Original paper

Patient involvement in healthcare professionals' hand hygiene compliance before and during the COVID-19 pandemic

Ocena higieny rąk personelu medycznego przez pacjentów przed pandemią i w czasie pandemii COVID-19

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Słowa kluczowe: bezpieczeństwo pacjentów, higiena rąk, zapobieganie zakażeniom, wzmacnianie pozycji pacjentów, pandemia COVID-19.

Abstract

Introduction: The need to educate the public about proper hand hygiene (HH) practices has gained prominence in light of the global epidemiological situation, particularly the emergence of the COVID-19 pandemic.
Aim of the research: To examine the patients' views of Health Care Providers' (HCPs) HH compliance before and during the COVID-19 pandemic.
Material and methods: The study was conducted through a diagnostic survey and involved 192 participants.
Results: According to 84.9% of respondents, HCPs' HH is significant for patients' health. This belief was held by most respondents both before and during the COVID-19 pandemic ($p = 0.018$). The greater part of respondents (74.5%) believed that the observance of HH by HCPs prevents infections among patients. However, notably, during the pandemic, there was a significant increase in the proportion of respondents who associated HCPs' HH practices with professionalism (45.4% vs. 63.2%, $p = 0.014$). Nurses were more likely to perform hand hygiene than other HCPs before and during the COVID-19 pandemic ($p = 0.034$).
Conclusions: During the COVID-19 pandemic, patients considered HCPs to be more professional or thought that medics were much more likely to perform HH before examining a patient or performing sterile procedures. In addition, the COVID-19 pandemic affected the perception of nurses as those HCPs who perform hand hygiene more often than others. The pandemic did not change patients' beliefs about the possibility of influencing the hygiene behaviour of HCPs. In contrast, patients observed that hand hygiene was promoted more often during the pandemic than before the pandemic.

Streszczenie

Wprowadzenie: Potrzeba edukacji społeczeństwa na temat właściwych praktyk higieny rąk zyskała na znaczeniu w świetle globalnej sytuacji epidemiologicznej, szczególnie w związku z pojawieniem się pandemii COVID-19.
Cel pracy: Zbadanie opinii pacjentów na temat zgodności pracowników opieki zdrowotnej z zasadami higieny rąk przed pandemią COVID-19 i w jej trakcie.
Materiał i metody: Badanie przeprowadzono przy użyciu ankiety i obejmowało 192 uczestników podzielonych na dwie grupy.
Wyniki: Według 84,9% respondentów higiena rąk personelu medycznego jest istotna dla zdrowia pacjentów. Przekonanie to było podzielane przez większość respondentów zarówno przed pandemią, jak i w jej trakcie ($p = 0{,}018$). Większość respondentów (74,5%) uważała, że przestrzeganie zasad higieny rąk przez pracowników opieki zdrowotnej zapobiega zakażeniom wśród pacjentów. Zauważalny był jednak znaczący wzrost odsetka respondentów, którzy w trakcie pandemii kojarzyli wykonywanie higieny rąk pracowników z profesjonalizmem (45,4% *vs* 63,2%, $p = 0{,}014$). Pielęgniarki częściej stosowały higienę rąk niż inni pracownicy zarówno przed pandemią COVID-19, jak i w jej trakcie ($p = 0{,}034$).
Wnioski: W czasie pandemii COVID-19 pacjenci uznali pracowników opieki zdrowotnej za bardziej profesjonalnych. Zauważyli, że medycy częściej stosowali higienę rąk przed badaniem pacjenta lub wykonywaniem procedur jałowych niż przed pandemią. Ponadto pandemia COVID-19 wpłynęła na postrzeganie pielęgniarek jako tych pracowników, którzy częściej stosują higienę rąk niż pozostali. Pandemia nie zmieniła przekonań pacjentów dotyczących możliwości wpływania na zachowania higieniczne personelu medycznego. Pacjenci spostrzegli jednak, że higiena rąk była częściej promowana w trakcie pandemii niż przed pandemią.

