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Assessment of Knowledge, Attitude and Practice of Hand Hygiene among Health Care Workers in Arar City, Saudi Arabia

Rawan Deham I Aledeilah[1], Nagah Mohamed Abo el-Fetoh[2], AmnahFarhan Albaker[3], Alaa Ahmed Aljabbab[4], Sarah Jamal Alkhannani[3], Saja Jamal alkhannani[5], Tasneem Saeed Almahroos[3], Abdalla Mohamed Bakr Ali[6]

[1] Primary Health Care Center, Arar, KSA.[2]Family and Community Medicine Department, Faculty of Medicine, Sohag University, Egypt &Northern Border University, Arar, KSA, [3] Primary Health Care Center, Riyadh, [4]Arar Central Hospital, Arar, [5]Faculty of Medicine, Northern Border University, Arar, KSA,[6]Faculty of Medicine, Sohag University, EGYPT

ABSTRACT

Background: Hand hygiene before and after each contact with any patient, is simple, easily implemented and an effective practice to prevent hospital acquired infection.This study **aimed** to assess the knowledge, attitude and practice of hand washing among health care workers (HCW) in health care units in Arar city, Northern Saudi Arabia, based on WHO's 'Five Moments of Hand Hygiene Questionnaire'. **Methodology:** A descriptive cross sectional study was carried out at health care unites in Arar city during the period from July to September 2017. The World Health Organization (WHO) "Hand Hygiene Knowledge Questionnaire"- revised 2009 edition was used. Results: In total, 116 respondents including 32 residents, 92 nurses and 37 nursing assistants enrolled in this study,68% of them were females and 32% were males, 41% were resident, 32.8% nurses, 12.9% Nursing assistant and 12.9% Technician. The mean score of HH knowledge in residents technicians, nurses and nurse assistants was 18 (±1.8), 17.7(±1.7), 18.3(±1.2) and 18.1(±1.4) respectively. While the mean score of attitude was the highest in nurses 6.9(±1.17) then the technicians 6.8(±1.6), and the lowest score was found in the nursing assistants 6.2(±0.56). The mean score of practice was found to be 4(±1.6) in technicians, 3.9(±1.0) in nurses, 3.8(±0.9) in residents and 3.5(±0.6) in nurse assistants. The majority of the participants (90.5%) had a high level of knowledge of HH. The attitude level was found moderate in 81.9% and high in only 17.2%. Level of practice of HH was high in 23.3%, moderate in 75.9% and almost none of our participants was found with a low level of practice. **Conclusion:** This study highlighted the importance of applying the multimodal training program addressing providers' knowledge regarding hand hygiene, as well as strategies for emotional and behavioral methods such as patient engagement in hand-hygiene interventions.

Keywords: Hand hygiene; Infection, Health care workers; Knowledge; Attitude; Practice; Arar; Northern Saudi Arabia

INTRODUCTION

Healthcare workers have been identified as the most common vehicle for transmission of most nosocomial infections (health care associated infections) from patient to patient and within the healthcare environment [1]. These infections can be life-threatening and difficult to treat. Health care-associated infections can be received from infected or draining wounds, frequently colonized areas of the intact patients' skin, patients' gowns, bed linen, bedside furniture and other objects in the immediate environment of the patient.

It has long been known that Practicing hand hygiene (HH), either washing the hands with water and soap or using alcohol-based hand rub is the most effective way of preventing the spread of infectious diseases [2]. Hand hygiene is simple, easily implemented and an effective practice that can reduce the risk of infection [3]. Proper hand hygiene before and after each contact with any patient is an important measure to prevent Hickman catheter-related infection (HCRI) in cancer patients [4]. Health care related infection is estimated to affect 10% of patients in developed countries, and 25% in developing countries [5]. The reasons for low levels of practice of hand hygiene have not been defined in developing countries probably due to limited observation and studies on hand hygiene [6]. **Wisniewski *et al.*** [7], stated that lack of awareness and knowledge among health care workers as regard the importance, techniques, methods and quality of hand hygiene considered the main factors that contribute to non-compliance to Hand Washing among health care workers. Hand hygiene also is an effective and cost-efficient way to reduce the number of microorganisms, thereby reducing the rate of transfer of microorganisms to hospitalized patients and this will reduce the number of HCRI [8].

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Although health care related infections is a major threat to patients' health and safety, it is highly preventable by proper hand hygiene (HH) [9]. Health care workers, especially nurses and physicians, have the most physical contact with patients, and thus they are the primary vector for infection transmission within hospitals.

