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Original Article / Özgün Araştırma

Analysis of hand hygiene belief and practices of health care providers using the hand hygiene belief scale and the hand hygiene practices inventory

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Abstract

Objectives: Hand hygiene is vital importance to health-care-associated infections; however, hand hygiene compliance has not been still at acceptable levels. Behavior and psychological frameworks-based interventions is required to enhance compliance. In this context, the current study aimed to evaluate self-reported hand hygiene belief and practices of health care providers (HCPs) rather than observational data to increase hand hygiene compliance.

Methods: This study included 468 HCPs working at a university hospital and responded the Hand Hygiene Belief Scale (HBS) and the Hand Hygiene Practices Inventory (HHPI). The responses were scored and given the variables affecting the hand hygiene belief and practices of HCPs, the data were processed by SPSS (Statistical Package for the Social Sciences) IBM 22.0 computer program.

Results: Three hundred sixty-five women, 45 physicians and 271 nurses; (median age 37 years; IQR; 28.0-44.0) were included the study. The median HBS and HHPI scores were 87.00 (IQR 80.0-95.0) and 69.00 (IQR 66.0-70.0), respectively. A significant positive low correlation between the scores was detected ($r = 0.369$, $P < 0.001$). The physicians had significantly higher HBS scores, and those working in the ICUs had higher HBS scores.

Conclusion: In this study, although scored self-reported hand hygiene belief and practices of health-care providers were acceptable limits; there was a low correlation between the scores, which suggests that there are inconsistencies between behaviours and targeted attitudes. Adaptation to hand hygiene is a challenging and complicated process; to increase compliance further evaluation of individual factors should be meticulously considered.

Key words: Hand hygiene, compliance, beliefs, behaviours, self report

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El hijyeni inanç ölçeği ve el hijyeni uygulamaları envanteri kullanılarak sağlık hizmeti sunucularının el hijyeni inanç ve uygulamalarının analizi

Öz

Amaç: El hijyeni, sağlık hizmetiyle ilişkili enfeksiyonlar için hayati önem taşır; ancak el hijyeni uyumu halen kabul edilebilir seviyelerde değildir. Uyumu artırmak için davranışsal ve psikolojik çerçevelere dayalı müdahaleler gereklidir. Bu bağlamda, mevcut çalışma, el hijyeni uyumunu artırmak için gözlemsel verilerden ziyade, sağlık hizmeti sunucularının (SHS) öz bildirimlerine dayalı el hijyeni inanç ve uygulamalarını değerlendirmeyi amaçlamıştır.

Yöntemler: Bu çalışmaya bir üniversite hastanesinde çalışan ve El Hijyeni İnanç Ölçeği (EHİÖ) ve El Hijyeni Uygulamaları Envanteri'ni (EHUE) yanıtlayan 468 SHS dahil edildi. Cevaplar puanlandırıldı ve veriler SHS'larının el hijyeni inanç ve uygulamalarını etkileyen değişkenler göz önünde bulundurularak SPSS (Sosyal Bilimler için İstatistik Programı) IBM 22.0 bilgisayar programı kullanılarak değerlendirildi.

Bulgular: Üç yüz altmış beş kadın, 45 hekim ve 271 hemşire; (ortanca yaş 37; IQR; 28.0-44.0) çalışmaya dahil edildi. EHİÖ ve EHUE puanlarının ortanca değerleri sırasıyla 87.00 (IQR 80.0-95.0) ve 69.00 (IQR 66.0-70.0) idi. Puanlar arasında düşük düzeyde pozitif anlamlı bir ilişki tespit edildi ($r = 0.369$, $P < 0.001$). Hekimlerin EHİÖ puanları anlamlı olarak daha yüksekti ve yoğun bakım ünitelerinde çalışanlar daha yüksek EHİÖ puanlarına sahipti.