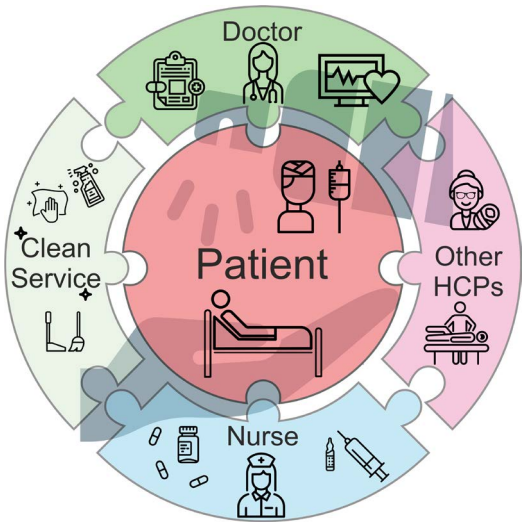

Figure 1. The importance of patient empowerment in hand hygiene as an essential factor in preventing healthcare-associated infections (HAIs) [Infographic created based on the author's original concept]

Introduction

Hand hygiene (HH) constitutes one of the key elements in infection prevention within the healthcare setting [1, 2]. It is widely recognised that the most common route of microbial transmission within healthcare facilities is through the hands of healthcare personnel, often involving contamination of surrounding or nearby patient's surfaces (e.g. equipment, clothing, beds, door handles) [1, 2]. Numerous publications emphasise the significance of proper HH, which mitigates reduction in either patient colonisation with epidemiologically relevant pathogens (*Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, *Enterococcus faecium*, *Acinetobacter baumannii*, and others) or healthcare-associated infections (HAIs). HAIs increase morbidity, prolong hospital stay, and are a major financial burden to healthcare systems [1]. The contaminated hands not only lead to transmission of pathogenic microorganisms but increase the risk of occupational exposure. This issue, therefore, carries significant health, social, and economic implications as it pertains to healthcare workers and the patients receiving medical care [1, 2]. Hence, the challenge of ensuring proper HH in the domain of healthcare provision has been the subject of extensive scientific research [1–3]. Previous reports have primarily focused on the assessment of health care providers' (HCPs) knowledge and skills pertaining to the procedures of hand washing and disinfection [4]. The initial step in engaging patients in hand hygiene as a pivotal element of infection control and prevention was undertaken by the World Health Organisation (WHO) in 2009 [5]. The engagement of patients is intended to be an integral component of patient-centred healthcare and a crucial element of ensuring safety, given the continually changing awareness of patients in this regard. Both WHO and Centres for Disease Control and Prevention (CDC) have developed educational programs for patients, emphasising their substantial role in preventing healthcare-associated infections. Currently, there is a lack of randomised studies highlighting the role of patients in hand hygiene interventions [6].

The existing global scientific literature includes reports assessing the HH behaviours of healthcare workers as perceived by patients. However, in Poland, such reports are currently lacking (Figure 1).

Another step in raising patient awareness regarding HH was the coronavirus disease 2019 (COVID-19) pandemic [7, 8]. The first cases of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) were first detected in China in December 2019. On 11 March 2020, the WHO declared COVID-19 as a pandemic, which lasted for over 3 years. Since the COVID-19 pandemic started, over 2 million people in the European region have died from the disease [9; WHO].

As a result of the COVID-19 pandemic, there was a sudden need for educating the population on hygiene practices, driven by the prevailing global epidemiological situation. Traditionally, HCPs have been the primary group expected to uphold proper practices and serve as exemplars in this regard. However, during the COVID-19 pandemic, discussions extended beyond the necessity of mask-wearing, emphasising HH not only among healthcare personnel and during hospitalisation but also in everyday life. The pandemic elevated this realm of health-related activities to a matter of significant societal importance. Over the past 2 years, education concerning HH has become widespread [10, 11]. However, it should be noted that education should yield tangible results, which should be subject to assessment.

Aim of the research

The aim of this study was to compare the HH practices of HCPs providing healthcare services, as evaluated by patients before and during the COVID-19 pandemic.

