GÜSBD 2023; 12(1): 90 - 99 | **Gümüşhane Üniversitesi Sağlık Bilimleri Dergisi** | **Araştırma Makalesi**
GUJHS 2023; 12(1): 90 - 99 | Gümüşhane University Journal of Health Sciences | Original Article

Behaviors and Attitudes Towards Personal Protective Equipment Use: A Cross-Sectional Study Among Physiotherapy Interns during COVID-19

Kişisel Koruyucu Ekipman Kullanımına Yönelik Davranış ve Tutumlar: COVID-19 Sırasında Fizyoterapi Stajyerlerinde Kesitsel Bir Çalışma

Tansu BİRİNCİ[1], Ayça ARSLANTÜRK[2], Merve SEVİNÇ GÜNDÜZ[3], Meltem ŞEN[4], Ebru KAYA MUTLU[5]

ABSTRACT

Internships are vital for preparing young healthcare workers for working life. Examining the behaviors and attitudes of interns about the use of personal protective equipment (PPE) and raising their awareness will contribute to the fight against contagious diseases. This study aimed to investigate the behaviors and attitudes towards PPEs in the physiotherapy interns during the COVID-19 pandemic. Two hundred twenty-three physiotherapy interns (mean age, 22.55±1.80 years; 162 female) were included in the study. The health-related characteristics, vaccination status, use of PPE against the COVID-19, behaviors and attitudes towards PPEs use, and the physical complaints related to the PPEs were questioned. A total of 43.2% interns have tested positive for COVID-19 during the internship. All participants preferred to wear the mask, while 95.1% used protective gloves in case of COVID-19 risk, and 66.4% of the participants stated that they were worried about finding new equipment while removing the PPEs. The most frequently reported physical complaints were dryness, irritation, and a scar on the hands. PPEs are essential in protecting against epidemics and infectious diseases that threaten public health; therefore, healthcare systems must prioritize the procurement and distribution of PPEs, and provide adequate training to interns in its use.

Keywords: Health Care, Masks**,** Pandemic, Undergraduate Student, Viruses

ÖZ

Genç sağlık çalışanlarını çalışma hayatına hazırlama sürecinde mesleki stajların önemi oldukça büyüktür. Stajyerlerin kişisel koruyucu ekipman (KKE) kullanımına ilişkin davranış ve tutumlarının incelenmesi ve KKE kullanımı açısından bilinçlendirilmesi bulaşıcı hastalıklarla mücadeleye katkı sağlayacaktır. Bu çalışma, COVID-19 pandemisi sırasında, Fizyoterapi alanında staj yapan öğrencilerin KKE kullanımına yönelik davranış ve tutumlarını araştırmayı amaçlamıştır. Çalışmaya toplam 223 gönüllü fizyoterapi stajyeri (ortalama yaş 22.55±1,80 yıl; 162 kadın) dahil edildi. Katılımcıların sağlıkla ilgili özellikleri, COVİD-19'a karşı korunmasa aşılanma durumu, COVID-19'a karşı korunmada KKE kullanımı, KKE kullanımına yönelik davranış ve tutumları ile KKE kullanımına bağlı fiziksel şikâyetleri sorgulandı. Staj yaptıkları dönem içerisinde toplam %43,2 stajyerin COVID-19 testi pozitif çıktı. Katılımcıların tamamı, staj yaparken COVID-19'a karşı korunma amacıyla maske takmayı tercih ederken, %95,1'i COVID-19 riskine karşı koruyucu eldiven kullandığını belirtti. Katılımcıların %66,4'ü KKE'leri çıkarırken yeni ekipman bulma konusunda endişeli olduğunu belirtti. En sık bildirilen fiziksel şikâyetler arasında ellerde kuruluk, tahriş ve yara oluşumu yer almaktaydı. KKE kullanımı halk sağlığını tehdit eden salgın hastalıklara ve bulaşıcı hastalıklara karşı korunmada esastır; bu nedenle, sağlık sistemlerinde KKE tedarikine ve dağıtımına öncelik verilmeli ve stajyerlere doğru KKE kullanımı konusunda yeterli eğitimi sağlamalıdır**.**

Anahtar Kelimeler: Sağlık Hizmetleri, Maskeler, Pandemi, Lisans Öğrencisi, Virüsler

Ethical approval was obtained from the Non-invasive Research Ethics Board of Istanbul University-Cerrahpasa (Approval number: 2021/34) This study has been registered on Clinical Trials.gov with registration number NCT04910880.