Any healthcare worker, who is involved in patient care directly or indirectly, should be aware of HH importance and also be able to carry out HH properly [10]. Assessing the knowledge, practices and attitudes for health care workers may also help in recognizing the factors that affect their compliance with HH, as it is still low [11]. Improved levels of knowledge, attitude and compliance with hand washing is usually associated with a significant decrease in overall rates of nosocomial infection and respiratory infections in particular [12].

Objectives

To assess the knowledge, attitude and practice of hand washing among health care workers (HCW) in health care units in Arar city, Northern Saudi Arabia, based on WHO's 'Five Moments of Hand Hand Questionnaire'.

METHODOLOGY

A descriptive cross sectional study was carried out at health care unites in Arar city; northern borders Saudi Arabia during the period from July to September 2017. One hundred and sixteen HCW were sampled and were observed to assess the practices of hand hygiene using the standard tool of WHO. A self-administered questionnaire was used for the assessment of knowledge, practices and attitudes regarding hand hygiene.

Data Collection

The World Health Organization (WHO) "Hand Hygiene Knowledge Questionnaire"- revised 2009 edition was used for collecting data in this study. The questionnaire contained questions on the participants' age, gender, profession, year of the course, formal training in HH and other multiple choice and "yes" or "no" questions to assess HH knowledge, Attitude and practice were assessed using another self-structured questionnaire which consists of 10 and 6 questions, respectively.

Ethical considerations

Data collector gave a brief written introduction to the participants by explaining the aims and benefits of the study. Anonymity and confidentiality of data were maintained throughout the study. There was no conflict of interest. **The study was done after approval of ethical board of Northern Border university.**

Statistical Analysis

We utilized the Statistical Package for Social Sciences (SPSS Inc., Chicago, IL, USA) version 16 to analyze the study data. Results were displayed as counts and percentages.The chi square and independent sample t tests was used as a tests of significance, and differences were considered significant at P value less than 0.05.

RESULTS

Table (1) describes the studied population, it's found that 68% of them were females and 32% were males and their age range from 26-39 years. Most of participants (41%) were resident, 37% of them worked in the outpatient clinics and 46% of them had experience for 1 year.

Table (2) shows HH levels of knowledge by answering some questions. Firstly; causes of contamination with increased likelihood of colonization of hands. 98% of studied population especially nurse and nursing assistant agree on that linens and utensils could be source of infection and as it's known that bathrooms are one of main source of infection, only 1.7 of studied population don't agree on that.

93% of nurse assistant agree on that wear jewelry and accessories are source of infection, Nail extension or artificial nails and Injuries or scratches in the hands are source of infection and all technician and nursing assistant agree on that. Secondly; statements on alcohol-based hand rub and hand washing with soap and water of the study participants, 92% of nurse and nursing assistant say that sterilization of hands with alcohol faster than washing with soap and water, when asked them if Sterilization using alcohol gives more dry hands than washing with soap and water all nursing assistant said "yes" and also they agree that Sterilization using alcohol is more effective in eliminating germs than washing with soap and water.

All technicians and nursing assistants prefer to wash hand with water and soap, followed by alcohol sterilization to obtain the best hand hygiene. It's found that 20 sec is the least time necessary to sterilize your hands with alcohol to eliminate most germs in your hands and 89% of nurse agrees on that. Finally; discus statements on indications of hand washing of the study participants. All of participant agree on washing or disinfecting the hands after touching the patient and wash or sterilize the hands immediately after

exposure to any secretions of the body of the patient and also they all agree on washing or disinfecting hands before preparation procedures. Washing or disinfecting the hands after touching the patient is important and all of nursing assistants agree on that. Technician an nursing assistants agree on the importance of wash or sterilize the hands immediately after exposure to any secretions of the body of the patient and washing or disinfecting hands before preparation procedures is very necessary and all of them agree on that.

Table (3) shows the attitude of participants regarding HH and statements on importance of hand hygiene of the study participants, all technician say that they have sufficient information about hand hygiene, 86% of nursing assistants have no emergencies or other considerations make it hard to comply with the rules of hand hygiene, when asked them if they think wearing a medical glove reduces the importance of sticking to the rules of hand hygiene 93% of nursing assistants said "No".

All nursing assistants complain that they feel resentful when others do not adhere to the rules of hand hygiene so 80% of them don't hesitate to advise others to abide by the rules of hand hygiene. It's found that all newly qualified staff of technician trained to comply with the rules of hand hygiene and there is no one of participant doesn't feel guilty about not following the rules of hand hygiene. 95% of resident considered that the rules of hand hygiene are easy and normal for them.

