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The impact of hospital outpatients' experiences of patient safety on infection fear: a secondary analysis of national data

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ABSTRACT

Introduction

Amid the COVID-19 pandemic and a growing elderly population, outpatients' concerns about infection risk have heightened. It is crucial to understand the factors that contribute to this fear of infection to promote patient safety and encourage outpatients to seek proper follow-up treatment without fear. This study aims to understand the relationship between outpatients' experiences of patient safety and their potential fear of infection.

Methods and analysis

Using data from the 2020 Healthcare Service Experience Survey which conducted from July to October 2020 in South Korea, this study analyzed a total of 4,416 outpatients. Six types of experiences of patient safety (patient identification, explanation before an injection, hand hygiene, proper use of injection supplies, skin disinfection, adverse drug reactions) were treated as independent variables. Descriptive statistics were employed using both frequency and weighted percentages. The relationship between experiences of patient safety and fear of infection was assessed using weighted unadjusted and adjusted logistic regression.

Results

Approximately 14% of outpatients had a fear of infection when receiving medical care. The unadjusted model showed that all patient safety categories were determinants of fear of infection, and the multivariate logistic model identified hand hygiene and medication safety experiences as significant factors associated with fear of infection.

Conclusions

To facilitate outpatients' use of medical facilities without concerns about infection, it is imperative to strengthen infection control practices among healthcare providers and minimize patients' experiences of adverse drug reactions.

Strengths and limitations of this study

- Our study sheds light on the psychological response to infection among patients in an outpatient setting.
- We have elucidated the interplay between negative patient safety experiences and fear of infection, providing valuable insights that can inform healthcare practitioners worldwide on the significance of addressing and enhancing patient experience with regard to HCP's safety behaviors.
- This study strongly emphasizes the necessity of implementing a policy that focuses on enhancing proactive behaviors among healthcare professionals and facilitating the presence of dedicated outpatient infection control personnel.
- The survey items, which specifically address the fear of infection as a single question, have limitations in fully capturing a comprehensive range and various aspects of responses.
- The original survey investigated experiences of outpatient utilization within the past year, introducing the potential for recall bias.

INTRODUCTION

Healthcare-associated infections (HAIs) are a growing concern in healthcare settings around the world because they pose a significant risk to patient safety.[1] HAIs refer not only to infections contracted during hospitalization, but also to infections related to medical activities within healthcare facilities, including outpatient care. The incidence of HAIs is estimated to range from 5% to 10% in South Korea.[2] HAIs have become more common in recent years due to factors such as an aging population, increasing use of medical devices, invasive procedures, and the coronavirus 2019 (COVID-19) pandemic. As concern about HAIs has increased, and with the ongoing spread of COVID-19, patients have become increasingly anxious about the risk of infection from exposure to other patients, contact with healthcare professionals (HCPs), and invasive procedures such as injections or blood tests during their visits to medical institutions. In fact, the percentage of outpatients who felt anxious about infection during the use of medical facilities has continued to increase, from 3% in 2018 to 6% in 2019, and then reaching 31.2% in 2021.[3]

The fear of infection is a crucial issue, since it not only has a negative impact on a patient's psychological state but also has the potential to trigger avoidance behavior toward healthcare facilities.[4] Lau et al. found that individuals with a higher fear of infection were more likely to avoid hospital visits.[5] Chatterji and Li analyzed the relationship between contagious diseases and hospital utilization, people tend to avoid visiting hospitals voluntarily when they perceive them as dangerous places due to the risk of catching infectious diseases.[6] The utilization of medical services, including emergency rooms, inpatient settings, and outpatient settings, has decreased due to a fear of hospitals during the COVID-19 pandemic.[7] This is a significant healthcare issue that leads to unmet medical needs and delays in treatment. In particular, assessing the fear of infection among outpatients is important, given that voluntary participation in follow-up observations is especially critical for outpatients.

Fear of infection can prompt individuals to avoid making outpatient visits to medical institutions, which can lead to delays in medical treatment and decreased quality of care.[8] Research has indicated that fear of COVID-19 resulted in discontinuity of care and lost follow-up; it has even led to acute cardiovascular events among patients with cardiovascular diseases.[9] Hence, there is a need for empirical research on the fear of infection at medical institutions in outpatient contexts, as well as for identifying the factors that would encourage patients to utilize hospitals without significant fear of infection.