[1]Dr. Öğr. Üyesi Tansu BİRİNCİ, Physiotherapy and Rehabilitation, Istanbul Medeniyet University, Department of Physiotherapy and Rehabilitation, tansubirinci@hotmail.com, ORCID: 0000-0002-7993-3254
[2]Arş. Gör. Ayça ARSLANTÜRK, Physiotherapy and Rehabilitation, Bezmialem Vakıf University, Department of Physiotherapy and Rehabilitation, aycaarslanturk.06@gmail.com, ORCID: 0000-0002-2535-6631
[3]Arş. Gör. Merve SEVİNÇ GÜNDÜZ, Physiotherapy and Rehabilitation, Bezmialem Vakıf University, Department of Physiotherapy and Rehabilitation, merve.sevinc@bezmialem.edu.tr, ORCID: 0000-0002-0443-2295
[4]Fzt. Meltem ŞEN, Physiotherapy and Rehabilitation, Istanbul University-Cerrahpasa, Institute of Graduate Studies, meltem.rumenov@gmail.com, ORCID: 0000-0002-6346-5126
[5]Doç. Dr. Ebru KAYA MUTLU, Physiotherapy and Rehabilitation, Bandirma Onyedi Eylul University, Department of Physiotherapy and Rehabilitation, fztebrukaya@hotmail.com, 0000-0002-8595-5513
İletişim / Corresponding Author: Tansu BİRİNCİ
e-posta/e-mail: tansubirinci@hotmail.com
Geliş Tarihi/Received: 26.06.2022
Kabul Tarihi/Accepted: 08.03.2023

INTRODUCTION

The SARS-CoV-2 virus, which emerged in Wuhan, China, affected worldwide. The World Health Organization declared the global public health threat on January 31, 2020, and pandemic on March 11, 2020, due to the rapid spread of coronavirus and its effects on human health.[1] In the ensuing weeks, preventive measures were enforced in many countries, including quarantine, lockdowns, self-isolation, social distancing, closure of borders, suspension of all teaching and training activities, and transitioning to online learning.[2] Despite all efforts, no cure or highly effective treatment is available for coronavirus disease-2019 (COVID-19). Vaccination programs started in many countries, but data about the level of vaccine protection over time, particularly against new variants of SARS-2, is still conflicting.[3, 4]

Healthcare professionals (HCPs) actively fighting against the virus in the COVID-19 pandemic are in the highest risk group due to direct exposure to COVID-19.[5,6] Therefore, the highest precautions should be taken to ensure droplet and contact isolation.[7-9] Using one or more personal protective equipment (PPE) is vital to prevent contagiousness.[10,11] However, PPEs might cause discomfort when used for a long duration.[12] Difficulty in breathing, feeling of suffocation, sweating, and fogging of eyeglasses are the most commonly reported problems during the use of PPEs.[13] Besides, a recent study has reported various side effects such as dermatitis, allergy, atopy, facial itching, acne, and redness due to the use of PPE.[14]

Previous studies have focused on PPEs use mainly through HCPs such as doctors and nurses.[15-18] On the other hand, the interns are the future HCPs, and internships are vital for preparing young healthcare workers for the challenges faced in working life; therefore, it is essential to determine the behaviors and attitudes of the interns towards PPEs. The negative impact of COVID-19 on health sciences interns is also an undeniable fact because health sciences interns, including physiotherapy interns, have one-on-one contact with the patient and need to minimize exposure to hazards that cause illnesses through proper care and disposal of the PPEs. Examining the behaviors and attitudes of interns about the use of PPE and raising their awareness will contribute to the fight against COVID-19 and other contagious diseases. Therefore, this study aimed to investigate the behaviors and attitudes towards PPEs in the physiotherapy interns during the COVID-19 pandemic.

MATERIAL AND METHOD

Study Design and Setting

This cross-sectional study was conducted at Istanbul Medeniyet University, Department of Physiotherapy and Rehabilitation, from May 2021 to August 2021.

Ethical Dimension of Research

Ethical approval was obtained from the Non-invasive Research Ethics Board of Istanbul University-Cerrahpasa (Approval number: 2021/34) and conducted according to the Declaration of Helsinki. This study was registered on ClinicalTrials.gov (Registration number: NCT04910880).

Participants

Two hundred-thirty physiotherapy interns in Turkey were included in the present study. The eligibility criteria were as follows: (1) actively interning in physiotherapy and rehabilitation clinic during the COVID-19 pandemic; (2) have been doing the internship for at least one week; (3) use computers and have internet access; and (4) being a volunteer to participate. The exclusion criteria were as follows: (1) not wanting to use PPEs with own choice; (2) having additional work in return for money outside the physiotherapy and rehabilitation clinics;

and (3) not being able to read and write in Turkish.