Sonuç: Bu çalışmada sağlık çalışanlarının öz bildirimlerine dayalı el hijyeni inanç ve uygulamaları puanları kabul edilebilir sınırlarda olsa da puanlar arasında düşük düzeyde bir ilişki vardı, bu da davranışlar ile hedeflenen tutumlar arasında tutarsızlıklar olduğunu gösteriyor. El hijyenine uyum zorlu ve karmaşık bir süreçtir, uyumu artırmak için bireysel faktörlerin daha detaylı değerlendirmeleri özenle dikkate alınmalıdır.

Anahtar kelimeler: El hijyeni, uyum, inançlar, davranışlar, öz bildirim.

INTRODUCTION

Hand hygiene (HH) is of vital importance to lower healthcare-associated infections, which increase healthcare costs and lead to a threat to patients' safety[1-4]. Despite being easy to practice, the reasons why healthcare providers (HCPs) do not adhere to HH are attributed to many diverse causes[5]. The multimodal HH strategies have increased compliance rates among HCPs, however, studies have shown that improvement in HH does not continue over an extended period without behaviour and psychological frameworks-based interventions[6-8].

Given the factors such as religions, cultural and personal beliefs, values, attitudes, the Theory of Planned Behaviour (TPB) has been used in evaluating hand hygiene behaviors and it is based on the idea that people are the best predictors of their behaviors and the most effective way in learning is to ask whether they perform the proposed behaviors[8,9]. 'Perceived behavorial' control that forms the spine of TPB include such features as (i) individual's belief in performing intended behaviors, (ii) having the necessary faculty and skill, (iii) having the power to overcome external stimuli. Thanks to TPB, HH intention can be assessed, the likelihood of performing the intended behavior can be recognized[8,10,11].

HH beliefs and practices are rated via the HH Belief Scale (HBS) and the HH Practices Inventory (HHPI)[12]. The Health Belief Model was devised to enhance health practices and it draws attention to whether one's perception of pros and cons can induce desired changes in behaviors for health[13]. In 1989, the original Hand washing Practices Inventory (HPI) was structured by Karaffa on the bases of Health Belief Model (HBM) in order to find out beliefs, knowledge of collage students about handwashing[13,14]. Karaffa, Sangkard, and Mann and Wood carried out several studies of HPI,

which were based on the responders' self-reports, but measured no factors affecting how knowledge and behavior were acquired and practiced among HCPs[13]. Accepted as the most important theory of behavior, Social Cognitive Theory involves the process of learning behavior, which examines how behavior is influenced by social, environmental, and individual factors. It also presents the basis for intervention strategies. HBS was devised on the basis of Bandura's Social Cognitive Theory[13-15].

Van de Mortel, who took HH guidelines of Centers for Disease Control and Prevention and World Health Organization (WHO) into consideration, modified HHPI from Karaffa and Larson, and structured HBS, furthermore, he applied HBS and HHPI to Italian and Greek nursing and medical students to examine their knowledge, beliefs, and practices of HH[12,14,16].

HBS and HHPI scales developed by Mortel were adopted into Turkish by Karadağ et al. and identified to be a valid and reliable means[17].

The current study aimed to address self-reported hand hygiene belief and practices of health care providers with the use of HBS and HHPI, rather than observational data.

METHODS

The current study was performed for a period of six months in 2021 at a university hospital in Turkey. The hospital infection control committee (HICC) has decided to evaluate HH knowledge, beliefs, and practices of HCPs at least once a year by using the Hand Hygiene Questionnaire (HHQ), in accordance with the recommendations by the guidelines of quality standards for healthcare. It was created consisting of a total of 40 items about the HBS and the HHPI, and the questions about socio-demographic characteristics (sex, age, occupation, departments where they work). This questionnaire was online announced and shared by the hospital electronic data system.

The study sample included HCP (physicians, nurses, medical secretaries, technical personnel, physical therapists, etc.) working at inpatient and outpatient departments as well as in laboratories. The structured questionnaire was sent to 3179 hospital employees. A total of 507 persons who were willing to participate in the study composed the study sample. However, those working in administration and technical departments were excluded, so, the remaining 468 were included in the study.