Fear of infection is an individual's intense psychological response regarding both being infected or infecting others.[10] These psychological response is influenced by various factors including personal characteristics, knowledge, experiences, and cultural backgrounds.[11] In fact, previous studies have shown that an individual's age, sex, marital status, medical coverage, economic activity, and prior experience with a disease are associated with their psychological response to infection.[12-14] Although there were evidence regarding the factors regarding fear of infection among general population,[12-14] there is a lack of research that focuses specifically on experiences during hospital treatment. Since HAIs result from interactions between patients and HCPs, it is necessary to investigate the relationship between patients' fear of infection and their experiences during medical treatment by HCPs. Patient safety activities, such as HCPs' proactive efforts to prevent transmission and ensure proper patient identification, can engender a strong sense of reassurance among those seeking medical care. These activities can help alleviate concerns about HAIs and enable patients to receive treatment safely. Individuals who have had positive experiences with patient safety in healthcare institutions are likely to perceive these institutions as safe places, which in turn provides a basis for appropriate utilization of medical services.

Therefore, this study aimed to investigate the perceived fear of infection among outpatients visiting medical institutions and sought to understand the relationship between their experiences of patient safety and their potential fear of infection.

METHODS

Study design

This study is a secondary cross-sectional analysis of existing data.

Source of Data and Data Collection

We utilized 2020 public data from the Korean Ministry of Health and Welfare's Healthcare Service Experience Survey (HSES). This survey has been conducted annually since 2017 to assess service levels in Korean healthcare institutions and public perceptions of the healthcare system. The HSES questionnaire was developed by incorporating the content of major patient experience surveys conducted in various countries and gathering expert opinions. It was refined through focus group interviews and pilot survey targeting the general population, resulting in the final composition of the questionnaire. This survey was conducted through a face-to-face interview process based on household visits by well-trained investigators from July 13th to October 7th. The HSES obtained informed consent voluntarily from all participants. However, participants had impaired cognitive function or disabilities, informed consent was obtained from their respective family members. As the HSES data is accessible to any individual through the MDIS website, we obtained the raw data of HSES after submitting a research proposal in January 16th 2023. Following the acquisition of the raw data on January 16th, 2023, this secondary analysis was conducted until July 2023.

Study setting and sampling

The setting of this study was Korea. The target population comprised people aged over 15, totaling 42,254,722 individuals from 20,343,188 households. Among them, a sample of 6,000 households was selected using stratified two-stage cluster sampling methods. The strata comprised a total of 26 regions and sample distribution was determined using square root proportional allocation based on the distribution of households in each stratum of the study population. Then the two-stage cluster sampling consisted of first selecting survey areas and then secondarily selecting households and their members. In accordance with the 2020 HSES survey, total number of participants was 12,133 of 6,000 households.[15,16] After the raw data were obtained, the research selection process was conducted as illustrated in Figure 1. Initially, only those who had utilized outpatient services during the prior 12 months were included in the sampling frame, which excluded those (N=4,363) who had not used outpatient services. Additionally, those who answered "not applicable" to the dependent or independent variables were also excluded (N=3,354). As a result, a total of 4,416 participants were analyzed in this study.

Variables

Predictor: Fear of infection

Fear of infection was used as a dependent variable. The outcome variable was obtained from the survey question “Have you experienced fear regarding infection while utilizing healthcare facilities in the last 12 months?” Responses were categorized as “yes” or “no”.

Outcome variables: Experiences of patient safety

Patient safety refers to the prevention of harm or injury to patients during the course of their healthcare and encompasses a range of practices and strategies designed to ensure that patients receive safe, effective care.[17] In this study, six survey questions related to patient safety were included from the HSES. The first question concerned proper patient

identification: “Did HCPs always verify your identity (name and date of birth) before administering injections, tests, surgeries, or procedures?” The next four questions were about injection safety topics, specifically providing an explanation (“Did HCPs explain the reason for the injection before administering it?”), hand hygiene (“Did HCPs clean their hands with hand sanitizer before administering the injection?”), the proper use of syringes and vials (“Did you observe HCPs open the sealed syringe and injection supplies before administering the injection to you?”), and skin disinfection (“Did HCPs disinfect your skin before administering the injection?”). The sixth question pertained to medication safety: “Did you experience any adverse drug reactions while visiting this healthcare facility?” Each response was categorized as “yes” or “no.”