The sample size and power calculation were performed using the G*Power 3.1 power analysis program. In the sample size calculated using the correlation model "Correlation: Bivariate normal model," the effect size was moderate (|ρ|=0.3), α error was 0.05, the 95% confidence interval, and the desired power was 95%. These parameters generated a sample size of at least 138 participants. Finally, 250 participants were invited to the present study.

Data Collection

Data were collected via e-survey sending out an e-mail to the targeted sample of prospective respondents. The link has only been active in the data collection process. It was a voluntary survey, and all participants were asked whether they were willing to participate before starting the survey. The first component of the online survey was an introductory page explaining the purpose of the research, the identity and affiliations of the researchers, details of what participation will entail, and confirmation of ethical approval by the ethics committee. The selection of one response option was enforced and completeness checks were before the questionnaire was submitted. Participants were able to review and change their answers through a Back button, and the survey never displayed a second time once the participants had filled it. The questionnaires which terminated early were not analyzed.

Data Collection Tools

The evaluation was composed of three parts: sociodemographic data and internship-related characteristics, the thoughts and beliefs regarding the use of PPEs, and the physical complaints related to the use of PPEs. The participants were asked to fill out questionnaires evaluating the sociodemographic information such as age, sex, body mass index (BMI), smoking habits, medications, and the medical diagnosis was questioned. The information related to internship (duration and frequency of the internship, whether the hospital is suitable for pandemic conditions, having contact with someone who has tested positive for COVID-19, being tested positive for COVID-19, being vaccinated for COVID-19) was asked to the participants. In the last part, the use of PPEs (medical mask, protective gloves, protective goggles, medical gowns, and medical coverall), the type of equipment, and access to PPEs were questioned.

The thoughts and beliefs of participants regarding the use of PPEs were evaluated using the questions prepared previously for HCPs.[19] Permission was obtained to use the questionnaire from the first author/corresponding author. The questionnaire consists of 20 items in 3 subgroups considering protection (8 items), comfort and difficulty (8 items), and accessibility (4 items). Each item is scored on a 5-point Likert scale (strongly disagree - strongly agree), and the total score is ranged from 5 to 100 points. However, in the present study, each item scored on a 3-point Likert scale (disagree - agree), and the total score is ranged from 3 to 60 points.

The physical complaints related to the use of PPEs were questioned. These physical complaints are (1) pain in the face, redness, and sores around the eyes, ears, and nose; (2) dryness, irritation, and scar on the hands; (3) nutritional disorders; (4) sleep disorders; (5) constipation; (6) urine-related problems; (7) dehydration headaches; (8) dryness in the skin due to dehydration; (9) dryness in the throat due to dehydration; (10) odor due to sweating; and (11) dehydration due to sweating. All items are answered as Yes or No, and the total number of physical complaints was calculated.[19]

Statistical Analysis

Statistical Package for Social Science (SPSS) version 21.0 for Windows software (SPSS, Inc., Chicago, IL, USA) was used for all statistical analyses. The Kolmogorov–Smirnov test was used to assess the data distribution. Descriptive statistics, including frequency, the percentage for nominal variables, and mean and standard deviation for continuous variables, were calculated.

Pearson correlation coefficient was analyzed to explore the relationship between the number of physical complaints and the subscales scores of the thoughts and beliefs related to PPE use. The significance level was set as $p<0.05$. The internal consistency of the thoughts and beliefs related to PPEs was analyzed through Cronbach alpha.

RESULTS AND DISCUSSION

Two hundred fifty individuals were invited to participate in the study, while 223 physiotherapy interns agreed to participate (mean age, 22.55±1.80 years; 162 female; mean BMI, 22.29±3.12 kg/m^2). The sociodemographic data and internship-related characteristics of the participants are presented in Table 1. Participants have been doing internships for 5.40±2.69 h a day, and 4.13±1.26 days a week in a hospital, and the mean duration of the internship is 6.30±5.56 weeks.

Table 1. Sociodemographic Data and Internship-related Characteristics of Participants