Material and methods

The study was conducted on a population of 97 patients during the COVID-19 pandemic (January–February 2022) and compared with the results of a study conducted before the pandemic (September–October 2019) on a population of 95 patients. The study group comprised patients receiving healthcare services at a Krakow hospital, both within inpatient hospital departments and outpatient clinics. Patients were tasked with assessing healthcare services based on their observations in various healthcare facilities. A diagnos-

tic survey method employing a questionnaire was utilised. The questionnaire, designed specifically for this research, consisted of 19 questions, of which 18 were closed-ended. The survey questionnaire was personally administered by the researcher to each patient who provided informed consent to participate in the study, along with an explanation of how to complete the questionnaire.

Statistical analysis

Associations between categorical variables were assessed using the Pearson χ^2 test or Fisher exact test, and the results are given as numbers and percentages. Student's *t*-test was used to assess the age of the studied groups of patients. Statistical significance was defined as $p < 0.05$ for all tests. Statistical analyses were carried out using IBM SPSS Statistics version 28. Some responses were excluded due to inaccuracies or incomplete answers by the respondents.

Ethics

Each patient was informed by the researcher about the purpose of the study, as well as the anonymity and voluntary nature of completing the questionnaire. The study was conducted with the approval of the Hospital's Medical Director. The study did not collect sensitive data; only parameters such as gender and age were obtained. Ethical approval (Resolution No. 61/2021) was obtained from the Bioethics Committee of Andrzej Frycz Modrzewski Krakow University, Poland.

Results

Among the respondents participating in our study, women were in the majority. Before the pandemic, 59.8% of women participated in the survey, while during the pandemic, this figure rose to 61.1%. The age structure of the patients did not differ significantly between the 2 studied periods (before the pandemic, it was 51.20 ±17.69, with the youngest participant being 19 years old and the oldest 84 years old, whereas during the COVID-19 pandemic, the mean age was 54.09 ±15.07, with the youngest participant being 20 years old and the oldest 77 years old). The survey included patients who accessed medical services with varying frequency, with the most numerous group comprising patients who had contact with healthcare facilities several times a year, both before and during the pandemic (75.3% vs. 74.7%; Table 1). Generally, according to 99.0% of respondents participating in the study, hand washing and disinfection by HCPs are deemed highly important for patient health (Table 1, Q4). Patient awareness regarding compliance with HH practices by healthcare workers to prevent infections among patients was very high (74.5%) and remained unchanged during the pandemic (Q17; $p = 0.322$). The pandemic also had no significant impact on the perception that HH protects HCPs themselves ($p = 0.197$) or that it is a significant element in preventing pathogen transmission ($p = 0.772$). However, significantly more respondents during the pandemic period (45.4% vs. 63.2%) considered HH of healthcare personnel as indicative of their professionalism (Q17; $p = 0.014$).

Furthermore, nurses were more frequently indicated by the respondents as workers performing HH compared to other healthcare personnel both before and during the COVID-19 pandemic ($p = 0.034$; Q5). Moreover, during the pandemic, nurses were even more commonly identified as the individuals performing HH than before the pandemic.

Slightly over half of the participants (55.1%) indicated consistent adherence to HH practice before procedures involving skin integrity disruption. Before the COVID-19 pandemic, only 33.3% of respondents believed that HCPs always washed/disinfected their hands before examining patients, drawing blood, or administering injections. However, during the SARS-CoV-2 pandemic, more than twice as many respondents asserted this practice (78%) ($p < 0.001$; Q6). Prior to the COVID-19 pandemic, participants were nearly twice as likely (40.4% vs. 23.4%) to hold the view that wearing disposable gloves was more important for patient safety than hand washing and disinfection ($p = 0.049$; Q7).

Over two-thirds of the surveyed participants (93.7%) reported feeling safe when HCPs performed HH before conducting medical procedures on them. However, no significant differences were observed in responses before and during the pandemic ($p = 0.063$; Q8). Furthermore, 94.8% of the respondents also felt just as safe when healthcare personnel used protective gloves during medical procedures. Nevertheless, no statistically significant differences were found between the surveyed periods ($p = 0.180$; Q9). Respondents most frequently emphasised the necessity of physicians' HH before examinations (95.3%), while, least frequently, they pointed to the situation after glove removal (27.1%). No statistical differences in responses were observed between the examined time periods (Q10). Before the COVID-19 pandemic, patients believed that 44.3% of doctors and 25% of nurses did not wash/disinfect their hands before performing a medical procedure. However, during the pandemic, these figures decreased for both physicians and nurses to 33.7% and 16%, respectively ($p = 0.022$ and $p = 0.009$; Q11 and Q12). Both before and during the pandemic, patients more often observed that doctors did not perform HH compared to nurses.