Covariates

Sociodemographic factors and health status were used as covariates. Regarding the sociodemographic factors, we included sex, age, educational level, type of insurance, job status, and income level. Age was categorized into two groups: < 60 years and ≥ 60 years. Sex was classified as male or female. There were three levels of education: primary (elementary school graduate or no education), secondary (middle school or high school graduate), and higher (college, bachelor's degree, post-baccalaureate degree). Insurance type was either national health insurance or, for some participants with lower incomes, Medical Aid. In Korea, health insurance is mandatory for all citizens, and Medical Aid is provided for those in low-income groups and the economically vulnerable who cannot afford the cost of insurance. This public Medical Aid program has either no or reduced out-of-pocket expenses compared to those covered under standard national health insurance. Income was categorized into quintiles; the first quintile represented the lowest 20% of the population's income, while the fifth represented the highest 20%. As health-related factors, we included underlying chronic disease status and self-perceived health status.

Statistical analysis

The original data collection method employed electronic systematic approaches to prevent non-response and outliers by implementing error message pop-ups and setting predefined ranges to avoid the entry of outliers. Consequently, there were no instances of non-response and outliers in our research variables. We analyzed the frequency and weighted percentage of each category. Weighted univariate and multivariate logistic regression analyses were performed to calculate the likelihood that individuals would have a fear of infection at medical institutions. In the multivariate model, the patient's experience with safety at the medical institution (based on the six survey questions mentioned earlier) was considered along with the specified covariates. A p-value of less than 0.05 was considered statistically significant using a two-tailed test.

Ethical considerations

The original HSES study obtained ethical approval from the institutional review board of the Korea Institution of Health and Social Affairs. For this secondary analysis, ethical approval was exempted by the Seoul National University Institutional Review Board (IRB No. E2302/004-003)

RESULTS

Table 1 shows the descriptive characteristics of the survey participants. Most of the participants were female (54.9%), were younger than 60 years (60.9%), had a secondary school education (50.1%), subscribed to national health insurance (97.5%), and were employed (55.2%). Regarding their health-related characteristics, variables related to 12 chronic diseases and subjective health are also shown in Table 1. For chronic diseases, the prevalence rate was highest for hypertension at 23.8%, followed by diabetes mellitus at

Table 1 Sociodemographic characteristics of participants[a]

Variable		Response	*n*	Weighted %
Socio-demographic	Sex	Male	1,902	45.1
		Female	2,514	54.9
	Age	<60 years	2,569	60.9
		≥ 60 years	1,847	39.1
	Education	Primary	601	11.8
		Secondary	2,302	50.1
		Higher	1,513	38.1
	Type of insurance	National health insurance	4,311	97.5
		Medical Aid	105	2.5
	Job status	Yes	2,454	55.2
		No	1,962	44.8
	Income	1st quintile	827	20.9
		2nd quintile	860	18.4
		3rd quintile	811	19.4
		4th quintile	914	19.6
		5th quintile	1,004	21.7
Health-related variables	Hypertension	No	3,279	76.2
		Yes	1,137	23.8
	Diabetes mellitus	No	3,876	88.4
		Yes	540	11.6
	Mental disorders	No	4,403	99.8
		Yes	13	0.2
	Respiratory disease	No	4,326	98.2
		Yes	90	1.8
	Heart disease	No	4,287	97.4
		Yes	129	2.6
	Cerebrovascular disease	No	4,344	98.5
		Yes	72	1.5
	Neurological disorders	No	4,321	98.2
		Yes	95	1.8
	Cancer	No	4,360	98.9
		Yes	56	1.1
	Thyroid gland disorders	No	4,313	98.0
		Yes	103	2.0
	Liver disease	No	4,382	99.2
		Yes	34	0.8
	Chronic kidney disease	No	4,402	99.6
		Yes	14	0.4
	Miscellaneous disease	No	4,096	93.1
		Yes	320	6.9
	Self-perceived health	Very good	497	10.5
		Good	2,268	53.0
		Neutral	1,122	25.4
		Bad	454	9.8
		Very bad	75	1.3

[a] Frequencies are raw values and percentages are weighted.