The HBS and HHPI were applied for the study participants.

The HBS and the HHPI

Created by Thea van de Mortel in 2009, the HBS is a 5-point Likert-type scale composed of 23 items that included the belief of (20 items), and the importance and perception of HH (3 items). Turkish version of the HBS, included 22 items, composed of two sub-scales. One is the importance sub-scale, which consists of 14 items (1,2,3,4,6,7,9,11,12,13,14,15,21 and 22), and the other is the belief sub-scale, which consists of 8 items (5,8,10,16,17,18,19,20). These items are coded as follows; 5 strongly agree; 4 agree; 3; neither agree nor disagree; 2 disagree; 1 strongly disagree (1). Eight items in the HBS (5,8,10,16,17,18,19,20) are calculated reversely. The total score ranges from 22 to 110. The higher the total score is, the more positive the belief about HH is[17].

HHPI is also a 5-point Likert scale that is composed of 14 items. They are scored as follows; 1; never, 2; sometimes, 3; often, 4; most of time, 5; always. The total score of the HHPI ranges from 14 to 70. The highest score indicates that HH practice is always performed. Internal consistency reliability coefficients of the HBS and the HHPI were 0.76 and 0.85 respectively in the reliability and validity study by Karadağ and colleagues[17].

Ethical approval

The study was approved by the ethical committee of School of Medicine, where the study was performed, with the number of E-60116787-020-277898/2022.

Statistical Analysis

The data were processed using IBM Statistical Package for the Social Sciences (SPSS) 22.0 computer program. Categorical variables are presented as frequency and percentage. Normal distribution of continues variables were tested with the Shapiro-Wilks test. In case of non-normal distributions of data, the median and interquartile range (IQR) values were used for descriptive data. The Kruskal Wallis test was used in multiple-group comparisons and the ~~the~~ Mann Whitney U test was used for binary group comparisons of variables. The Spearman's Correlation test was used for continuous variables. The confidence interval (CI) was 95.0% and a p value of 0.05 was considered significant.

RESULTS

A total of 468 health-care providers (the median age 37.0 years; min: 22, max: 59, IQR; 28.0-44.0). Of whom 76% (n=356) were women.

HCPs included physicians (10%; n=45), nurses (58%; n=271), laboratory technicians (12%; n=56), paramedics (1%; n=4), medical secretaries (10%; n=52), and the others (9%, n=40) including dietitians, psychologists, and individuals responsible for cleaning hospital, physiotherapists, pharmacy providers and social aid workers.

A total of 37% (n=172) of HCPs were working in the department of internal medicine; 17% (n=81) of HCPs in the surgical services, 20% (n=92) in the intensive care units, 6% (n=28) in the emergency department, 8% (n=39) in the laboratories, 12% (n=56) in the other departments such as kitchen and restaurants, pharmacy, cleaning.

Scores gained from the scales

The median HBS score of health-care providers was 87,00 (IQR 80.0-95.0). The median importance sub-scale of HBS score was 63.00 (IQR 56.00-68.00); the belief sub-scale of HBS score was 27.00, (IQR 23.00-29.00). The median HHPI score was 69.00 (IQR 66.0-70.0) (Table 1).

Table I: Scores of the HBS* and the HHPI†

Scale	Median	Min.	Max.	Q1	Q3
HBS score	87.00	46	110	80.00	95.00
HHPI score	69.00	14	70	66.00	70.00
HBS importance sub-scale score	63.00	14	70	56.00	68.00
HBS belief sub-scale score	27.00	9	40	23.00	29.00

** Hand Hygiene Belief Scale †Hand Hygiene Practices Inventory*

Item 22 saying ''Cleaning hands after toilet use can reduce the risk for transmission of infectious diseases'' (4.56±0.765), item 9 saying ''Prevention of hospital-acquired infections is an essential part of HCPs (4.52±0.747) and item 1 saying ''Hand hygiene is considered as an important part of the curriculum'' (4.50±0.886) had the highest scores of HBS (Table 2).