Parameters (N=223)	**N**	**%**
Age (years), mean±SD [min-max]		22.55±1.80 [19-32]
Sex		
Female	162	72.6
Male	61	27.4
Body mass index (kg/m^2), mean±SD [min-max]		22.29±3.12 [14.88-32.30]
Smoking habits		
Never smokers	132	59.2
Former smokers	24	10.8
Current smokers	67	30
Medication use		
Yes	34	15.2
No	189	84.8
Medical diagnosis		
Yes	47	21.1
No	176	78.9
Duration of the internship (weeks), mean±SD [min-max]		6.30±5.56 [1-30]
Frequency of the internship		
Days in a week		4.13±1.26 [2-5]
Hours in a day		5.40±2.69 [1-6]
Occupational health and safety training		
Yes	211	94.6
No	12	5.4
The hospital where the internship was made is a pandemic hospital		
Yes	146	65.5
No	77	34.5
The hospital where the internship was made is suitable for the pandemic situation.		
Yes	167	74.9
No	56	25.1
During the internship, there was a contact with someone who had tested positive for COVID-19.		
Yes	142	63.6
No	81	36.4
Tested positive for COVID-19		
Yes, I have tested positive during the internship.	96	43.2
Yes, I have tested positive ahead of the internship.	49	21.9
No	78	34.9
Administered at least one dose or fully vaccinated for COVID-19		
Yes	180	80.7
No	43	19.3

Data are expressed as number (percentage of the total number) and mean±standard deviation [minimum-maximum].

65.5% of the participants were doing internships in hospitals declared as pandemic hospitals by the Ministry of Health, and 74.9% thought that the hospital was suitable for pandemic conditions. One hundred forty-two participants (63.6%) reported having contact with a positive patient during the internship, and 80.7% had been vaccinated at least once. A total of 43.2% have tested positive for COVID-19 during the internship, and most of them reported that they have mild COVID-19.

Table 2 demonstrates the responses to the questions about using PPEs against the risk of COVID-19. The PPEs were provided to 63.7% of the participants by the institutions they did their internship.

All participants preferred to use the mask, and most of them (79.4%) were surgical masks. A total of 95.1% used protective gloves in case of COVID-19 risk, and 66.8% of them were disposable non-sterile gloves. Contrary to these, most participants did not use protective goggles, medical gowns, and medical overalls (94.2%, 96%, and 61%). A total of 66.4% of the participants stated that they were worried about finding new equipment while removing the PPEs.

Table 2. Response to Questions Related to the Use of Personal Protective Equipment Against the Risk of COVID-19

Personal Protective Equipment (N=223)	N	%
Providing personal protective equipment during the internship		
Yes	142	63.7
No	81	36.3
The use of the medical mask in case of COVID-19 risk		
Yes	223	100
No	0	0
Type of medical mask		
N95	6	2.7
Surgical mask	177	79.4
3M mask	26	11.7
All of them	14	6.3
The use of protective gloves in case of COVID-19 risk		
Yes	212	95.1
No	11	4.9
Type of protective gloves		
Disposable non-sterile gloves	149	66.8
Sterile gloves	58	26
Sachet gloves	5	2.2
The use of protective goggles in case of COVID-19 risk		
Yes	13	5.8
No	210	94.2
The use of medical gowns in case of COVID-19 risk		
Yes	9	4
No	214	96
The use of medical coveralls in case of COVID-19 risk		
Yes	87	39
No	136	61
The risk of running out of personal protective equipment		
Yes	75	33.6
No	148	66.4

Data are expressed as numbers (percentage of the total number).

The total score of the thoughts and beliefs related to PPEs use was 37.02±5.74. Respectively, protection, comfort and difficulty, accessibility subscale scores were 13.00±3.53, 18.02±4.53, 37.02±5.74 (Table 3).

Table 3. The Thoughts and Beliefs Related to the Use of Personal Protective Equipment Against the Risk of COVID-19

Thoughts and Beliefs (N=223)	Agree		Not Sure		Disagree	
	N	%	N	%	N	%
Protection						
I feel safe when I use gloves.	181	81.2	14	6.3	28	12.6
I feel safe when I use hand sanitizer.	147	65.9	59	26.5	17	7.6
I feel safe when I use a mask.	202	90.6	5	2.2	16	7.2
I find the protective goggles that I use sufficient.	44	19.7	126	56.5	53	23.8
I feel safe because I wear protective goggles.	80	35.9	104	46.6	39	17.5
I feel safe because I wear medical gowns.	94	42.2	90	40.4	39	17.5
I find the protective suits are sufficient in case of risk.	71	31.8	115	51.6	37	16.6
I feel safe because I wear a protective suit.	79	35.4	105	47.1	39	17.5
Protection total score, mean±SD [min-max]					13.00±3.53 [8-24]	
Comfort and difficulty						
The use of gloves makes it difficult for me to do my job.	53	23.8	32	14.3	138	61.9
Using a mask prevents me from doing my job.	55	24.7	49	22	119	53.4
Wearing protective goggles makes it hard for me to do my job.	46	20.6	96	43	81	36.3
I find the protective goggles uncomfortable.	58	26	93	41.7	72	32.3
Wearing medical gowns makes it hard for me to do my job.	33	14.8	83	37.2	107	48
Table 3 (Continued). The thoughts and beliefs related to the use of personal protective equipment against the risk of COVID-19.						
I find the medical gowns uncomfortable.	32	14.3	84	37.7	107	48
Wearing protective suits makes it hard for me to do my job.	38	17	101	45.3	84	37.7
I find the protective suits uncomfortable.	38	17	103	46.2	82	36.8
Comfort and difficulty total score, mean±SD [min-max]					18.02±4.53 [8-24]	
Accessibility						
I can easily change gloves when needed.	174	78	32	14.3	17	7.6
The unit I work in has enough hand sanitizer.	182	81.6	20	9	21	9.4
I can easily change my mask when necessary.	148	66.4	43	19.3	32	14.3
I can easily change my protective apron when necessary.	78	35	76	34.1	69	30.9
Accessibility total score, mean±SD [min-max]					5.99±2.17 [4-12]	
The total score, mean±SD [min-max]					37.02±5.74 [20-54]	