Table (4) shows the questions about the practice and adherence of participants to HH rules. Studies found that the resident, nurse and nursing assistants considered that hand hygiene is an important part of their business. When asked participants if the Infection Prevention Team have a positive impact on their hand hygiene all of nursing assistant said "yes". Most (66%) of nursing assistant can't attend hand hygiene sessions due to time pressure.

Table (5) shows that the mean score of HH knowledge in residents technicians, nurses and nurse assistants was 18 (±1.8), 17.7(±1.7), 18.3(±1.2) and 18.1(±1.4) respectively. While the mean score of attitude was the highest in nurses 6.9(±1.17) then the technicians 6.8(±1.6), and the lowest score was found in the nursing assistants 6.2(±0.56). The mean score of practice was found to be 4(±1.6) in technicians, 3.9(±1.0) in nurses, 3.8(±0.9) in residents and 3.5(±0.6) in nurse assistants.

Table (6) shows that the majority of the participants (90.5%) had a high level of knowledge of HH when the attitude levels was found moderate in 81.9% and high in only 17.2%. Level of practice of HH was high in 23.3%, moderate in 75.9% and almost none of our participants were found with a low level of practice.

Table (1): sex, age, job title, department and Experience period of the study participants, Arar, 2017

Sex	Frequency	Percent
Female	79	68.1
Male	37	31.9
Total	116	100.0
Mean (±SD) age of participants	**32.2±6.6**	
Job title		
Resident	48	41.4
Technician	15	12.9
Nursing assistant	15	12.9
Nurse	38	32.8
Total	116	100.0
Department		
Emergency	18	15.5
ICU	20	17.2
Outpatient clinics	43	37.1
Inpatient departments	35	30.2
Total	116	100.0
Experience		
< 1year	54	46.6
1-5 years	44	37.9
6-10years	18	15.5
Total	116	100.0

Table (2): HH knowledge of the study participants, Arar, 2017

Knowledge statements	Job title				Total (n=116)	P value
	Resident (n=48)	Technician (n=15)	Nursing assistant (n=15)	Nurse (n=38)		
Sources of infection could be linens and utensils						
Agree	47	14	15	38	114	0.372
	97.9%	93.3%	100.0%	100.0%	98.3%	
Sources of infection could be bathrooms and Bathrooms						
Agree	48	14	15	37	114	0.327
	100.0%	93.3%	100.0%	97.4%	98.3%	
Wear jewelry and accessories						
Agree	40	13	14	33	100	0.801
	83.3%	86.7%	93.3%	86.8%	86.2%	
Nail extension or artificial nails						
Agree	42	15	15	35	107	0.258
	87.5%	100.0%	100.0%	92.1%	92.2%	
Continuous use of skin creams on hands:						
Agree	39	11	13	27	90	0.538
	81.2%	73.3%	86.7%	71.1%	77.6%	
Injuries or scratches in the hands:						
Agree	43	15	15	36	109	0.309
	89.6%	100.0%	100.0%	94.7%	94.0%	
Is the sterilization of hands with alcohol faster than washing with soap and water:						
Yes	46	13	14	35	108	0.663
	95.8%	86.7%	93.3%	92.1%	93.1%	
Sterilization using alcohol gives more dry hands than washing with soap and water:						
Yes	46	13	15	35	109	0.407
	95.8%	86.7%	100.0%	92.1%	94.0%	
Sterilization using alcohol is more effective in eliminating germs than washing with soap and water:						
Yes	7	3	0	9	19	0.197
	14.6%	20.0%	.0%	23.7%	16.4%	
It is preferable to wash with water and soap, followed by alcohol sterilization to obtain the best hand hygiene:						
Yes	43	15	15	35	108	0.361
	89.6%	100.0%	100.0%	92.1%	93.1%	
What is the least time necessary to sterilize your hands with alcohol to eliminate most germs in your hands:						
1-5 minutes	8	5	3	3	19	0.179
	16.7%	33.3%	20.0%	7.9%	16.4%	
20 sec	38	9	10	34	91	
	79.2%	60.0%	66.7%	89.5%	78.4%	
< 15 sec	2	1	2	0	5	
	4.2%	6.7%	13.3%	.0%	4.3%	
Until it dry	0	0	0	1	1	
	.0%	.0%	.0%	2.6%	.9%	
Washing or disinfecting the hands after touching the patient:						
Agree	48	15	15	38	116	
	41.4%	12.9%	12.9%	32.8%	100.0%	
Wash or sterilize the hands immediately after exposure to any secretions of the body of the patient:						
Agree	48	15	15	38	116	
	41.4%	12.9%	12.9%	32.8%	100.0%	
Washing or disinfecting hands before preparation procedures:						
Agree	48	15	15	38	116	
	41.4%	12.9%	12.9%	32.8%	100.0%	

