Mediterranean Nursing and Midwifery

Mediterr Nurs Midwifery 2023; 3(3): 124-130 DOI:10.4274/MNM.2023.23148

ORIGINAL ARTICLE

Analyzing the Relationship Between Hand Hygiene Beliefs and Practices and Adherence to Isolation Precautions in Dialysis Professionals

Diyaliz Ünitelerinde Çalışanların El Hijyeni Uygulamaları ve İzolasyon Önlemlerine Uyum Düzeylerinin Belirlenmesi

Ayşe Didem Çakır[1], Seda Cevheroğlu[2], Funda Büyükyılmaz[3]

[1]Clinic of Nursing, Ankara Kahramankazan State Hospital, Ankara, Turkey
[2]Department of Nursing, Eastern Mediterranean University Faculty of Health Sciences, Mersin, North Cyprus, Turkey
[3]Department of Fundamental Nursing, İstanbul University-Cerrahpaşa, Florence Nightingale Faculty of Nursing, İstanbul, Turkey

Abstract

Objective: This study aims to evaluate the relationship between the hand hygiene beliefs and practices of dialysis professionals and their adherence to isolation precautions.

Method: Healthcare professionals working in dialysis units in Turkey and Northern Cyprus constituted the population. Snowball sampling technique was used to determine the sample, which included 127 nurses and hemodialysis technicians that could be accessed online after obtaining the approval of ethical committee. Descriptive information form, Compliance with isolation precautions scale (CIPS), hand hygiene beliefs scale (HHBS) and hand hygiene practices inventory (HHPI) were used for data collection.

Results: Participants were predominantly female (92.1%), 47.2% had an associate degree or below, 51.2% were nurses, and 33.1% worked at a state hospital. Besides, 55.1% received in-house education on isolation precautions, and 96.9% reported the existence of visual orders about hand hygiene and isolation precautions in the unit. The mean scores obtained from the HHBS, HHPI and CCIPS were 96.19±8.1, 62.72±5.29 and 74.72±12.57, respectively. There was a positive and statistically significant correlation between the HHBS, HHPI and CIPS scores ($p<0.05$).

Conclusion: The study found that health professionals working in dialysis units had positive hand hygiene beliefs and high levels of hand hygiene practice and adherence to isolation precautions. Besides, the participants with positive hand hygiene beliefs had also high level of adherence to isolation precautions. Similarly, hand hygiene practice was positively associated with adherence to isolation precautions. Therefore, further observational studies in different clinical centers may be conducted to contribute to the literature.

Keywords: Hand hygiene, isolation precaution, hemodialysis unit, health professionals, adherence, belief

Öz

Amaç: Bu çalışma; diyaliz ünitesinde çalışanların el hijyeni uygulama durumlarını, el hijyeni inançlarını ve izolasyon yöntemlerine uyum düzeylerini belirleyerek aralarındaki ilişkiyi incelemek amacıyla planlanmıştır.

Yöntem: Araştırmanın evrenini, Türkiye ve Kuzey Kıbrıs Türk Cumhuriyeti'nde diyaliz ünitelerinde çalışan sağlık çalışanları oluşturmuştur. Çalışmanın örneklemini ise etik kurul iznini takiben 6 ay sürede olasılıksız örnekleme yöntemlerinden kartopu yöntemi kullanılarak online adreslerden ulaşılabildiğimiz hemşire ve diyaliz teknikerleri oluşturmuştur (n=127). Verilerin toplanmasında; tanıtıcı özellikler bilgi formu, izolasyon önlemlerine uyum ölçeği (İÖUÖ), el hijyeni inanç ölçeği (EHİÖ) ve el hijyeni uygulama envanteri (EHUE) kullanılmıştır.

Bulgular: Araştırmaya katılan sağlık çalışanlarının %92,1'inin kadın, %47,2'sinin ön lisans veya altı bir okuldan mezun olduğu, %51,2'sinin hemşire, %33,1'inin bir devlet hastanesinde çalışmakta olduğu belirlendi. Ayrıca %55,1'inin izolasyon hakkında kurum içi eğitim aldığı, %96,9'unun çalıştığı klinikte el hijyeni ve izolasyon yöntemleri hakkında görsel talimatların olduğu saptandı. Sağlık çalışanlarının EHİÖ toplam puan ortalamalarının 96,19±8,1, EHUE toplam puan

