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Hand hygiene beliefs and practices and five indications-oriented hand hygiene observation results among healthcare professionals: a retrospective study

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ABSTRACT

Aims: The present study attempted to retrospectively depict hand hygiene beliefs and practices and five indications-oriented hand hygiene observation results among physicians and nurses employed in the internal, surgical, emergency, and intensive care units of a district state hospital.

Methods: While the target population consists of healthcare professionals deployed in the internal, surgical, emergency, and intensive care units of a district hospital (n=426), we carried out this study with 122 nurses and 53 physicians (n=175). We collected the data using a demographic information form, the hand hygiene beliefs scale (HHBS), and hand hygiene practices inventory (HHPI).

Results: The findings revealed the participants' mean scores to be 93.05±13.08 on the HHBS (61.90±9.16 on the hand hygiene importance subscale and 27.22±5.33 on the hand hygiene beliefs subscale) and 67.96±5.07 on the HHPI. We also considered a total of 1.228 notes from hand hygiene observations. While 78.25% of these observations were found to comply with hand hygiene standards, 59.55% (n=159) of 267 observations regarding non-compliance with hygiene rules were realized to be linked with improper gloves use.

Conclusion: Overall, the participating healthcare professionals adopted firmer hand hygiene beliefs and practices, which may be thanks to the achievement of relevant in-service training and the effective planning of the infection control committee. Yet, most of the hygiene non-compliance could be attributed to improper gloves use.

Keywords: Hand hygiene, healthcare professionals, belief, observation, compliance

INTRODUCTION

Despite improvements in hospital healthcare services and health technologies, healthcare-associated infections continue to be among significant health problems worldwide. Indeed, they may engender functional disorders, emotional distress, reduced quality of life, morbidity, and mortality. Besides, they can be considered an alerting social problem since leading to prolonged hospitalization, job losses, increased drug use, and elevated healthcare expenditures due to extra diagnostic techniques used.[1] One may comply with hand hygiene practices and isolation measures as the most apparent practices to eliminate or reduce the risk of infection in healthcare settings.[2,3] The level of compliance with both isolation measures and hand hygiene among healthcare professionals also emerges as a critical factor in the prevention of healthcare-associated infections since it was previously reported that while pathogenic microorganisms are hosted on the hand surfaces of only 6% of healthy individuals, this rate rises up to 68% of healthcare professionals.[4] Hand hygiene is, therefore, the initial and essential step in infection control and hygiene practices.

Despite being a cheap and efficient method of infection control, previous research often reported poorer hand

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hygiene compliance among healthcare workers.[5,6] Yet, monitoring and feedback may contribute to healthcare professionals' compliance with hand hygiene. The World Health Organization (WHO) offers the observation technique as the most efficient way to directly measure healthcare professionals' compliance with hand hygiene rules. Moreover, it recommends that findings of compliance with hand hygiene indications (moments) will help provide feedback, inform the target audience about the indications, and improve the relevant personnel's hand hygiene knowledge.[7] Thus, the present study aimed to reveal selected healthcare professionals' hand hygiene compliance in different indications and to interpret the compliance findings by profession.

Healthcare services are provided through the collaborative efforts of professionals from diverse educational and medical backgrounds working within an organisation. The key feature of this multidisciplinary work is their joint efforts to enhance patient outcomes. In healthcare institutions, where patient improvement is the top priority, teamwork and cooperation are of paramount importance. Therefore, an analysis of hand hygiene practices across different professions would be informative.

METHODS

The present study attempted to retrospectively depict hand hygiene beliefs and practices and five indications-oriented hand hygiene observation results among healthcare professionals. While the target population consists of healthcare professionals (n=426) deployed in the internal, surgical, emergency, and intensive care units of a district hospital in Ankara, we carried out this study with 122 nurses and 53 physicians (n=175) between January 1 - December 31, 2022. We collected the data using a demographic information form, the hand hygiene beliefs scale (HHBS), and hand hygiene practices inventory (HHPI). The data collection tools were consolidated on one-to-one committee observation reports and Google Forms. The Scientific Researches and Publication Ethics Committee of Doğu Akdeniz University granted ethical approval to our study (Date: 27.01.2023, Decision No: ETK00-2023-0029), and we obtained institutional permission (E-69051143-774.01.01) from the Chief Physician Office of Kahramankazan State Hospital. All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Demographic Information Form

We designed this form to cover seven questions about the demographic characteristics of the participating healthcare professionals (i.e., age, gender, educational attainment, profession, the unit deployed, seniority in the profession, and seniority in the institution).