Washing or disinfecting the hands after exposure to the patient's surroundings:						
Agree	48	13	14	38	113	0.17
	42.5%	11.5%	12.4%	33.6%	100.0%	
No	0	2	1	0	3	
	.0%	66.7%	33.3%	.0%	100.0%	
Washing or disinfecting the hands after touching the patient:						
Agree	47	14	15	37	113	0.697
	97.9%	93.3%	100.0%	97.4%	97.4%	
Wash or sterilize the hands immediately after exposure to any secretions of the body of the patient:						
Agree	47	15	15	37	114	0.862
	97.9%	100.0%	100.0%	97.4%	98.3%	
Washing or disinfecting hands before preparation procedures:						
Agree	48	15	15	38	116	
	41.4%	12.9%	12.9%	32.8%	100.0%	
Washing or disinfecting the hands after exposure to the patient's surroundings:						
Agree	47	14	15	37	113	0.697
	97.9%	93.3%	100.0%	97.4%	97.4%	

Table (3): HH attitude among the study participants, Arar, 2017

Knowledge statements	Job title				Total	P value
	esident (n=48	Technician (n=15)	ursing assistant (n=15)	Nurse (n=38)	(n=116)	
Do you commit to the proper rules of hand hygiene all the time?						
Yes	47	13	15	35	110	0.225
	97.9%	86.7%	100.0%	92.1%	94.8%	
Do you have sufficient information about hand hygiene?						
Yes	47	15	14	37	113	0.697
	97.9%	100.0%	93.3%	97.4%	97.4%	
Do you sometimes have things that are most important for you to adhere to the rules of hand hygiene?						
Yes	8	6	1	10	25	0.103
	16.7%	40.0%	6.7%	26.3%	21.6%	
Do emergencies or other considerations make it hard for you to comply with the rules of hand hygiene?						
Yes	10	6	2	14	32	0.144
	20.8%	40.0%	13.3%	36.8%	27.6%	
Do you think wearing a medical glove reduces the importance of sticking to the rules of hand hygiene?						
Yes	6	5	1	12	24	0.047
	12.5%	33.3%	6.7%	31.6%	20.7%	
Do you feel resentful when others do not adhere to the rules of hand hygiene?						
Yes	45	13	15	37	110	0.325
	93.8%	86.7%	100.0%	97.4%	94.8%	
Do you hesitate to advise others to abide by the rules of hand hygiene?						
Yes	9	2	3	11	25	0.557
	18.8%	13.3%	20.0%	28.9%	21.6%	
Are newly qualified staff trained and trained to comply with the rules of hand hygiene?						
Yes	41	15	13	34	103	0.470
	85.4%	100.0%	86.7%	89.5%	88.8%	
Do you feel guilty about not following the rules of hand hygiene?						
Yes	48	14	15	38	115	0.079
	41.7%	12.2%	13.0%	33.0%	100.0%	
Is adherence to the rules of hand hygiene easy and normal for you?						
Yes	46	14	14	37	111	0.881
	95.8%	93.3%	93.3%	97.4%	95.7%	

Table (4): HH practice among the study participants, Arar, 2017

Knowledge statements	Job title				Total (n=116)	P value
	Resident (n=48)	Technician (n=15)	Nursing assistant (n=15)	Nurse (n=38)		
Do you sometimes not do the rules of cleaning your hands because you forgot?						
Yes	18	7	3	16	44	0.420
	37.5%	46.7%	20.0%	42.1%	37.9%	
Is hand hygiene an important part of your business?						
Yes	48	13	15	38	114	0.003
	100.0%	86.7%	100.0%	100.0%	98.3%	
Does the frequency of hand hygiene required makes it difficult for you to implement them whenever necessary?						
Yes	12	5	0	9	26	0.13
	25.0%	33.3%	.0%	23.7%	22.4%	
Does the Infection Prevention Team have a positive impact on your hand hygiene?						
Yes	39	14	15	32	100	0.245
	81.2%	93.3%	100.0%	84.2%	86.2%	
Does the infection-warning reminder remind you to do a clean hand?						
Yes	48	14	15	38	115	0.079
	100.0%	93.3%	100.0%	100.0%	99.1%	
Is it hard for you to attend hand hygiene sessions due to time pressure?						
Yes	19	7	5	18	49	0.763
	39.6%	46.7%	33.3%	47.4%	42.2%	

Table (5): Mean (±SD) score of HH knowledge, attitude and practice of the study participants, Arar, 2017