Corresponding Author:
Seda Cevheroğlu, seda.cevheroglu@emu.edu.tr

Received: April 27, 2023
Accepted: June 07, 2023

Cite this article as: Çakır AD, Cevheroğlu S, Büyükyılmaz F. Analyzing the Relationship Between Hand Hygiene Beliefs and Practices and Adherence to Isolation Precautions in Dialysis Professionals. Mediterr Nurs Midwifery 2023; 3(3): 124-130

ortalamalarının 62,72±5,29 ve İÖUÖ toplam puan ortalamalarının da 74,72±12,57 puan olduğu belirlendi. Sağlık çalışanlarının EHİÖ ve EHUE ile İÖUÖ'den alınan puanlar arasında istatistiksel olarak anlamlı ve pozitif yönlü korelasyon olduğu tespit edildi (p<0,05).

Sonuç: Diyaliz ünitesinde çalışan sağlık çalışanlarının el hijyeni inançlarının olumlu, el hijyeni uygulama durumlarının yüksek ve izolasyon önlemlerine uyumlarının da iyi düzeyde olduğu belirlenmiştir. Ayrıca el hijyeni inancı olumlu olan sağlık çalışanlarının izolasyon yöntemlerine uyumları da iyi düzeyde bulunmuştur. Benzer şekilde el hijyeni uygulama durumu arttıkça izolasyon önlemlerine uyumun da arttığı görülmüştür. Bu noktada farklı kliniklerde gözlemsel çalışmalar yapılarak literatüre katkı sağlanması önerilir.

Anahtar Kelimeler: El hijyeni, izolasyon önlemleri, diyaliz ünitesi, sağlık çalışanları, bağlılık, inanç

Introduction

Hand hygiene and adherence to isolation precautions are the common interventions to reduce the risk of disease transmission in a health care center (1,2). Isolation precautions may be grouped into standard precautions and the precautions for specific patient groups (3). Standard precautions refer to precautions that may be applied to all patients regardless of diagnosis or infection. These precautions are taken to eliminate risks that can be transmitted via blood, blood products or body fluids (3,4). Adherence of health professionals to both hand hygiene and isolation precautions are vital for their protection against nosocomial infections (2). Existing studies have reported that adherence to hand hygiene is affected by a number of factors, including, personal characteristics and professional experiences of health professionals, workload, lack of and distance to hygiene equipment, inadequate knowledge on hand hygiene and patient turnover (5,6). On the other hand, studies on the adherence to isolation precautions reported conflicting findings in different countries, which may be caused by the level of development and working conditions in different countries, the number, experience and education levels of health professionals, facilities of health centers, and the health and education policies (2,3,7-11).

Infections are the second leading cause of mortality in patients undergoing hemodialysis in dialysis units so that infection risks should be reduced in these units (12). During a working day, patients from different units are admitted to the dialysis units and are transferred back to their units or discharged after treatment. High patient turnover may decrease the adherence to hand hygiene and isolation precautions in dialysis units. Insufficient information about the isolation needs of patients that are admitted to dialysis units may adversely affect infection precautions. Weaker immune system of dialysis patients increases the risk of transmission for both the patients and health professionals.

Main Points

- Adherence of health professionals to both hand hygiene and isolation precautions are vital for their protection against nosocomial infections.
- Infections are the second leading cause of mortality in patients undergoing hemodialysis in dialysis units so that infection risks should be reduced in these units.
- High patient turnover may decrease the adherence to hand hygiene and isolation precautions in dialysis units. Insufficient information about the isolation needs of patients that are admitted to dialysis units may adversely affect infection precautions.

At this point, adherence to hand hygiene and isolation precautions become even more important. Due to these reasons, this study aims to analyze the relationship between the hand hygiene beliefs and practices and the adherence to isolation precautions in healthcare professionals working in dialysis units. Within this context, the study aimed to answer the following questions:

1. What is the level of adherence to isolation precautions in dialysis professionals?

2. What is the level of hand hygiene beliefs in dialysis professionals?

3. What is the level of hand hygiene practice in dialysis professionals?

4. Is there a relationship between hand hygiene beliefs and practices of dialysis professionals and their adherence to isolation precautions?

Material and Methods

Objectives
This study aimed to evaluate the relationship between the hand hygiene beliefs and practices of dialysis professionals and their adherence to isolation precautions.

Research Design
The study had a descriptive-correlational design.

Population and Sampling
Healthcare professionals working in dialysis units in Turkey and Northern Cyprus constituted the population. Snowball sampling technique was used to determine the sample, which included 127 nurses and hemodialysis technicians that could be accessed online after obtaining the approval of Ethical Committee of Eastern Mediterranean University (ETK00-2022-0238/02.11.2022). Nurses and dialysis technicians working in dialysis centers who volunteered to participate in the study were included in the study.