Table II: The mean HBS scores

Items	Mean±SD
1. Hand hygiene is considered as an important part of the curriculum	4.50 ± 0.886 virgül noktaya çevrilmeli
2.Emphasis on the importance of hand hygiene at the department where I work facilitates my compliance	4.39 ± 0.837
3.The importance of hand hygiene is emphasized by my clinical supervisors	4.41 ± 0.896
4. I have to act as a role model for other healthcare workers	4.29 ± 0.963
5.When I have heavy workload, it is important to fulfill my duty rather than caring about hand hygiene	1.97 ± 1.222
6. Performing hand hygiene as indicated is likely to decrease mortality rates	4.26 ± 0.947
7. Performing hand hygiene as indicated is likely to decrease hospital-acquired infections- associated costs	4.41 ± 0.858
8. Because I always give priority to my patient's needs, I am unable to perform hand hygiene as indicated	2.25 ± 1.237
9. Prevention of hospital-acquired infections is an essential part of healthcare workers	4.52 ± 0.747
10.The attitudes of experience healthcare workers determines my decision making whether to perform hand hygiene	3.46 ± 0.962
11. An infectious disease contracted in a healthcare setting may become a threat to my carrier	4.36 ± 0.886
12. I believe I have the capacity to change wrong/poor practices in the workplace	4.01 ± 0.968
13. Failure to perform hand hygiene as indicated, can be considered to be negligence.	4.04 ± 1.004
14. Hand hygiene is my usual habit in daily life.	4.48 ± 0.753
15. I assured that I can effectively apply my knowledge of hand hygiene to professional life	4.39 ± 0.756
16. To remember performing hand hygiene as indicated requires an effort	3.62 ± 1.300
17. I feel disturbed when warning a health professional to wash their hands	3.22 ± 1.381
18. Compliance with hand hygiene decreases immunity to infectious diseases	2.41 ± 1.363
19. Dirty sinks may be a reason for not washing hands.	2.59 ± 1.316
20. A lack of cleaning product can be a reason for not cleaning hands	2.79 ± 1.319
21. Performing hand hygiene after contact with a wound can prevent from infections	4.40 ± 0.831
22.Cleaning hands after toilet use can reduce the risk for transmission of infectious diseases	4.56 ± 0.765

According to responses to items of HHPI scale, the circumstances under which they clean their hands mostly were after contact with patient's blood and body fluids (item 5; 4.81±0.678); after contact with patient's secretions (item 11; 4.80±0.679), when they fell their hands dirty, or their hands seem to be dirty (item 14) (4.75±0.652) (Table 3).

Correlation Between the Scores of the Scales

There was a significant positive low correlation between the scores of the HBS and the HHPI ($r=0.369$, $p<0.001$). There was a significant positive weak correlation between the importance sub-scale and the belief sub-scale of HBS ($r=0.209$, $p<0.001$).

Table III: The mean HHPI scores

I clean my hands;	Mean± SD
1. After toilet use	4.75±0.764
2. Before contact with a wound	4.69±0.786
3. After contact with a wound	4.75±0.767
4. After touching potentially contaminated objects	4.77±0.702
5. After contact with blood or body fluids	4.81±0.678
6. After placing an invasive device	4.79±0.681
7. Before entering an isolation room	4.63±0.880
8. After physical contact with a patient	4.75±0.703
9. After leaving an isolation room	4.72±0.807
10. Before endotracheal suctioning	4.68±0.804
11. After contact with a patient's secretions	4.80±0.679
12. Before contact with a patient	4.60±0.854
13. After removing gloves	4.5±1.130
14. If I feel my hands dirty or they seem to be dirty	4.79±0.652

COMPARISONS

Gender

Both women and men had a median of the HBS scores of 87.00 (women; 46 to 110, men; 54 to 109); and of the HHPI scores 69.00 (17 to 70) and 68.00 (28 to 70), respectively.