A vast majority of the respondents (86%) believed that they had the right to remind a physician or nurse to perform HH, and the occurrence of the pandemic did not significantly affect their awareness of these rights (86.6% vs. 85.3%) ($p = 0.094$; Q13). During the pandemic, respondents significantly more often

Table 1. Descriptive survey results regarding patients' knowledge and perceived behaviours regarding healthcare workers' hand hygiene before and during the COVID-19 pandemic

Variable	Before the pandemic		During the pandemic		Total		$\chi^2(3)$	*P*-value
Q1: Sex	***N***	**%**	***N***	**%**	***N***	**%**		
Women	58	59.8	58	61.1	116	60.4	0.03	0.884
Men	39	40.2	37	38.9	76	39.6		
Total	97	100	95	100	192	100		
Q2: Age	**M**	**SD**	**M**	**SD**	**M**	**SD**	**t(189)**	
Age [years]	50.76	16.68	55.43	15.84	52.62	16.47	–1.94	0.055
Q3: How often do you make use of medical services?	***N***	**%**	***N***	**%**	***N***	**%**	$\chi^2(3)$	
Once a year	10	10.3	15	15.8	25	13	3.64	0.303
Several times a year	73	75.3	71	74.7	144	75		
Several times a month	14	14.4	8	8.4	22	11.5		
At least once a week	0	0	1	1.1	1	0.5		
Total	97	100	95	100	192	100		
Q4: Is hand hygiene of the medical staff important for the patient's health?	***N***	**%**	***N***	**%**	***N***	**%**	$\chi^2(2)$	
Yes	97	100	93	97.9	163	99	2.06	0.356
No	0	0	1	1.1	1	0.5		
I have no opinion on this subject	0	0	1	1.1	1	0.5		
Total	97	100	95	100	192	100		
Q5: Which medical staff member performs hand hygiene more frequently?	***N***	**%**	***N***	**%**	***N***	**%**	$\chi^2(3)$	
Physician	28	35.4	15	19.5	43	27.6	8.69	0.034
Nurse	48	60.8	62	80.5	110	70.5		
Physiotherapist	3	3.8	0	0	3	1.9		
Total	79	100	77	100	156	100		
Q6: Do members of the medical staff always perform hand hygiene before procedures such as patient examination, blood collection, etc.?	***N***	**%**	***N***	**%**	***N***	**%**	$\chi^2(3)$	
Yes	32	33.3	71	78	103	55.1	40.04	< 0.001
No	32	33.3	8	8.8	40	21.4		
I don't know. Hard to say	32	33.3	12	13.2	44	23.5		
Total	96	100	91	100	187	100		

Table 1. Cont.

Variable		Before the pandemic		During the pandemic		Total		$\chi^2(3)$	*P*-value
Q7: Do disposable gloves provide greater protection to the patient than hand hygiene?		***N***	**%**	***N***	**%**	***N***	**%**	$\chi^2(4)$	
Definitely yes		38	40.4	22	23.4	60	31.9	9.54	0.049
Probably yes		32	34	37	39.4	69	36.7		
Probably no		17	18.1	30	31.9	47	25		
Definitely no		7	7.4	5	5.3	12	6.4		
Total		94	100	94	100	188	100		
Q8: Do you feel safer if a healthcare worker performs hand hygiene before, for example, taking blood, conducting a medical examination, or giving an injection?		***N***	**%**	***N***	**%**	***N***	**%**	$\chi^2(4)$	
Definitely yes		79	81.4	66	69.5	145	75.5	8.93	0.063
Probably yes		13	13.4	22	23.2	35	18.2		
Probably no		1	1	5	5.3	6	3.1		
Definitely no		0	0	1	1.1	1	0.5		
I've never thought about it		4	4.1	1	1.1	5	2.6		
Total		97	100	95	100	192	100		
Q9: Do you feel safer if medical staff perform procedures while wearing gloves?		***N***	**%**	***N***	**%**	***N***	**%**	$\chi^2(3)$	
Definitely yes		75	77.3	60	63.2	135	70.3	4.89	0.18
Probably yes		18	18.6	29	30.5	47	24.5		
Probably no		2	2.1	4	4.2	6	3.1		
I've never thought about it		2	2.1	2	2.1	4	2.1		
Total		97	100	95	100	192	100		
Q10[a]: In what situations should a doctor perform hand hygiene?		***N***	**%**	***N***	**%**	***N***	**%**	$\chi^2(1)$	
Before examining the patient	It was not indicated	6	6.2	3	3.2	9	4.7	0.99	0.497
	before examining the patient	91	93.8	92	96.8	183	95.3		
After examining the patient	It was not indicated	53	54.6	39	41.1	92	47.9	3.55	0.063
	after examining the patient	44	45.4	56	58.9	100	52.1		