Data are expressed as numbers (percentage of the total number) and mean±standard deviation [minimum-maximum].

The total number of physical complaints was 3.89±2.97 and the most frequently reported physical complaints were dryness, irritation, and scar in the hands (Table 4). There was a significant relationship between the number of physical complaints and the subscales score of the thoughts and beliefs related to PPEs use (r=0.18, p=0.009 for the protection subscale, r=-0.35, p=0.001 for the comfort and difficulty subscale, and r=0.32, p=0.001 for accessibility). However, the number of physical complaints and the subscales score of the thoughts and beliefs related to PPEs were not significantly correlated with age, BMI, internship duration, and internship frequency. Only the protection subscale score was significantly associated with the frequency of internship days in a week (r=0.16, p=0.02). Cronbach alpha was 0.81 for the Protection subscale; Cronbach alpha was 0.88 for the Comfort and Difficulty subscale; Cronbach alpha was 0.76 for the Accessibility subscale, and Cronbach alpha was 0.72 overall.

Table 4. The Physical Complaints Related to the Use of Personal Protective Equipment Against the Risk of COVID-19

Physical Complaints (N=223)	N	%
Pain in the face, redness, sores (around the eyes, ears, and nose)		
Yes	105	47.1
No	118	52.9
Dryness, irritation, and the scar on the hands		
Yes	134	60.1
No	89	39.9
Nutritional disorders		
Yes	48	21.5
No	175	78.5
Sleep disorders		
Yes	58	26
No	165	74
Constipation		
Yes	33	14.8
No	190	85.2
Urine-related problems (infection and/or pain)		
Yes	15	6.7
No	208	93.3
Dehydration headaches		
Yes	118	52.9
No	105	47.1
Dryness in the skin due to dehydration		
Yes	87	39
No	136	61
Dryness in the throat due to dehydration		
Yes	117	52.5
No	106	47.5
Odor due to sweating		
Yes	56	25.1
No	167	74.9
Dehydration due to sweating		
Yes	86	38.6
No	137	61.4
Total number of physical complaints, mean±SD [min-max]		3.89±2.97 [0-11]

Data are expressed as numbers (percentage of the total number) and mean±standard deviation [minimum-maximum].

The present study aimed to investigate the behaviors and attitudes of the physiotherapy interns towards the use of PPEs in the COVID-19 pandemic. The findings pointed out that physiotherapy interns have highly contact with COVID-19-positive patients during the internship, and there is a risk of transmission. Although 100% wear masks and 80% are vaccinated at least once, 43% have tested positive for COVID-19 during the internship. Approximately 67% stated that being worried about finding new equipment while removing the PPEs. The recent narrative review emphasized that using only equipment is insufficient to reduce the risk of transmission; indeed, it is necessary to don and doff the equipment in the correct order and pay attention to its disposal.[20] Similarly, a prospective cohort study revealed that the risk of contracting COVID-19 decreased as the level of knowledge of the participants about PPEs increased.[21] Thus, healthcare systems must prioritize the procurement and distribution of PPEs, and provide adequate training to interns in its use.

The present study showed that the most used PPEs were surgical masks, which is similar to previous findings.[22] A recent study pointed out that European radiologists

prefer to use FFP2 masks when providing face-to-face ultrasound services in COVID-19 positive patients, but prefer to use surgical masks in COVID-19 asymptomatic patients.[23] However, other studies have found that the N95 mask provides the best protection and is used more often.[24] The reason for this difference in findings may be due to the availability and cost of the N95 mask. In addition, the present findings also showed that the participants mostly preferred to use disposable non-sterile gloves, similar to the previous study.[25] Although most of the participants received occupational health and safety training, they did not receive special training on which equipment to use during their internship. Besides, the availability of equipment can be considered a factor affecting the usage rate because studies have shown that HCPs are concerned about PPE shortages.[26]

The thoughts and beliefs related to the use of PPEs against the risk of COVID-19 were assessed by the questionnaire. In the previous study, each item scored a 5-point Likert scale, and the total score is ranged from 5 to 100 points; however, in the present study, each item scored a 3-point Likert scale, and the total score is ranged from 3 to 60 points, with Cronbach alpha was 0.72 overall.[19] A 3-point Likert scale was used to reduce the length of time of the survey.