Data Collection Tools
Descriptive information form, compliance with isolation precautions scale (CIPS), hand hygiene beliefs scale (HHBS) and hand hygiene practices inventory (HHPI) were used for data collection.

Descriptive Information Form
The form was prepared by the researchers in line with the literature and asked 18 questions on age, gender, marital status, education level, education on isolation precautions and hand hygiene, problems with access to hand hygiene equipment and knowledge of five indication rules of CDC (2,3).

CIPS
CIPS was developed by Tayran and Ulupınar (13) and comprised 18 items in four subscales, namely, route of infection, practitioner-patient safety, environmental safety and hand-hygiene/glove use. Items were scored on a 5-point Likert scale. Possible scores ranged from 18 to 90, with higher scores indicating higher level of compliance with isolation precautions. Cronbach's alpha of the original scale and our study were 0.85 and 0.90, respectively (13).

HHBS
HHBS was developed by Thea van de Mortel (2009) and adapted to Turkish by Karadağ et al. (5) The scale had 22 items in two subscales, namely, hand hygiene beliefs and importance of hand hygiene. Items were scored on a 5-point Likert scale. Possible scores ranged from 22 to 110, with higher scores indicating more positive beliefs about hand hygiene. Cronbach's alpha of the Turkish version of HHBS and our study were 0.80 and 0.75, respectively (5).

HHPI
HHPI was also developed by Thea van de Mortel (2009) and adapted to Turkish by Karadağ et al. (5). The inventory has 14 items, which were scored on a 5-point Likert scale. Possible scores ranged from 14 to 70, with higher scores indicating that hand hygiene is always practiced. Cronbach's alpha of the Turkish version of HHPI and our study were 0.85 and 0.90, respectively (5).

Ethical Considerations
Approval of Eastern Mediterranean University Ethical Committee was obtained (ETK00-2022-0238/02.11.2022). Before data collection, voluntary informed consent in accordance with the Declaration of Helsinki was obtained.

Statistical Analysis
SPSS version 26.0 was used for data analysis. Mean, standard deviation and minimum and maximum values were used for numerical variables. Number and percentage were used for categorical variables. Frequency analysis was used for descriptive data on nurses and hemodialysis technicians. Descriptive statistics were used to present data on the scores obtained from CIPS, HHPI and HHBS. Pearson's correlation analysis was used to analyze the correlation between the scores obtained from the scales and subscales. Statistical significance was set at $p<0.05$.

Results

Findings About Descriptive Characteristics and Practices of Isolation Precautions and Hand Hygiene
Table 1 presented descriptive characteristics. Accordingly, 92.1% were female, 47.2% had an associate degree or below,

Table 1.
Descriptive Characteristics

		n	%
Gender	Female	117	92.1
	Male	10	7.9
Education level	Associate and below	60	47.2
	Undergraduate	51	40.2
	Graduate	16	12.6
Position	Nurse	65	51.2
	Hemodialysis technician	62	48,8
Works at	State hospital	42	33.1
	Training research hospital	15	11.8
	University hospital	18	14.2
	Private dialysis center	52	41.0
Length of professional experience (years) Mean 12.8±10.67	1-10	59	46.5
	11-20	38	29.9
	≥21	30	23.6
Length of experience in dialysis unit (years) Mean 8.46±8.36	1-5	62	50.8
	6-10	23	18.9
	≥11	37	30.3
Length of experience in current health center Mean 3.02±1.74	1-2	57	44.9
	3-4	20	15.7
	≥5	50	39.4

51.2% were nurses, and 33.1% worked at a state hospital. The mean length of professional experience, experience in a dialysis center and experience in the current health center were 12.8±10.67, 8.46±8.36 and 3.02±1.74 years, respectively.

Table 2 presented data on isolation precaution and hand hygiene practices. Accordingly, 55.1% received in-house education on isolation precautions, 96.9% reported the existence of visual orders about hand hygiene and isolation precautions in the unit and 97.6% evaluated the isolation status of admitted patients from different units. Besides, 92.9% of the participants expressed that they knew the isolation precaution visuals, 40.9% stated that their units employed the isolation methods of contact, droplet and respiration, 57.5% did not experience any problems during isolation precautions, but 81.9% had problems in access to hand hygiene equipment. Finally, 74% of the participants stated that they adhered to hand hygiene after exposure to body fluids.