Table 1. Cont.

Variable		Before the pandemic		During the pandemic		Total		$\chi^2(3)$	*P*-value
Before changing a dressing	It was not indicated	48	49.5	36	37.9	84	43.8	2.62	0.112
	before changing the dressing	49	50.5	59	62.1	108	56.3		
After removing gloves	It was not indicated	77	79.4	63	66.3	140	72.9	4.15	0.051
	after removing gloves	20	20.6	32	33.7	52	27.1		
	Total	97	100.0	95	100.0	192	100.0		
Q11: Has it happened that a doctor did not perform hand hygiene before an examination?		***N***	**%**	***N***	**%**	***N***	**%**	$\chi^2(3)$	
Yes		43	44.3	32	33.7	75	39.1	9.62	0.022
No		16	16.5	30	31.6	46	24.0		
I don't remember		17	17.5	22	23.2	39	20.3		
I didn't notice that		21	21.6	11	11.6	32	16.7		
Total		97	100.0	95	100.0	192	100.0		
Q12: Has it happened that a nurse did not perform hand hygiene before administering an injection, taking blood, or measuring blood pressure?		***N***	**%**	***N***	**%**	***N***	**%**	$\chi^2(3)$	
Yes		24	25.0	15	16.0	39	20.5	11.66	0.009
No		32	33.3	53	56.4	85	44.7		
I don't remember		20	20.8	17	18.1	37	19.5		
I didn't notice that		20	20.8	9	9.6	29	15.3		
Total		96	100.0	94	100.0	190	100.0		
Q13: Does the patient have the right to remind a healthcare worker to perform hand hygiene?		***N***	**%**	***N***	**%**	***N***	**%**	$\chi^2(3)$	
Definitely yes		49	50.5	36	37.9	85	44.3	6.39	0.094
Probably yes		35	36.1	45	47.4	80	41.7		
Probably no		13	13.4	11	11.6	24	12.5		
Definitely no		0	0.0	3	3.2	3	1.6		
Total		97	100.0	95	100.0	192	100.0		
Q14: Does the patient have an influence on healthcare workers' compliance with hand hygiene?		***N***	**%**	***N***	**%**	***N***	**%**	$\chi^2(3)$	
Definitely yes		32	33.3	19	20.0	51	26.7	4.75	0.191
Probably yes		36	37.5	46	48.4	82	42.9		
Probably no		26	27.1	27	28.4	53	27.7		
Definitely no		2	2.1	3	3.2	5	2.6		
Total		96	100.0	95	100.0	191	100.0		

Table 1. Cont.