There were not significantly different between HBS and HHPI with respect to both genders (p=0.968, p=0.108, respectively) (Table 4).

Age

Given the age groups (older than or equal to 37 years and younger than or equal to 36 years), scores of the HBS and the HHPI scales were not significantly different (HBS p=0.977; HHPI p=0.066) (Table 4).

Occupations

HBS (p<0.01) and HBS importance sub-scale (p<0.01) scores differed significantly with respect to occupations (Table 4). Between-group comparisons showed that physicians had significantly higher HBS scores than nurses (p=0.017), laboratory technicians (p=0.002), medical secretaries (p<0.001), and the group of 'others' (p=0.004) excluding paramedics (p=0.819). Nurses had higher HBS scores than laboratory technicians (p=0.067), medical secretaries (p<0.001) and the group of 'others' (p=0.191); however, there was a significant difference in the HBS scale scores as compared with only the group of medical secretaries. Paramedics had higher HBS scores than medical secretaries (p=0.008) and the group of 'others' (p=0.05), both of which were statistically significant.

Between-group comparisons showed that physicians had significantly higher HBS importance sub-scale scores than nurses (p=0.006), laboratory technicians (p<0.001), medical secretaries (p<0.001) and 'others' (p<0.001). Nurses significantly had the higher scores of the HBS importance sub-scale than the laboratory technicians (p=0.029) and the medical secretaries (p=0.002).

Paramedics had significantly higher scores of the HBS importance sub-scale than the medical secretaries (p=0.048) and the 'others' (p=0.040).

Departments

There was a statistically significant difference with respect to scores from the three scales (HBS, HBS importance sub-scale, HBS belief sub-scale) across the departments (p=0.009, p=0.008, p=0.048, respectively), but there was not significant difference for HHPI (p=0.343) (Table 4).

Table IV: Distribution of HHB scale and HHPI median by variables

Variables	Number	HBS scores (min-max) P value	HBS importance sub-scale scores P value	HBS belief sub-scale scores P value	HHPI scores P value
Gender					
Women	356	87.00(46-110)	63.00 (14-70)	26.50 (9-40)	69.00 (14-70)
Male	112	87.00 (54-109)	63.00 (14-70)	27.00 (9-40)	68.00 (28-70)
		P = 0.968	P = 0.468	P = 0.871	P =0.108
Age					
≥ 37 years	246	87.00 (46-110)	62.00 (14-70)	27 (9-40)	69 (22-70)
≤ 36 years	222	87.50 (54-110)	63.00 (14-70)	26 (9-40)	68 (14-70)
		P = 0.977	P = 0.458	P = 0.477	P = 0.066
Occupations					
Physicians	45	95.00 (54-107)	68.00 (14-70)	28.00 (9-40)	69.00 (24-70)
Nurses	271	88.00 (46-110)	63.00 (14-70)	27.00 (9-40)	68.00 (21-70)
Laboratory technicians	56	84.50 (54-103)	58.50 (14-70)	26.00 (9-40)	70.00 (34-70)
Paramedics	4	94.00 (90-100)	68.00 (60-70)	27.50 (24-33)	70.00 (64-70)
Medical secretaries	52	81.50 (57-107)	57.00 (26-70)	24.50 (9-37)	68.00 (25-70)
'Others' **	40	86.50 (54-101)	60.50 (14-70)	27.00 (16-40)	69.00 (14-70)
		P = 0.00	P = 0.00	P = 0.208	P =0.531
Departments					
Internal medicine	172	86.00 (59-110)	63.00 (28-70)	25.00 (9-40)	69.00 (25-70)
Surgical services	81	87.00 (46-109)	63.00 (14-70)	26.00 (9-39)	68.00 (22-70)
Intensive care unit	92	90.00 (62-110)	64.00 (40-70)	27.00 (13-40)	68.00 (37-70)
Emergency department	28	91.50 (57-102)	65.50 (26-70)	28.00 (9-34)	68.00 (40-70)
Laboratories	39	87.00 (46-103)	61.00 (18-70)	28.00 (15-33)	70.00 (40-70)
'Others'‡	56	82.00 (54-107)	57.00 (17-70)	26.00 (9-40)	68.50 (14-70)
		P =0.009	P = 0.008	P = 0.048	P = 0.343