Hand Hygiene Beliefs Scale (HHBS)

The HHBS was developed by Thea van de Mortel and adapted into Turkish by Karadağ.[8,9] It consists of 22 items within two subscales: hand hygiene importance (items 1, 2, 3, 4, 6, 7, 9, 11, 12, 13, 14, 15, 21and 22) and hand hygiene beliefs (items 20, 19, 8, 5, 18, 10, 16, and 17). The items are scored on a five-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). One may obtain 22-110 points on the HHBS, and the scale offers no cut-off point. While the adaptation study calculated its internal consistency coefficient to be 0.80, we discovered it to be 0.75 in this study.

Hand Hygiene Practices Inventory (HHPI)

Karadağ also adapted the 15-item HHPI, designed by Thea van de Mortel, into Turkish. The items are scored on a five-point Likert-type scale ranging from 1 (Never) to 5 (Always). One may obtain 15-75 points on the HHPI, and the tool offers no cut-off point. Higher scores on the scale indicate one's higher compliance with hygiene practices. While Karadağ found Cronbach's alpha coefficient for the scale to be 0.85, we calculated it to be 0.77 in this study.

Hand Hygiene Observations

The infection control committee of our hospital performs observations every three months pertinent to healthcare professionals' hand hygiene practices in the working environment every three months. We categorized the mentioned observational data into five hand hygiene indications (moments) recommended by the WHO and, accordingly, explored hand hygiene attitudes and behaviors of the participating healthcare professionals.

Statistical Analysis

Initially, we calculated the internal consistency coefficients (Cronbach's alpha) of the measurement tools above. While continuous variables are expressed as means (*M*) ± standard deviations (*SD*) and minimum-maximum values, categorical variables are presented as numbers (n) and percentages (%). We display the participants' demographic characteristics as frequencies and descriptive statistics of their HHBS and HHPI scores. Then, we ran a Pearson correlation analysis to investigate the relationships between the participants' hand hygiene beliefs and practices. All analyses were performed on Statistical Package for Social Sciences (SPSS) 26.0, and a p-value of <0.05 was considered statistically significant.

RESULTS

Participants' Demographic Characteristics

The findings revealed that 72% of the participants were females, 69.7% were nurses, 44% had undergraduate education, and 27.4% held a doctorate degree. The mean age of the participants was calculated to be 37.8±9.6 years. While they had a mean professional seniority of 13.3±9.08 years, the mean seniority in the institution was found to be 7.8±7.06 years. About one-third (35.43%) of the participants were employed in the internal medicine department of the hospital (Table 1).

Table 1. Participants' demographic characteristics

		n	%
Gender	Female	126	72
	Male	49	28
Educational attainment	Associate degree and below	32	18.3
	Undergraduate	77	44
	Master's degree	18	10.3
	Doctorate degree	48	27.4
Profession	Nurse	122	69.7
	Physician	53	30.3
Unit deployed	Emergency	41	23.43
	Surgical medicine	59	33.71
	Internal medicine	62	35.43
	Intensive care	13	7.43
Seniority in profession (M±SD=13.3±9.08)	1-10 years	66	37.7
	11-20 years	74	42.3
	21 years and above	35	20
Seniority in the institution (M±SD=7.8±7.06)	1 year and below	57	32.56
	2-10 years	69	39.4
	10-20 years	47	26.89
	21 years and above	2	1.1
Mean age (years)	**M±SD**=37.8±9.6	**min.=22 - max.=63**	

Findings of the HHBS and the HHPI

The findings revealed the participants' mean scores as 93.05±13.08 on the HHBS (61.90±9.16 on the hand hygiene importance subscale and 27.22±5.33 on the hand hygiene beliefs subscale) and 67.96±5.07 on the HHPI. The participating physicians got a mean score of 85.43±11.55 on the HHBS (58.37±10.1 on the hand hygiene importance subscale and 24.58±3.98 on the hand hygiene beliefs subscale) and 66.71±6.92 on the HHPI. On the other hand, we found the nurses obtained a mean score of 96.36±12.3 on the HHBS (63.44±8.2 on the hand hygiene importance subscale and 28.37±5.45 on the hand hygiene beliefs subscale) and 68.5±3.92 on the HHPI (Table 2).