Variable		Before the pandemic		During the pandemic		Total		$\chi^2(3)$	*P*-value
Q15: What emotions are evoked in you by a healthcare worker who does not perform hand hygiene?		***N***	**%**	***N***	**%**	***N***	**%**	$\chi^2(3)$	
Fear		34	37.0	34	37.0	68	37.0	0.15	0.985
Helplessness		19	20.7	20	21.7	39	21.2		
Anger		22	23.9	20	21.7	42	22.8		
It doesn't evoke any emotions		17	18.5	18	19.6	35	19.0		
Q16: Have you ever asked a healthcare worker to perform hand hygiene?		***N***	**%**	***N***	**%**	***N***	**%**	$\chi^2(1)$	
Yes		3	3.1	10	10.5	13	6.8	4.12	0.049
No		93	96.9	85	89.5	178	93.2		
Total		96	100.0	95	100.0	191	100.0		
Q17[a]: What role does hand hygiene play in healthcare facilities?		***N***	**%**	***N***	**%**	***N***	**%**	$\chi^2(1)$	
It prevents infections among patients	Not specified	28	28.9	21	22.1	49	25.5	1.15	0.322
	Specified	69	71.1	74	77.9	143	74.5		
It points to professionalism of the staff	Not specified	53	54.6	35	36.8	88	45.8	6.12	0.014
	Specified	44	45.4	60	63.2	104	54.2		
It protects staff from infection	Not specified	50	51.5	40	42.1	90	46.9	1.72	0.197
	Specified	47	48.5	55	57.9	102	53.1		
It is a significant element in preventing the spread of microorganisms	Not specified	42	43.3	39	41.1	81	42.2	0.10	0.772
	Specified	55	56.7	56	58.9	111	57.8		
	Total	97	100.0	95	100.0	192	100.0		
Q18: Is hand hygiene promoted in healthcare facilities?		***N***	**%**	***N***	**%**	***N***	**%**	$\chi^2(3)$	
Yes – it is promoted adequately		24	24.7	44	47.3	68	35.8	13.20	0.004
Yes – it is promoted, but insufficiently		50	51.5	29	31.2	79	41.6		
No – it is not promoted		10	10.3	5	5.4	15	7.9		
I don't have an opinion on this matter		13	13.4	15	16.1	28	14.7		

Q – Question, [a] – multiple choice question, N – number of observations, $\chi^2(df)$ – chi square test result (number of degrees of freedom), p – statistical significance, M – average, SD – standard deviation, t(df) – value of the Student's t test statistic (degrees of freedom), b – not all participants completed the question. The percentages have been calculated from the number of answers received.

(Q16; $p = 0.049$) felt that they had the right to ask HCPs to wash and disinfect their hands (10.5%) compared to before the pandemic (3.1%).

69.6% of the respondents believed that they had an influence on healthcare personnel's adherence to the HH practice. However, no differences were observed in responses between the examined time periods (Q14). At the same time, when HCPs did not perform hand hygiene, patients experienced negative emotions, with fear being the most frequently reported emotion (37%). There were no significant differences in the expression of emotions by respondents in the studied time periods ($p = 0.985$; Q15). The occurrence of the pandemic did not affect the emergence of negative emotions related to the lack of HH by HCPs, regardless of the respondents' age ($p = 0.069$) and gender ($p = 0.305$).

A substantial majority of respondents (74.5%) acknowledged that adherence to HH practices by healthcare providers prevents infections among patients. Patients' awareness in this regard remained unchanged during the pandemic (Q17; $p = 0.322$). The pandemic also did not affect the perception that HH protects healthcare workers themselves ($p = 0.197$) or that it is a crucial element in preventing pathogen transmission ($p = 0.772$). However, notably more respondents during the pandemic period (45.4% vs. 63.2%) considered that HH by healthcare personnel in healthcare facilities implies their professionalism (Q17; $p = 0.014$).

Nearly half of the surveyed patients (41.6%) stated that HH is promoted, but in an insufficient way; however, the COVID-19 pandemic has influenced the promotion of hand hygiene in healthcare facilities (Q18; $p = 0.004$; 24.7% vs. 47.3%).

Before the emergence of the COVID-19 pandemic, patients had more additional concerns about the HH of medical personnel compared to during the pandemic. Before the pandemic, they noticed a lack of hand disinfection supplies in medical facilities. There were also suggestions that HCPs should wash their hands in the presence of patients, and that physicians should wash their hands more frequently. However, during the pandemic, patients considered the hand hygiene of healthcare workers providing them with medical services to be satisfactory (Q19).

Discussion

Epidemiologists and organisations like the WHO have drawn attention for many years to the fact that HH constitutes one of the key elements in infection prevention control [5]. Furthermore, patients have the right to receive healthcare services provided with due diligence by HCWs [12–14]. Consequently, patients hold a unique position as observers of healthcare, because they are physically present when it is administered and have a personal stake in the high quality of medical services provided to them.