The present study pointed out the number of physical complaints associated with the thoughts and beliefs related to PPE use. The most rated physical complaints are dryness, irritation, scar on the hands, dehydration headaches, and dryness in the throat. Similarly, it was concluded that prolonged use of N95 and surgical masks by HCPs during COVID-19 has caused adverse effects such as headaches, rash, acne, skin breakdown, and impaired cognition.[27] Besides, the complaints about inconvenience at work and pressure sores were more frequently reported by the HCPs who worked in PPE for more than 4 hours; the longer the duration of wearing PPE, the greater the rate of complaints about discomfort.[28] The management of adverse effects related to prolonged PPEs use might be provided with frequent breaks, improved hydration and rest, and skincare; however, more than half of the participants worried about finding new equipment while removing the PPEs.

These physical complaints are linked to medical masks and protective gloves. The use of masks and gloves have had dermatological adverse effects on HCPs, and nurses and female HCPs were at a higher intrinsic risk of developing dermatological reactions.[29] In the present study, the total number of physical complaints is lower than HCPs in the previous study.[19] The first reason for this difference may be that the interns did not use PPEs for as long HCPs. Studies have shown that prolonged exposure to PPEs increases physical complaints.[12,28,30] At the same time, some PPEs cover the whole body and increase heat stress and the complaints caused by it – such as sweating, dehydration due to sweating, odor due to sweating, and headache due to dehydration- in HCPs.[31] From this point of view, some equipment may be more uncomfortable than others. Thus we thought that physical complaints were also more minor since some types of equipment -like gowns and medical coveralls- were less used among physiotherapy interns.

This study has some limitations that should be highlighted. First, we have a small study population since some universities stopped internships according to the number of cases in the country and the course of the pandemic. Second, it was carried out through an online platform. Third, we did not ask about the mask use status of the patients with whom the participants were in contact during the treatment, and we did not ask whether the patient showed symptoms or not, which may affect the use of PPEs by the participants. Fourth, we did not ask the participants if they had a dermatological disease before. Pre-existing physical complaints of the participants may increase the discomfort due to PPEs.

CONCLUSION AND RECOMMENDATIONS

Even though all interns wear masks and most wear gloves, physiotherapy interns might still get COVID-19. This result is significant because most goggles, gowns, and coveralls are not used during the internship, which may increase the risk of getting COVID-19. Interns who are worried about finding new equipment do not change the PPEs and may increase their risk of getting COVID-19. This study raises awareness about preventive measures among physiotherapy interns, who are the future HCPs, during the COVID-19 pandemic.

PPEs are essential in protecting against epidemics and infectious diseases that threaten public health; thus, it is necessary to provide PPEs and share instructions on using PPEs with interns for a safe treatment process. Further studies involving larger samples, including interns and HCPs, should be conducted.

Declaration of Conflicting Interests

The authors declare no potential conflicts of interest concerning the research, authorship and/or publication of this article.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Acknowledgment

The authors would like to thank the physiotherapy interns who participated in the study.

REFERENCES

1. Sohrabi, C, Alsafi, Z, O'Neill, N, Khan, M, Kerwan, A, Al-Jabir, A, Iosifidis, C and Agha, R. (2020). "World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19)". International Journal of Surgery, 76, 71-76. https://doi.org/10.1016/j.ijsu.2020.02.034

2. Strielkowski, W. (2020). "COVID-19 Pandemic and the digital revolution in academia and higher education". Preprints. 2020040290. https://doi.org/10.20944/preprints202004.0290.v1

3. World Health Organization. (2020). "Tracking SARS-CoV-2 variants". Access adress: https://www.who.int/en/activities/tracking-SARS-CoV-2-variants/ (Accessed date: 26 June 2022).