Correlations Between Hand Hygiene Beliefs and Practices

The findings revealed significant relationships between the participants' HHPI scores and their HHBS total and hand hygiene importance scores (p=0.000). Nevertheless, it was not the case for their HHBS hand hygiene beliefs scores (p=0.450) (Table 3).

Table 3. Correlations between hand hygiene beliefs and practices

		HHBS	HHBS Hand hygiene beliefs	HHBS Hand hygiene importance
HHPI	**r**	0.268	0.057	0.264
	p	0.000*	0.450*	0.000*

p<0.05

Analysis of Observations Pertinent to Hand Hygiene Compliance and Non-compliance

The infection control committee gathered the data regarding the observations of the healthcare professionals' compliance and non-compliance with hand hygiene rules (n=1228). Accordingly, 78.25% of the observations revealed the participants' compliance with hand hygiene standards. This rate was 79.3% among the nurses and 75.82% among the physicians. On the other hand, 59.55% (n=159) of 267 observations regarding hand hygiene non-compliance were attributed to improper gloves use. We found this rate to be 71.35% among the nurses and 35.96% among the physicians (Table 4).

Table 2. Participants' scores on the HHBS and the HHPI by profession

	HHBS		HHBS Hand Hygiene Beliefs		HHBS Hand Hygiene Importance		HHPI	
	M±SD	**min.- max.**	**M±SD**	**min.- max.**	**M±SD**	**min.- max.**	**M±SD**	**min.- max.**
Nurses	96.36 ±12.3	52-110	28.37±5.45	17-35	63.44±8.20	61.86±9.01	68.50±3.92	34-70
Physicians	85.43±11.55		24.58±3.98		58.37±10.1		66.71±6.92	
Total	93.05±13.08		27.22±5.33		61.90±9.16		67.96±5.07	
Cronbach's alpha	0.75						0.77	

Table 4. Analysis of observations hand hygiene compliance and Non-compliance

Profession	Number of observations pertinent to hand hygiene compliance and Non-compliance	Total observations	Hand hygiene compliance rate	Number of observations pertinent to hand hygiene Non-compliance	Number of gloves in hand hygiene Non-compliance	Attribution of hand hygiene Non-compliance to improper gloves use
Nurse	682	860	79.3	178	127	71.35
Physician	279	368	75.82	89	32	35.96
Total	**961**	**1228**	**78.25**	**267**	**159**	**59.55**

Hand Hygiene Compliance Rates by Five Indications (Moments)

We also analyzed the participants' hand hygiene observation results by five indications (moments) for hand hygiene (Table 5). Accordingly, the rates of positive observations related to hand hygiene compliance by the mentioned indications were found to be as follows (nurses and physicians, respectively): 69.44% (n=324) vs. 69.33% (n=163) before touching a patient; 79.52% (n=83) vs. 81.82% (n=55) before an aseptic procedure; 100% (n=182) vs. 93.94% (n=66) after a procedure or body fluid exposure risk; 87.97% (n=424) vs. 87.11% (n=225) after touching a patient; 83.64% (n=110) vs. 61.11% (n=18) after touching a patient's surroundings.

Table 5. Hand hygiene compliance rates by five indications

Indication		Nurse	Physician
Before touching a patient	**Compliant**	225	113
	Total	324	163
	Rate (%)	69.44	69.33
Before an aseptic procedure	**Compliant**	66	45
	Total	83	55
	Rate (%)	79.52	81.82
After a procedure or body fluid exposure risk	**Compliant**	182	62
	Total	182	66
	Rate (%)	100	93.94
After touching a patient	**Compliant**	373	196
	Total	424	225
	Rate (%)	87.97	87.11
After touching a patient's surroundings	**Compliant**	92	11
	Total	110	18
	Rate (%)	83.64	61.11

DISCUSSION

It is often emphasized that healthcare personnel exhibits insufficient hand hygiene compliance, although it was previously shown that it helps reduce nosocomial infections by about 50%. In this respect, the WHO recommends designating multifaceted strategies and national campaigns to promote hand hygiene compliance.[10] Our findings showed that the nurses had higher HHBS and HHPI scores than the physicians, albeit the difference was not statistically significant. In their study, Ataei et al.[11] discovered nurses had higher adaptation to hand hygiene compliance (8.4%) than physicians (3.8%), students (7.3%), and auxiliary staff (0.9%). Rosenthal et al.[12] investigated 62.626 patient contacts between 1998-2005 in Argentina, Brazil, Colombia, India, Mexico, Morocco, Peru, and Türkiye and concluded that nurses had the highest hand hygiene compliance among other healthcare professionals. Moreover, Azim et al.[13] found that nurses are likely to show 1.5 times more hand hygiene compliance than physicians despite having three times more contact with patients. Overlapping these findings, considering the hand hygiene compliance by five indications, the nurses achieved more hand hygiene compliance in 4 indications than the physicians.