Some authors highlight the role of patients in multimodal HH strategies [15, 16]. These programs assume that patients react when healthcare personnel fail to follow proper hand hygiene procedures. Unfortunately, our study revealed that patients often hesitate to remind healthcare staff about non-compliance with HH procedures. One possible reason for this reluctance may be the low level of assertiveness among patients. Longtin *et al.* investigated the reasons behind patients' reluctance to inquire about HH. Patients cited the belief that medical personnel are knowledgeable about the guidelines (or should be) and that verifying compliance with HH is not the patient's responsibility as their main reasons [17]. Patients also mentioned feeling embarrassed and a lack of awareness regarding hand hygiene as contributing factors [18].

In the internationally recognised approach to patient care, which has been established for over 10 years but is still relatively new in Poland, the emphasis is placed on patient involvement in the treatment process. The patient should be at the centre of attention, and patients have a significant influence on actions that will lead to recovery or improved health. WHO guidelines on HH in healthcare [5] recommend encouraging patients, their families, and healthcare personnel to collaborate in promoting hand hygiene in healthcare facilities. In studies assessing patient engagement in the context of improving hand hygiene by healthcare personnel during healthcare provision, the results indicate that the idea itself is attractive to patients. However, there can be a significant disparity between patients' intentions and their actual behaviours [19, 20]. In other studies, improvements in the HH of healthcare personnel were observed as a result of feedback from patients [21].

Recently, there has been a renewed focus on patient engagement in healthcare, which is closely related to the emergence of the COVID-19 pandemic [22]. The pandemic was expected to strengthen the position of patients in healthcare facilities, extending to patient safety, including the practice of hand hygiene by healthcare workers. Our study confirmed that patients pay attention to the hand washing and disinfection performed by medical personnel. However, awareness that healthcare worker HH prevents infections among patients increased only minimally during the pandemic. This may be explained by the fact that it was already quite high before the pandemic (71.1% vs. 77.9%). Interestingly, patients also noted the aspect of professionalism exhibited by HCPs through the practice of HH, and this was slightly influenced by the onset of the COVID-19 pandemic (45.4% vs. 63.2%). Such a situation can be explained by cultural factors and the significance of perceiving healthcare workers as professionals in Polish society. However, only slightly over half of the respondents believed that HH (56.7% vs. 58.9%) is a crucial element in preventing the spread of microorganisms.

These examples may point to gaps in patient education regarding hand hygiene. Delving deeper into the principles of hand hygiene and the correct provision of medical care, it becomes evident that patient awareness of the proper use of protective gloves is insufficient. Proper glove application entails hand disinfection before donning gloves and afterward upon doffing them [5, 23]. Observational studies among healthcare workers suggest that hand hygiene compliance tends to be lower when gloves are used, and relying solely on gloves does not prevent hand contamination [24, 25]. Therefore, contamination of gloves due to skipped hand disinfection can increase the risk of cross-contamination with microorganisms [24], underscoring the importance of educating patients on this matter [26].

According to Wałaszek [27], patients may be unable to observe proper hygiene practices related to glove use because they often lack the ability to directly observe healthcare workers' actions, and it may also be difficult to assess the validity and correctness of using gloves due to the patient's age, education, and place of residence. It is challenging to agree with such a perspective, as patients serve as observers of medical procedures, including HH procedures, that directly affect them. The only point to agree with lies in the patient's level of education, particularly in the context of inadequate medical education. In the age of the Internet and widespread educational campaigns, especially during the pandemic, factors such as age, gender, or place of residence no longer hold significant relevance. On the other hand, it is difficult to attribute knowledge deficits solely to patients, considering that in studies conducted before the pandemic [28], even medical students and junior healthcare providers in Poland were unable to accurately determine the appropriateness of HH before and after the use of protective gloves.

Returning to our study, patients felt safe when medical procedures were performed with gloves. Therefore, in the matter of appropriate glove use, patients need to be educated to understand the medical procedures for which glove usage is justified and necessary. According to Wałaszek [27], HCP can educate patients in this regard by emphasising that gloves do not always prevent the transmission of microorganisms, and by highlighting the need for hand disinfection. Patient education performed by HCPs regarding hand hygiene should be a component that increases patient awareness and influences their hand hygiene practices. Unfortunately, in many studies, it has been demonstrated that HCPs adhere to hand hygiene with varying degrees of effectiveness, often quite low. Thus, mutual collaboration, including education and feedback on HH practices, may be a valuable approach to improve adherence to proper hand hygiene procedures.