4. Liu, H, Zhang, J, Cai, J, Deng, X, Peng, C, Chen, X, Yang, J, Wu, Q, Chen, X, Chen, Z, Zheng, W, Viboud, C, Zhang, W, Ajelli, M. and Yu, H. (2022). "Investigating vaccine-induced immunity and its effect in mitigating SARS-CoV-2 epidemics in China". BMC Medicine, 20(1), 37. https://doi.org/10.1186/s12916-022-02243-1

5. Pascarella, G, Strumia, A, Piliego, C, Bruno, F, Del Buono, R, Costa, F, Scarlata, S. and Agrò, F.E. (2020). "COVID-19 diagnosis and management: a comprehensive review". Journal of Internal Medicine, 288(2), 192-206. https://doi.org/10.1111/joim.13091

6. Guo, Y.R, Cao, Q.D, Hong, Z.S, Tan, Y.Y, Chen, S.D, Jin, H.J, Tan, K.S, Wang, D.Y. and Yan, Y. (2020). "The origin, transmission and clinical therapies on coronavirus disease 2019 (COVID-19) outbreak - an update on the status". Military Medical Research, 7(1), 11. https://doi.org/10.1186/s40779-020-00240-0

7. Kluge, H.H.P, Wickramasinghe, K, Rippin, H.L, Mendes, R, Peters, D.H, Kontsevaya, A. and Breda, J. (2020). "Prevention and control of non-communicable diseases in the COVID-19 response". Lancet, 395(10238), 1678-1680. https://doi.org/10.1016/S0140-6736(20)31067-9

8. World Health Organization. (2020). "WHO releases guidelines to help countries maintain essential health services during the COVID-19 pandemic". Access adress: https://www.who.int/news/item/30-03-2020-who-releases-guidelines-to-help-countries-maintain-essential-health-services-during-the-covid-19-pandemic (Accessed date: 26 June 2022).

9. Ağalar, C. and Engin, D.Ö. (2020). "Protective measures for COVID-19 for healthcare providers and laboratory personnel". Turkish Journal of Medical Sciences, 50(SI-1), 578-584. https://doi.org/10.3906/sag-2004-132

10. Jha, S.K. (2020). "Physiological effects of N95 FFP and Personal protective equipment in healthcare workers in COVID ICU: A prospective cohort study". Indian Journal of Critical Care Medicine, 24(12), 1156-1157. https://doi.org/10.5005/jp-journals-10071-23690

11. Cohen, J. and van der Meulen Rodgers, Y. (2020). "Contributing factors to personal protective equipment shortages during the COVID-19 pandemic". Preventive Medicine, 141, 106263. https://doi.org/10.1016/j.ypmed.2020.106263

12. Davey, S.L, Lee, B.J, Robbins, T, Randeva, H. and Thake, C.D. (2021). "Heat stress and PPE during COVID-19: impact on healthcare workers' performance, safety and well-being in NHS settings". Journal of Hospital Infection, 108, 185-188. https://doi.org/10.1016/j.jhin.2020.11.027

13. Coca, A, Quinn, T, Kim, J-H, Wu, T, Powell, J, Roberge, R. and Shaffer, R. (2017). "Physiological evaluation of personal protective ensembles recommended for use in West Africa". Disaster Medicine and Public Health Preparedness, 11(5), 580-586. https://doi.org/ 10.1017/dmp.2017.13

14. Sarmasoğlu, Ş, Tarakçıoğlu Çelik, G.H. ve Korkmaz, F. (2020). "İnceleme: COVID-19 hastalığından korunmaya yönelik kişisel koruyucu ekipman kullanımı". Hacettepe Üniversitesi Hemşirelik Fakültesi Dergisi, 7, 47-65. https://doi.org/10.31125/hunhemsire.776491

15. Ayu, N.M.S, Novieastari, E, Gayatri, D, Handiyani, H. and Arruum, D. (2021). "Personal protective equipment and nurse self-efficacy due to Coronavirus disease-19 pandemic: A systematic review". Open Access Macedonian Journal of Medical Sciences, 9(G), 195-202. https://doi.org/10.3889/oamjms.2021.7151

16. Jessop, Z.M, Dobbs, T.D, Ali, S.R, Combellack, E, Clancy, R., Ibrahim, N, Jovic, T.H, Kaur, A.J, Nijran, A. and O'Neill, T.B. (2020). "Personal protective equipment for surgeons during COVID-19 pandemic: systematic review of availability, usage and rationing". British Journal of Surgery, 107(10), 1262-1280. https://doi.org/10.1002/bjs.11750

17. Halcomb, E, McInnes, S, Williams, A, Ashley, C, James, S, Fernandez, R, Stephen, C. and Calma, K. (2020). "The experiences of primary healthcare nurses during the COVID-19 pandemic in Australia". Journal of Nursing Scholarship, 52(5), 553-563. https://doi.org/10.1111/jnu.12589

18. Sampaio, F, Sequeira, C. and Teixeira, L. (2021). "Impact of COVID-19 outbreak on nurses' mental health: A prospective cohort study". Environmental Research, 194, 110620. https://doi.org/10.1016/j.envres.2020.110620