Erasmus et al.[14] systematically reviewed 96 studies on hand hygiene compliance guidelines in patient care and discovered that healthcare professionals' hand hygiene compliance remained at 40%. Thus, they uttered a need for research and training to boost hand hygiene compliance among healthcare staff. In another study, Karabey et al.[15] reported the rate of handwashing among healthcare staff to be 12.9%. Our findings demonstrated the participating healthcare personnel's hand hygiene compliance rate to be 78.25%. The higher hand hygiene compliance rate in this study compared to other studies may be a positive consequence of periodic hand hygiene training by the hospital's infection control committee, practical training at the bedside, and visual materials on five hand hygiene indications in all units.

Toraman et al.[16] found hand hygiene compliance among the participating healthcare personnel was higher (81%) in the case of body fluid exposure risk. Similarly, we found hand hygiene compliance rates were high among the participating physicians (93.94%) and nurses (100%) in the case of body fluid exposure risk. There may be a greater tendency among healthcare professionals to wash hands in the case of an apparent or tangible risk of contamination since contact with body fluids may be considered a critical situation for

catching infections. On the other side, the low rate (61.1%) of hand hygiene compliance after touching a patient's surroundings may support the view that healthcare personnel may not perceive a need for washing hands in the case of an implicit or intangible risk of contamination. In the same vein, Demir et al.[17] reported that hand hygiene is ensured at least (0%) "after touching a patient's surroundings". Therefore, poor hand hygiene compliance in this indication may be considered an alarming issue in controlling nosocomial infections.

Given the hand hygiene observation results by the WHO-recommending five hand washing indications, we found hand hygiene compliance to be the most frequent in the case of body fluid exposure risk among both nurses and physicians. In their study, Koşucu et al.[18] discovered that the participants engaged in handwashing before aseptic procedures the most (80%), followed by body fluid exposure risk (71%). Artan and Türeyen asked their participants to rank the frequency of their hand hygiene compliance by the five handwashing indications. Accordingly, while the participants ranked washing hands before aseptic procedures first (68.8%), followed by body fluid exposure risk (33.1%), washing hands before touching a patient remained in the last place (65%).[19] Since we designed this study based on hygiene observations, it seems rather usual that self-report and practical behaviors differ in the order of importance of these indications. Thus, different from what has been reported in the literature so far, the observations showed that the participants had higher hygiene compliance rates in the case of body fluid exposure risk in daily practice than other handwashing indications. Our findings overlap with the idea that healthcare professionals are often more inclined to wash their hands and intuitively engage in self-protection in case of perceived contamination.

We also considered observations regarding non-compliance with hygiene rules. Accordingly, 59.55% (n=159) of 267 observations regarding non-compliance with hygiene rules were attributed to improper gloves use. We found this rate to be 71.35% among the nurses and 35.96% among the physicians. These findings may imply that gloves use may potentially distract healthcare professionals from applying routine hygiene procedures, which may highlight the importance of in-service training regarding hygiene procedures before and after gloves use.

Limitations

We could not reach the targeted sample size because carrying out this research in a single center with an insufficient number of healthcare professionals deployed in the units with a high workload. Hence, further research may be designed as a multicenter with a larger sample size to achieve more robust findings.

CONCLUSION

Undertaking a primary role in every step of healthcare, healthcare professionals also have responsibilities in preventing healthcare-associated infections. In our study, the participating nurses and physicians scored higher on the HHBS and HHPI, which may document greater adoption of hand hygiene beliefs and practices among healthcare staff. Yet, it should be noted that self-report and observational data may exhibit relative differences regarding the actual picture of hand hygiene behaviors, highlighting the significance of observational data. Overall, prospective researchers may consider scrutinizing the subjects on a larger sample with the help of observational data.

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ETHICAL DECLARATIONS

Ethics Committee Approval: The Scientific Research and Publication Ethics Committee of Doğu Akdeniz University granted ethical approval to our study (Date: 27.01.2023, Decision No: ETK00-2023-0029), and we obtained institutional permission (E-69051143-774.01.01) from the Chief Physician Office of Kahramankazan State Hospital.

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

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