*** Dietitians, psychologists, individuals responsible for cleaning hospital, physiotherapists, pharmacy workers ‡ Kitchen and restaurants, pharmacy, cleaning.*

The HBS scores of those working in the departments of internal medicine (p=0.021), in the surgical services (p=0.009), in the emergency department (p=0.013), in the laboratories (p=0.021) were significantly higher than those working in the 'other' departments. In addition, the health-care providers in the intensive care unit also had statistically higher scores than those working in the departments of internal medicine (p=0.042) as well as those working in the ''other'' (p<0.001) departments including kitchen and restaurants, pharmacy, cleaning staff.

Apart from those working in the laboratories, the scores of the HBS importance sub-scale of those working in the internal medicine services (p<0.001), in the surgical services (p=0.005), in the intensive care units (p=0.002) and in the emergency department (p=0.002) were

significantly higher than those working in the ''other'' departments.

Furthermore, the scores of the HBS belief sub-scales of those working in the internal medicine services were significantly higher than those working in the intensive care units (p=0.005) and laboratories (p=0.013).

DISCUSSION

The current study evaluated the responses of HCPs to HBS and HHPI administered to promote HH compliance in the context of policies to lessen healthcare-associated infections in a university hospital in Turkey, estimated the level of the hand hygiene belief and practices based on self-reports of responders by scoring points that were given, and examined the variables likely to affect the scores.

There are many studies evaluating compliances with HH based on observational data and knowledge of hand hygiene. However, reports of ''hand hygiene belief and practice based on self-report'' are highly limited. Such studies had also been carried out mostly among medical and nursing students. Therefore, this study is important in terms of both conducted among HCPs and based on self-report.

In line with the WHO Multimodal Hand Hygiene Improvement Strategy,[18] the programs by the ministry of health of Turkey continue to be applied in health care environments[5]. However, the perception and belief on HH of HCPs is as much essential as their knowledge and adherence to prevent health-care-associated infections[18]. In this context, the healthcare quality system of Turkey has attached importance to this issue, thereby adding the standard encoded as SEN09.01 says 'Awareness, perception and the level of HH practices should be quantified at least once yearly to the version 6 of healthcare quality standard of Turkey released in June, 2020. When taking account of the standard encoded SEN09.01, the hospital where this study was carried out put this standard into practice.

Studies that included HCPs and medical students performed with the use of TPB found that behavioural beliefs, subjective norms, normative beliefs, perceived behavioural control, and intention were essential predictors of self-reported HH behaviours[19]. Taken together, once HCPs have had positive beliefs of hand hygiene, we could possibly conclude that they have adhered to HH practice. However, several other studies have shown that data of actual HH behaviors may not be consistent with those from self-reported HH. O' Boyle and colleagues, who were among the first investigators to put questionnaire into practice for HCP, reported that subjective norms, perceived behavioural control were predictors of self-reported HH behaviors, but not predictors of actual HH behavior[20,21]. In contrast, Piras et al. noticed that there was a correlation between the rates of observed and self-reported HH practices[21]. Furthermore, there are studies reporting differences ranging from appreciable to trivial significances between the compliance rates of self-reported and observed HH behaviours. This may result from differences in conditions under which they work i.e.; the intensity of, complexity of hospital setting, or under which they respond the questionnaires[13].