HHBS, HHPI and CIPS Scores

Table 3 presented data on the scores obtained from the HHBS, HHPI and CIPS. Accordingly, the mean score obtained from the HHBS and its subscales of hand hygiene belief and importance of hand hygiene were 96.19±8.1, 31.48±4.8 and 64.68±4.9, respectively. The mean score obtained from the HHPI was 62.72±5.29. Finally, the mean scores obtained from the CIPS and its subscales of route of infection, practitioner-patient safety, environmental safety and the hand-hygiene/glove use were 74.72±12.57, 22.16±4. 25.58±4.59, 14.43±2.97, and 12.56±2.43, respectively.

Correlation between HHBS, HHPI and CIPS Scores

Table 4 presented the correlation between the HHBS, HHPI and CIPS. Accordingly, there was a positive and statistically significant correlation between the HHBS, CIPS and its subscales of route of infection, practitioner-patient safety, environmental safety and hand-hygiene/glove use ($p<0.05$). There was also a positive and statistically significant correlation between the scores obtained from the hand hygiene belief subscale of HHBS and the CIPS and its subscales ($p<0.05$). Besides, we found a positive and statistically significant correlation between the hand hygiene subscale of the HHBS and the CIPS and its subscales ($p<0.05$). Finally, we found a positive and statistically significant relationship between the HHPI and the CIPS

Table 2.
Isolation Precaution and Hand Hygiene Practices

		n	%
Type of education on isolation precautions	In-house education	70	55.1
	Vocational education	47	37
	Scientific meeting	10	7.9
Evaluated the isolation status of patients admitted from different units	Yes	124	97.6
	No	3	2.4
Knows the isolation figures	Yes	118	92.9
	No	9	7.1
Experienced difficulties during isolation practices	No	73	57.5
	Yes	54	47.5
Isolation methods in the unit	Contact	31	24.4
	Contact + droplet + respiration	52	40.9
	Contact + respiration	27	21.3
	Others	17	13.4
Existence of visuals about hand hygiene and isolation methods in the unit	Yes	123	96.9
	No	4	3.1
Uses for hand hygiene	Water and soap	83	65.4
	Hand sanitizer	44	34.6
Experiences problems in access to hand hygiene equipment	No	104	81.9
	Yes	23	18.1
Adherence to five indications rules	Before contact with the patient	61	48
	After contact with the patients	88	69.3
	Before aseptic procedures	73	57.5
	After exposure to body fluids	94	74
	After contact with the friends and relatives of patient	68	54

Table 3.
HHBS, HHPI and CIPS Scores

	Min-max	Mean ± SD	Cronbach's alpha
Hand hygiene belief subscale (HHBS)	21-40	31.48±4.8	0.75
HHBS importance of hand hygiene subscale	51-69	64.68±4.9	
HHBS total	73-109	96.19±8.1	
HHPI total	14-70	62.72±5.29	0.90
CIPS route of infection subscale	4-25	22.16±4.64	0.90
CIPS practitioner-patient safety subscale	16-30	25.58±4.59	
CIPS environmental safety subscale	6-19	14.43±2.97	
CIPS hand-hygiene/glove use subscale	6-15	12.56±2.43	
CIPS total	34-89	74.72±12.57	

SD=standard deviation, HHBS=hand hygiene belief subscale, CIPS=isolation precautions scale, HHPI=hand hygiene practices inventory

Table 4.
Correlation Between HHBS, HHPI and CIPS Scores

		HHBS	Hand hygiene belief subscale (HHBS)	Importance of hand hygiene subscale	HHPI
CIPS	**r** **p**	0.43 **0.00***	0.33 **0.00***	0.39 **0.00***	0.32 **0.00***
Route of infection subscale	**r** **p**	0.33 **0.00***	0.21 **0.00***	0.34 **0.00***	0.26 0.00*
Practitioner-patient safety subscale	**r** **p**	0.41 **0.00***	0.31 **0.00***	0.37 **0.00***	0.32 **0.00***
Environmental safety subscale	**r** **p**	0.35 **0.00***	0.31 **0.00***	0.26 0.00*	0.19 0.03
Hand-hygiene/glove use subscale	**r** **p**	0.40 **0.00***	0.34 **0.00***	0.32 **0.00***	0.32 **0.00***

*Pearson's correlation test, *p<0.05, CIPS=isolation precautions scale, HHPI=hand hygiene practices inventory*

and its subscales of route of infection, practitioner-patient safety and hand-hygiene/glove use (p<0.05).

