thankful to our patients who participated and contributed the sample to the study, department of internal medicine and department of physiotherapy, its staff and all colleagues, at Jimma University, Ethiopia, for helping in carrying out this research to a fruitful outcome.

Authors' contributions

This work was carried out in collaboration among the authors. All the authors played a key role in carrying out the study to a fruitful outcome. Ethical approval, implementation of the research, and data collection were done by the first author. Study design, data analysis, and interpretation with proof reading were done by the second author. Second author and third author also contributed in conceptualization of the research, revisions of the article and final approval of the version to be published.

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Conflicts of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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