In the current study, the scores were consistent with the studies from Turkey and United Arab Emirates. These studies found that the mean scores of the participants were high, the score from HHPI seemed to be favorable, but the scores from HBS were not enough to consider approving. Weak positive correlations were found between the scores of HBS and HHPI[19,22-24]. The rates of HH compliances from our hospital's HICC were found to be high, this was out of the scope of this study. Although this rate seemed to be high and consistent with the high scores of HBS and HHPI, it may be misleading.

Because health-care providers were informed about the observation of hand hygiene in advance. However, when HCP were observed uninformed, the adherence to HH were/are noticed to be very low.

Studies performed in several countries, including Turkey, have described that women are more sensitive to social hand washing, and among health-care providers they had higher HH compliance[22,23,25,26]. However, studies of HH beliefs or practices that included nursing and medical students by Karadağ and Crutz pointed out that males had higher scores, but in the current study, there was no significant difference with respect to gender. Therefore, interventions to enhance HH compliance should take account of the data of the institution where the hand hygiene compliance is evaluated, as emphasized by Ceylan that, when planning HH training programs, gender differences should be given priority[17,26,27].

Chan as well as Artan and colleagues reported that age represented a demographic factor associated with hand washing compliance[28,29]. But the current study found no differences in age with respect to the scores of HBS and HHPI.

Nurses were found to have higher HH compliance than physicians and other HCPs in the literature[22,30,31]. Similarly, Mortel stated that nursing students had higher rates of self-reported HH practice and compliance than medical students[14,16]. In a study from Turkey, whereas nurses had lower mean scores than specialists and residents, there was no significant difference in occupational groups with respect to mean scores of HBS and HHPI[28].

The current study identified that physicians had statistically higher scores than other occupational groups with respect to the HBS and HBS importance sub-scales, but not the same differences with respect to the HHPI scale. Observational HH compliance rates determined during routine practices by the members of our HICC demonstrated that although physicians had received longer training and statistically higher belief scores, they had significantly lower compliance rates as compared with nurses and other groups (68%, 84%, 84%, respectively). This suggests that having more knowledge and/or belief does not always reflect actual HH practices. The differences found in occupational groups such as education, healthcare settings should be meticulously considered.

HCPs working in the departments of internal medicine were surprisingly found to have significantly higher scores of the HBS and HBS importance sub-scale than those working in other departments. Which is consistent with the study[22].

Studies by Artan and Hugonnet reported that intensive care providers were in lower compliance with HH[28,32]. In our hospital, scores of the HBS and HBS importance sub-scale of ICU were lower than internal medicine departments. In departments, such as intensive care units where the risk of hospital acquired infection is high, HCPs should have paid more attention to hand hygiene. The reasons such as heavy workload, technical shortcomings, etc., reported by healthcare providers, especially those working in ICUs might be partially acceptable for non-compliance. However, the fact that they were found to have lower belief scores remains to be a matter that is worth pint pointing.

Evaluating responses to each item in the HHPI scale, we found that hands were reported to be cleaned after toilette use, especially after contact with patients and their blood and body fluids. Of note, the scores were lower of HH compliance prior to contact with patients and invasive procedures, which is suggestive of self-protection of HCPs themselves rather than patients.

CONCLUSION

Although the TPB says that people are the best predictors of their behaviors and the most effective way in learning is to ask whether they perform the proposed behaviors, the current study found surprisingly a low correlation between the HBS and HHPI scores. When the study results and data from our HICC's were evaluated together, it has shown that there were inconsistencies between actual behaviours and targeted attitudes, and belief and practice. This suggests that, contrary to popular belief, adaptation to HH is a challenging and complicated process, and needs to further evaluation of individual factors to improve.

Limitations

- This study is a single-center study.
- Only health care providers who were willing were included in the study.
- This study did not take account of the individual characteristics of departments and staff working in there.

Ethics Committee Approval: The study was approved by the ethical committee of School of Medicine, where the study was performed, with the number of E-60116787-020-277898/2022.

Conflict of Interest: The authors declared no conflicts of interest.

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