Discussion

This study aims to analyze the relationship between the hand hygiene beliefs and practices and the adherence to isolation precautions in healthcare professionals working in dialysis units. The purpose of isolation precautions is to prevent the transmission of microorganisms from infected persons to patients, visitors and health professionals. As a vital element of health care, the adherence of nurses to isolation precautions is influenced by a number of factors, including adequate equipment, physical conditions and the number and qualifications of health professionals that provide care (8,10,14-17). Most of the participants of this study received in-house education on isolation, evaluated the isolation status of patients admitted from different units and knew about the isolation visuals. Additionally, 47.5% of the participants experienced difficulties during isolation practices and most participants reported that their units employed the isolation methods of contact, droplet and respiration (Table 2). Analysis of the CIPS scores revealed that the participants had a sufficient level of compliance with isolation precautions (Table 3). Analysis of the literature reveals conflicting findings. The studies of Erden et al. (2), Arli and Bakan (18), and Geçit and Özbayır (3) reported high levels of compliance with isolation precautions. On the other hand, Suliman et al. (8) found that nurses in Jordan had low levels of compliance with isolation precautions, whereas Özden and Özveren (10) reported moderate levels of compliance for Turkish nurses. These conflicting findings may be related with working conditions, availability of equipment and characteristics of healthcare professionals.

Analysis of the HHBS scores reveals that the participants had positive beliefs about hand hygiene (Table 3). Similarly, the studies of Kozik Çarıklı et al. (19), İkiışık et al. (20) and Karahan et al. (7) reported positive hand hygiene beliefs among health professionals.

Besides, the mean HHPI score was 62.72±5.29, indicating high level of hand hygiene practice (Table 3). In a similar vein, Kozik Çarıklı et al. (19), İkiışık et al. (20) and Karahan et al. (7) reported high levels of hand hygiene practice.

Adherence to isolation precautions and hand hygiene are among the most important practices to prevent the transmission of disease and increase patient safety, especially in hemodialysis units (17). This study found that isolation precautions had a positive and moderate correlation with hand hygiene beliefs (r=0.43) and a positive but a weak correlation with hand hygiene practices (r=0.32) (Table 4). In other words, and increase in hand hygiene beliefs and practices of the participants meant an increase in in adherence to isolation precautions. Besides, there was a positive correlation between CPIS, HHBS and HHPI scores, indicating an increase in adherence to isolation precautions parallel to an increase in the beliefs and practices of hand hygiene. Based on these findings, we may suggest that increase in hand hygiene beliefs and practices is associated with an increase in the adherence to isolation compliances.

Study Limitations

Data on adherence to isolation precautions and the beliefs and practices of hand hygiene were self-reported.

Conclusions

The study found that health professionals working in dialysis units had positive hand hygiene beliefs and high levels of hand hygiene practice and adherence to isolation precautions. Besides, the participants with positive hand hygiene beliefs had also high level of adherence to isolation precautions. Similarly, hand hygiene practice was positively associated with adherence to isolation precautions. Therefore, further observational studies in different clinical centers may be conducted to contribute to the literature. In addition, the compliance of the nurses, who are in contact with the patient for the longest time in health institutions, to hand hygiene and isolation measures is very important in ensuring and maintaining infection control. At this point, it is recommended to plan trainings regularly by hospital infection control committees.

Acknowledgments: The authors thank the Dialysis Professionals who participated voluntarily in this study.

Ethics Committee Approval: Approval of Eastern Mediterranean University Ethical Committee was obtained (ETK00-2022-0238/02.11.2022).

Informed Consent: Before data collection, voluntary informed consent in accordance with the Declaration of Helsinki was obtained.

Peer-review: Externally peer-reviewed.

Author Contributions: Surgical and Medical Practices – A.D.Ç., S.C., F.B.; Concept – A.D.Ç., S.C., F.B.; Design – A.D.Ç., S.C., F.B.; Data Collection and/or Processing – A.D.Ç., S.C., F.B.; Analysis and/or Interpretation – A.D.Ç., S.C., F.B.; Literature Review – A.D.Ç., S.C., F.B.; Writing – A.D.Ç., S.C., F.B.

Declaration of Interests: No conflict of interest was declared by the authors.

Funding: The authors declared that this study received no financial support.