Knowledge statements	Job title				Total (n=116)
	Resident (n=48)	Technician (n=15)	Nursing assistant (n=15)	Nurse (n=38)	
Mean (±SD) score of knowledge	18 (±1.8)	17.7(±1.7)	18.3(±1.2)	18.1(±1.4)	18.0(±1.6)
Mean (±SD) score of attitude	6.3(±0.9)	6.8(±1.6)	6.2(±0.56)	6.9(±1.17)	6.6(±1.1)
Mean (±SD) score of practice	3.8(±0.9)	4(±1.6)	3.5(±0.6)	3.9(±1.0)	3.8(±1.05)

Table (6): Levels of Knowledge, attitude and practice of HH of the study participants, Arar, 2017

Levels of knowledge of HH	No.	%
High (>75%)	105	90.5
Moderate (50%-75%)	5	4.3
Low (<50%)	5	4.3
Levels of attitude of HH		
High (>75%)	20	17.2
Moderate (50%-75%)	95	81.9
Low (<50%)	1	.9
Levels of practice of HH		
High (>75%)	27	23.3
Moderate (50%-75%)	88	75.9
Low (<50%)	1	.9

DISCUSSION

Our total participants were 116, of a relatively young population with a mean age of 32.2±6.6 years, and the majority of them were between the ages of 20 and 39 years. A similar research was done in **Sokoto State, Nigeria** [13], using similar age group, in which the mean age was 32.1 ± 7.4 years and 81.2% of the participants were also between the ages of 20 and 39 years. It differs from another study conducted in Nigeria [14], in which majority of the respondents were aged 25 to 34 years with a mean age of 31.3 ± 6.8 years. While this compares well with the age distribution of respondents in another study conducted in Ghana, which reported a much younger population, with majority of respondents between the ages of 20 and 29 years [15]. The low mean age could be due to the fact that close to half of them (46.6%) were newly recruited and have spent less than one year, and 37.9% have spent less than 5 years in the service. In our study physicians, nurses, nursing assistants and technicians had almost the same rated knowledge, practice and attitude regarding HH. The same results were found in another study carried by by **Mu'taz M. Dreidi *et al.*** [16],. They found that both nurses and physicians had almost the same rated knowledge, practice and attitude about hand hygiene. Another study conducted by **Van de Mortel *et al.*** [17], showed that hand hygiene knowledge and practices were significantly higher in nursing students than among medical students. The level of knowledge in the present study was high (more than 75%) in 90.5% of the participants. This could be due to the fact that most of health care workers had some form of training on hand hygiene. This conclusion could be considered to be a positive contribution to our heath care workers. A similar study was done in **Raichur** [18] found a moderate levels of knowledge on hand hygiene in India. Another study done by **Azmeer** [21] reported that, majority of health care workers had a good knowledge (63.4%), while 33.7 had excellent knowledge on hand hygiene **Hosein *et al.*** [3] also reported a moderate knowledge of HH among his study group. In the current survey, the participants' level of attitude toward Hand Hygiene was moderate (50% to 75%) in 81.9%, and high (more than 75%) in 17.2% of the total participants. Also, there were wide areas where the level of attitude was low, particularly regarding infections that a health care worker can transmit to a patient [19].According to worldwide rates, adherence of HCWs to recommended hand hygiene procedures ranges from 5-89% [20].

Compliance with hand hygiene among the physician, nursing groups and technicians were almost similar in our study. Our findings revealed that more than 75% of the participants had a moderate level of practice and 23.3% had a high level. The mean score of practice of hand hygiene was nearly the same in all groups of health care workers. In contrast, **AbdElaziz and Bakr**[21] found that doctors showed a significantly higher compliance than other. While in Imam Hossein Hospital [22], the medical residents had poor hand hygiene practice, despite having a satisfactory level of knowledge and awareness about hand washing, which may be due to inadequate hygiene supervision in the hospital. Practice of hand hygiene among health care workers can be enhanced significantly through regular hand hygiene training and campaigns using posters and encouraging peers to remind health care workers of hand hygiene [23]. Continuous monitoring, observations and performance feedback of practicing of hand hygiene should be done. Also hand hygiene training sessions should be conducted more frequently for health care workers to encourage them to observe and follow up correct hand hygiene practices.

CONCLUSION

The present study was a cross-sectional study and has its own limitations. Our sample distribution was not uniform in the field of hospital units. The main cause was the difference of the staff numbers and also cooperation of the staff. The strength of the study was due to the assessing the knowledge, attitude and practice level of different occupations in the health care units with all participants.

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