11.6%, miscellaneous disease at 6.9%, and heart disease at 2.6%. The weighted percentage of all participants who responded that they had other diseases was less than 2%. Approximately 60% of the participants indicated that they perceived their health as good or very good, while 11.1% reported their health as bad or very bad.

The results regarding the participants' experiences of patient safety at medical institutions and their fear of infection are reported in Table 2. A small proportion of participants (2.4%) reported that HCPs failed to follow the patient identification process properly. With regard to injection safety, 7.2% of the participants reported that HCPs failed to provide a proper explanation prior to administering the injection, 10.9% reported that HCPs failed to clean their hands prior to administering the injection, 7.4% reported that HCPs did not open sealed syringes and vials in their presence, and 5.9% reported that HCPs neglected to disinfect injection sites. Furthermore, 12.8% of the participants reported experiencing adverse drug reactions while receiving care at the medical institution. Lastly, 14.1% of the participants reported having a fear of infection while utilizing the medical institution's outpatient services, whereas 83.9% stated that they did not have such concerns.

The chi-square test revealed significant associations among experiences of patient safety, except for skin disinfection before an injection, and the fear of infection (Table 3). In the unadjusted logistic regression model (Table 4), all items but one in the patient safety experience questionnaire—disinfection before an injection—were found to influence participants' fear of infection. Participants who interacted with HCPs who had overlooked the patient identification process were 2.10 times more likely to have a fear of infection (95% CI: 1.34, 3.28). Participants who observed HCPs disregarding the injection safety process were also more likely to have a fear of infection. Those who reported not receiving an explanation for their injection were 1.54 times more likely to have a fear of infection (95% CI: 1.13, 2.08), and those who reported that HCPs had omitted hand hygiene were 3.85 times more

Table 2 Experiences of patient safety in medical institutions and patients' fear of infection[a]

Experience of patient safety	Yes		No	
	n	Weighted %	*n*	Weighted %
Patient identification				
HCPs verified the patient's identity	4,301	97.7	115	2.3
Injection safety				
HCPs provided an explanation for administering the injection	4,089	92.8	327	7.2
HCPs performed hand hygiene before the injection	3,889	89.1	527	10.9
HCPs opened the sealed syringe and injection supplies in the patient's presence	4,100	92.6	316	7.4
HCPs disinfected the skin before administering the injection	4,168	94.1	248	5.9
Medication safety				
Experience of adverse drug reactions at medical institution	584	12.8	3,832	87.2
Fear of infection	786	14.1	3,630	83.9

Abbreviations: HCP, healthcare professional

[a] Frequencies are raw values and percentages are weighted.

Table 3 Chi-square examining experiences of patient safety associated with fear of infection

Experience of patient safety	Fear of infection		$F(p)$
	Yes (%)[a]	No (%)[a]	
Patient identification			9.38(.002)
Yes	15.8	84.2	
No	28.3	71.7	
Explanation			6.11(.014)
Yes	15.6	84.4	
No	2.2	7.8	
Hand hygiene			76.72(<.001)
Yes	13.5	86.5	
No	37.6	62.4	
Proper use of injection supplies			6.35(.012)
Yes	15.6	84.4	
No	22.3	77.7	
Skin disinfection			2.01(.157)
Yes	15.9	84.1	
No	20.5	79.5	
Experience of adverse drug reaction			429.81(<.001)
Yes	55.7	44.3	
No	10.3	89.7	

[a] Percentages are weighted.

Table 4 Association between experience of patient safety and fear of infection

Variable	Unadjusted model		Adjusted model[a,b]	
	OR	95% CI	OR	95% CI
Patient identification (reference, yes)	2.10**	[1.34, 3.28]	0.76	[0.45, 1.30]
Explanation (reference, yes)	1.54**	[1.13-2.08]	0.62	[0.32, 1.21]
Hand hygiene (reference, yes)	3.85***	[3.08-4.80]	8.00***	[5.64, 11.33]
Proper use of injection supplies (reference, yes)	1.55**	[1.15-2.09]	0.79	[0.41, 1.54]
Skin disinfection (reference, yes)	1.37	[0.97-1.91]	0.78	[0.38, 1.61]
Adverse drug reaction (reference, no)	10.89***	[8.77, 13.53]	13.96***	[10.97, 17.87]

Abbreviations: OR, odds ratio; CI, confidence interval.