The aspect of promoting HH divided our respondents. Before the pandemic, only slightly less than one-third of patients believed that HH was adequately promoted in healthcare facilities where they received care. This situation significantly improved during the COVID-19 pandemic ($p = 0.004$). Unfortunately, before the pandemic, over half of the respondents stated that hand hygiene was promoted but in an insufficient manner. The onset of the COVID-19 pandemic led to a reduction in the number of patients holding this view. Further research is warranted to determine whether this situation has continued to improve in the longer term, beyond the pandemic. A promising indicator of enhanced HH promotion is the fact that the number of patients who believed hand hygiene was not promoted in healthcare facilities decreased by half during the pandemic.

Promoting HH has an impact on the perceptions of respondents regarding hand hygiene practices by doctors and nurses. According to patients, physicians perform this important activity less frequently than nurses (27.6% vs. 70.5%). These research findings are consistent with studies conducted in various other centres [29]. The pandemic situation, however, had a positive effect on adherence to this procedure, with both doctors and nurses being evaluated more favourably by respondents. Despite challenges in conducting observational research, several studies conducted in hospitals providing emergency care suggest that compliance with HH principles significantly increased during the pandemic compared to previous years. Unfortunately, researchers in these studies reported that this trend was not upheld in the longer term [30–33].

Returning to the topic of patient engagement in safety and reducing the likelihood of HAIs, most respondents in our study believed that they could influence healthcare workers' compliance with hand hygiene (69.6%) by reminding them about it (86.0%). Thus, it is interesting that most patients did not take such action (93.2%). This may be due to the emotions experienced by patients during the provision of medical care. In our study, respondents primarily mentioned feelings of fear (37.0%), anger (22.8%), and helplessness (21.2%). In a study by Seale *et al.*, some patients claimed that they did not want to cause trouble and would not tell staff members to perform hand hygiene. Moreover, in the same study, some participants articulated a fear that their care may be negatively affected if they directly engaged or confronted clinicians about their behaviours [34]. Some patients appeared to feel disempowered and were reluctant to speak up for fear of retribution from healthcare professionals [5].

In summary, patient engagement in infection prevention, considered as closing the loop on infection control, is a commendable idea. However, for it to be successful, patients must be knowledgeable about hygiene standards and adhere to them. Moreover, they should actively observe the hygienic behaviour of healthcare personnel and be able to address any

noticeable deviations. Healthcare professionals, on the other hand, should raise awareness among patients about their role in infection prevention and patient safety [35]. It is evident from our study that there is still much work to be done in this regard. Hopefully, the emergence of the COVID-19 pandemic will bring about positive effects, including increased patient awareness and influence on both healthcare workers and patients in maintaining proper HH when making use of healthcare services.

Ours was a single-centre study, which is undoubtedly a limitation of our work. However, it was a pilot study. In the future, we plan to conduct a multicentre study involving a larger population of respondents, because such studies are lacking in Poland. Nevertheless, the results we obtained will contribute to expanding knowledge about HH and may serve as a new educational component for HCPs and students in medical fields. Comparing the situation before the COVID-19 pandemic and the current pandemic situation regarding HH assessed by patients can provide concrete evidence of changes in this area. Above all, our study assesses the potential for active patient participation in processes aimed at reducing HAIs in healthcare facilities.

Conclusions

The COVID-19 pandemic did not significantly affect patient observations of various aspects of hand hygiene performed by HCPs. Nevertheless, during the COVID-19 pandemic, patients considered HCPs to be more professional or thought that medics were much more likely to perform HH before examining a patient or performing sterile procedures. In addition, the COVID-19 pandemic affected the perception of nurses as those HCPs who perform hand hygiene more often than others. The pandemic did not change patients' beliefs about the possibility of influencing the hygiene behaviour of HCPs, because this awareness was already very high before the pandemic occurred. In contrast, patients observed that hand hygiene was promoted more often during the pandemic than before the pandemic.

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Conflict of interest

The authors declare no conflict of interest.

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