References

1. Gammon J, Hunt J. The neglected element of hand hygiene - significance of hand drying, efficiency of different methods and clinical implication: A review. J Infect Prev 2019;20(2):66-74. [Crossref]
2. Erden S, Kahraman BB, Bulut H. Yoğun Bakım Ünitelerinde Çalışan Doktor ve Hemşirelerin İzolasyon Önlemlerine Uyumlarının Değerlendirilmesi. Gümüşhane Üniversitesi Sağlık Bilim Derg 2015;4(3):388-398.
3. Geçit S, Özbayır T. Hemşire ve Hekimlerin İzolasyon Önlemlerine Uyumu, Compliance of Nursing and Physicians to Isolation Precautions. EGEHFD 2020;36(3):163-173. [Crossref]
4. Siegel JD, Rhinehart E, Jackson M, Chiarello L. 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Health Care Settings. Am J Infect Control 2007;35:65-164. [Crossref]
5. Karadağ M, Yıldırım N, İşeri ÖP. El Hijyeni İnanç Ölçeği ve El Hijyeni Uygulamaları Envanterinin geçerlilik ve güvenirliliği. Cukurova Med J 2016;41(2):271-284. [Crossref]
6. Teker B, Ogutlu A, Gozdas HT, Ruayercan S, Hacialioglu G, Karabay O. Factors Affecting Hand Hygiene Adherence at a Private Hospital in Turkey. Eurasian J Med 2015;47(3):208-212. [Crossref]
7. Karahan E, Taşdemir N, Çelik S, Professor A. Original Article Factors Influencing Compliance with Isolation Precautions among Nurses who Work in Turkish Surgical Clinics. Int J Med Invest [Internet] 2019;8:31-39. [Crossref]
8. Suliman M, Aloush S, Aljezawi M, AlBashtawy M. Knowledge and practices of isolation precautions among nurses in Jordan. Am J Infect Control 2018;468(6):680-684. [Crossref]
9. Moriceau G, Gagneux-Brunon A, Gagnaire J, Mariat C, Lucht F, Berthelot P, et al. Prévention des infections associées aux soins : internes et médecins ont besoin de plus de formation pour les précautions complémentaires d'hygiène. Med Mal Infect 2016;46(1):14-19. [Crossref]
10. Özden D, Özveren H. Determining the Professional And Organizational Factors In Nurses' Compliance With Isolation Precautions. J Acad Res Nurs 2016;2:24-32. [Crossref]
11. Zencir G, Bayraktar D, Khorshid L. Nurses' Compliance with Isolation Precautions Worked in a Public Hospital. Ege Üniversitesi Hemşirelik Fakültesi Derg 2013;29(2):61-70. [Crossref]
12. Qin JJ, Xing YF, Ren JH, Chen YJ, Gan YF, Jiang YQ, et al. Mandatory Mask-Wearing and Hand Hygiene Associated With Decreased Infectious Diseases Among Patients Undergoing Regular Hemodialysis: A Historical-Control Study. Front Public Health 2021;9:678738. [Crossref]
13. Tayran N, Ulupınar S. Development of a Scale Study: Validity and Reliability of a Scale Compliance with Isolation Precautions. Florence Nightingale J Nurs 2011;2:89-98. [Crossref]

14. National Center for Health Statistics. Health, United States, 2020–2021: Annual Perspective. Health (Irvine Calif) 2023;1-32. [Crossref]
15. Barikani A, Afaghi A. Knowledge, attitude and practice towards standard isolation precautions among Iranian medical students. Glob J Health Sci 2012;4(2):142-146. [Crossref]
16. Aloush SM. Does educating nurses with ventilator-associated pneumonia prevention guidelines improve their compliance? Am J Infect Control 2017;45(9):969-973. [Crossref]
17. Scheithauer S, Eitner F, Mankartz J, Haefner H, Nowicki K, Floege J, et al. Improving hand hygiene compliance rates in the haemodialysis setting: more than just more hand rubs. Nephrol Dial Transplant 2012;27(2):766-770. [Crossref]
18. Arli SK, Bakan AB. Nurses' compliance with isolation precautions and the affecting factors. Appl Nurs Res 2017;38:175-178. [Crossref]
19. Kozik Çakırlı D, Öner C, Çetin H, Şimşek Ersin E. Evaluation of hand hygiene beliefs and compliance of primary care health care workers in Tuzla, Istanbul. Jour Turk Fam Phy 2022;13(3):96-103. [Crossref]
20. İkiışık H, Turan G, Taşğın AA, Kul A, Aydın FZ, Eliaçık M, et al. Evaluation of Hand Hygiene Belief and Practice of Nurses in a Hospital. Sağlık ve Toplum 2022;32(2):129-135. [Crossref]