[a] LR $Chi^2(29) = 551.20$, Prob > Chi^2 = <.001, Pseudo R-squared = .213

[b] Effects of sex, age, educational level, insurance type, income grade, job status, underlying disease, and perceived health status were controlled for in the regression analyses.

*$p < .05$, ** $p < .01$, *** $p < .001$

likely to have a fear of infection (95% CI: 3.08, 4.80). Participants who reported that HCPs had not opened the sealed syringe or vials for injection in their presence were also 1.55 times more likely to have a fear of infection (95% CI: 1.15, 2.09).

After covariates were accounted for in the multivariate logistic regression model, experiencing an adverse drug reaction and poor hand hygiene by HCPs were found to be significantly related to participants' fear of infection. Participants who experienced an adverse drug reaction were 13.96 times more likely to have a fear of infection (95% CI: 10.94, 17.87), and those who reported that HCPs had omitted hand hygiene were 8.00 times more likely to have a fear of infection at the medical institution they visited (95% CI: 5.64, 11.33). However, other safety experiences were not significant in the multivariate logistic regression analysis.

DISCUSSION

The purpose of this study was to understand the fear of infection among outpatients in medical institutions and to investigate the relationship between outpatients' experiences of patient safety and their fear of infection. Our study found that patients' experiences of HCPs' hand hygiene and medication safety were the most significant determinants of their fear of infection. The findings of our study are noteworthy for revealing the influence of patient safety experiences in hospitals on outpatients' fear of infection. Previous studies have mainly emphasized the importance of patient safety activities such as hand hygiene and patient identification in reducing hospital-acquired infections.[18] Our study builds on these findings by indicating that patient safety activities inside hospitals may have an impact not only on patients' physical health but also on their psychological well-being.

Prior research on the general fear of infections within hospitals, not specific to any particular infectious disease, is limited. Therefore, this study compared a general fear of

infection in hospitals to existing research on COVID-19 fear. Fear of COVID-19 in various cohorts ranged from 18.1% to 45.2%,[10] whereas in our study, the fear of infection in hospitals amid the COVID-19 pandemic was relatively low. The difference in findings may be attributed to differences in how infection fear was measured. Previous studies focused on fear of COVID-19 infection using structured instruments, while our study measured fear of infection related to HAIs during the first year of the COVID-19 pandemic.

The analysis of participants' experiences with patient safety revealed that HCPs had the highest compliance rate with patient identification activities and the lowest compliance rate with hand hygiene activities. Our result is in line with previous studies, which have identified hand hygiene as one of the most frequently omitted infection-control activities by nurses.[19] Despite a significant improvement in the hand hygiene compliance rate after the COVID-19 pandemic began,[20] our results suggest that additional solutions should be sought to improve compliance further. Additionally, the incidence rate of medication safety issues reported in our study was higher than the 8% rate among the Swiss public.[21] However, compared to the medication error rate that may be extracted from electronic records, the rate of patient-reported medication safety incidents was relatively low.[22] These discrepancies in rates across measurement methods may arise from a lack of patient awareness concerning the extent of medication safety. Patients may neglect to report adverse effects if they have limited knowledge of medication safety, or they may report only severe cases.

Our research indicates that two kinds of patient safety experiences affected outpatients' fear of infection. First, outpatients who had positive experiences with proactive HCPs were less likely to develop a fear of infection. Our results provide evidence to support an earlier study, which suggested that patients' fear of infection was influenced by HCPs' proactivity in infection control.[23] According to the previous study, patient experience, knowledge, and hygiene sensitivity are related to a patient's general awareness of safety

issues.[23,24] Therefore, both institutional and patient-level actions are needed to improve patient safety experiences in hospitals. Second, patients who experienced medication safety incidents had a higher level of fear of infection in healthcare facilities. Our research is consistent with the result of a systematic review which revealed that negative experiences related to patient safety incidents can lead to a negative perception of healthcare institutions.[25] A systematic review of studies of patients' experiences of adverse events in healthcare noted that patients may feel distressed by such experiences.[26] Our study provides evidence for the importance of implementing effective patient safety activities to prevent and manage patient safety issues, not only to improve patient outcomes, but also to enhance patients' trust and assurance in healthcare institutions.