19. Çiriş Yildiz, C, Ulaşli Kaban, H. and Tanriverdi, F.Ş. (2022). "COVID-19 pandemic and personal protective equipment: Evaluation of equipment comfort and user attitude". Archives of Environmental & Occupational Health, 77(1), 1-8. https://doi.org/10.1080/19338244.2020.1828247

20. Cook, T.M. (2020). "Personal protective equipment during the coronavirus disease (COVID) 2019 pandemic - a narrative review". Anaesthesia, 75(7), 920-927. https://doi.org/10.1111/anae.15071

21. Haegdorens, F, Franck, E, Smith, P, Bruyneel, A, Monsieurs, K.G. and Van Bogaert, P. (2022). "Sufficient personal protective equipment training can reduce COVID-19 related symptoms in healthcare workers: A prospective cohort study". International Journal of Nursing Studies, 126, 104132. https://doi.org/10.1016/j.ijnurstu.2021.104132

22. Princeton, B, Santhakumar, P. and Prathap, L. (2020). "Awareness on preventive measures taken by health care professionals attending COVID-19 patients among dental students". European Journal of Dentistry, 14(S 01), S105-S109. https://doi.org/ 10.1055/s-0040-1721296

23. Adriaensen, M.E, Dalili, D, Lamb, H, and Ricci, P. (2022). "Use of personal protective equipment by European Radiologists during the COVID-19 pandemic, a survey of the European Union of Medical Specialists (UEMS)". Insights Into Imaging, 13(1), 20. https://doi.org/10.1186/s13244-021-01154-8

24. Sharaf, R.F. and Kabel, N. (2021). "Awareness and knowledge of undergraduate dental students about the signs and symptoms of Corona viral infection (COVID-19), and the required infection control measures to prevent its spread". Bulletin of the National Research Centre, 45(1), 32. https://doi.org/10.1186/s42269-021-00494-1.

25. Dodamani, A.S, Jadhav, H.C, Khairnar, M.R. and Naik, R.G. (2021). "Dental professionals' knowledge and behavior towards utilization of gloves: a cross-sectional survey". Journal of Preventive Medicine and Hygiene, 61(4), E636-E641. https://doi.org/10.15167/2421-4248/jpmh2020.61.4.1291

26. Bourne, T, Kyriacou, C, Shah, H, Ceusters, J, Preisler, J, Metzger, U, Landolfo, C, Lees, C. and Timmerman, D. (2022). "Experiences and well-being of healthcare professionals working in the field of ultrasound in obstetrics and gynaecology as the SARS-CoV-2 pandemic were evolving: a cross-sectional survey study". BMJ Open, 12(2), e051700. https://doi.org/10.1136/bmjopen-2021-051700

27. Rosner, E. (2020). "Adverse effects of prolonged mask use among healthcare professionals during COVID-19". Journal of Infectious Diseases and Epidemiology, 6(3), 130. https://doi.org/10.23937/2474-3658/1510130

28. Xia, W, Fu, L, Liao, H, Yang, C, Guo, H. and Bian, Z. (2020). "The physical and psychological effects of personal protective equipment on health care workers in Wuhan, China: A cross-sectional survey study". Journal of Emergency Nursing, 46(6), 791-801.e7. https://doi.org/ 10.1016/j.jen.2020.08.004

29. Santoro, P.E, Borrelli, I, Gualano, M.R, Proietti, I, Skroza, N, Rossi, M.F, Amantea, C, Daniele, A, Ricciardi, W, Potenza, C. and Moscato, U. (2022). "The dermatological effects and occupational impacts of personal protective equipment on a large sample of healthcare workers during the COVID-19 pandemic". Frontiers in Public Health, 9, 815415. https://doi.org/ 10.3389/fpubh.2021.815415

30. O'Brien, W.H, Wang, S, Varga, A.V, Xu, H, Sims, T, Horan, K. and Lim, C.X. (2021). "Predicting personal protective equipment use, trauma symptoms, and physical symptoms in the USA during the early weeks of the COVID-19 lockdown (April 9-18, 2020)". Journal of Contextual Behavioral Science, 21, 37-47. https://doi.org/10.1016/j.jcbs.2021.05.003

31. Bongers, C.C, de Korte, J.Q, Zwartkruis, M, Levels, K, Kingma, B.R. and Eijsvogels, T.M. (2022). "Heat strain and use of heat mitigation strategies among COVID-19 healthcare workers wearing personal protective equipment-A retrospective study". International Journal of Environmental Research and Public Health, 19(3), 1905. https://doi.org/10.3390/ijerph19031905