This study has important policy and practical implications. Our research highlights the need for both institutional and patient-level actions to enhance outpatient patient safety. Institutionally, it's crucial to strengthen infection-control education and improve infrastructure to prevent adverse drug reactions. South Korea has improved its infectious disease management, mandating dedicated infection-control staff for hospitals with over 100 beds .[27] However, there is a gap in government agencies' oversight of how medical institutions manage infection-control education and activities.[28] There is also a need for tailored infection-control education to support outpatient services, since current educational offerings focus primarily on inpatients. In addition, staff shortages, patient overcrowding, and heavy workloads have been reported as barriers to patient-safety compliance.[29,30] In fact, the consultation time per patient in Korea was only 6.2 minutes per patient, corresponding to half of the average OECD outpatient consultation time, of 12.6 minutes.[31,32] It has also been reported that outpatient nurses experience job stress due to insufficient staffing,[33] which may lead to inadequate explanations and omission of patient safety behaviors, such as careful observation of infusion-related reactions or performing hand hygiene. To improve the quality

of outpatient medical services, it is necessary to implement a reinforced staffing policy that expands personnel for outpatients.

"To err is human," as noted in 2000 by the Institute of Medicine Committee on Quality of Health Care in America. Since HCPs are human, unintended errors are possible. To prevent patient safety incidents, multiple layers of mechanisms are required to avoid safety behavior omissions resulting from human error. Patient participation in patient safety activities may also serve as part of the overall mechanism for preventing such incidents. Patients should actively engage in their safety by asking questions, seeking information, and participating in their treatment.[34] In a study on patient safety behaviors and patient willingness to participate, patients reluctant to ask challenging questions to HCPs, such as "Have you washed your hands?" or "Would you check that this is the correct medication for me?".[35] Based on the traditional relationship between HCPs and patients in which the latter are regarded as passive recipients of the former's care,[36] patients may hesitate to challenge a HCP's authority fearing potential negative consequences for themselves. To reduce patient concerns about contracting infection at hospitals, it is necessary to cultivate a hospital culture where patients feel comfortable speaking openly about factors that contribute to their fears. Supportive and permissive attitudes of HCPs may encourage patients to ask challenging questions and voice their opinions on safety issues.[37-39] Therefore, education programs should be implemented for both patients and HCPs, with the goal of improving awareness and creating an environment that fosters open communication.

This study has several limitations. Firstly, while data were collected during the COVID-19 pandemic, its direct external effects were not considered. Given COVID-19's known influence on infection fear, future research should account for these effects. Secondly, relying on a single question for infection fear may not comprehensively capture all aspects of the psychological responses related to the fear of infection. Future studies should use

validated tools to assess various dimensions of fear. Thirdly, while participants were advised to respond based on their most recent experience within the past year of outpatient utilization, for those with medical experiences in the more distant past not closely aligned with the data collection period, recall bias may have occurred. Lastly, it should be noted that the questionnaire utilized to evaluate patient safety experiences primarily provided binary response options. To improve research quality, adopting more refined methods like Likert scales and validated assessment tools is essential. Lastly, this study focused on how outpatients' patient safety experiences relate to infection fear but didn't explore infection fear's impact on health outcomes or healthcare utilization. We suggest that future research investigate the relationship among patients' experiences of patient safety, infection fear, and their health outcomes.

CONCLUSION

The perceived fear of infection at medical institutions was associated significantly with patients' experiences of safety in outpatient settings. As the risk of infection in healthcare facilities continues to cause concern among outpatients, it may lead to reduced utilization of healthcare services, potentially resulting in negative health outcomes. Our research findings indicate that in order to address outpatients' infection fear and encourage their use of outpatient services, healthcare facilities must prioritize the implementation of enhanced patient safety activities and encourage patients' participation in their own safety. Achieving this goal will require the improvement of hospital culture, as well as the activation of educational programs tailored to outpatients.

Author contributions

HK designed and conceptualized the study, analyzed the data, and drafted the manuscript. ML contributed to the conceptualization of the paper, and critically reviewed and provided feedback on the manuscript. Both authors have read and approved the final version of the manuscript.

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Data acquisition and data availability

The data used in the study are available on the Microdata Integration Service at https://mdis.kostat.go.kr. To download the original data, interested parties must first register as a member and then submit a research proposal. We also acquired the HSES data after submitting a research proposal and downloaded after permission from the Microdata Integration Service.

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Declaimer

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Competing interests

None declared.

Patient and public involvement

Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication

Not required.

Provenance and peer review

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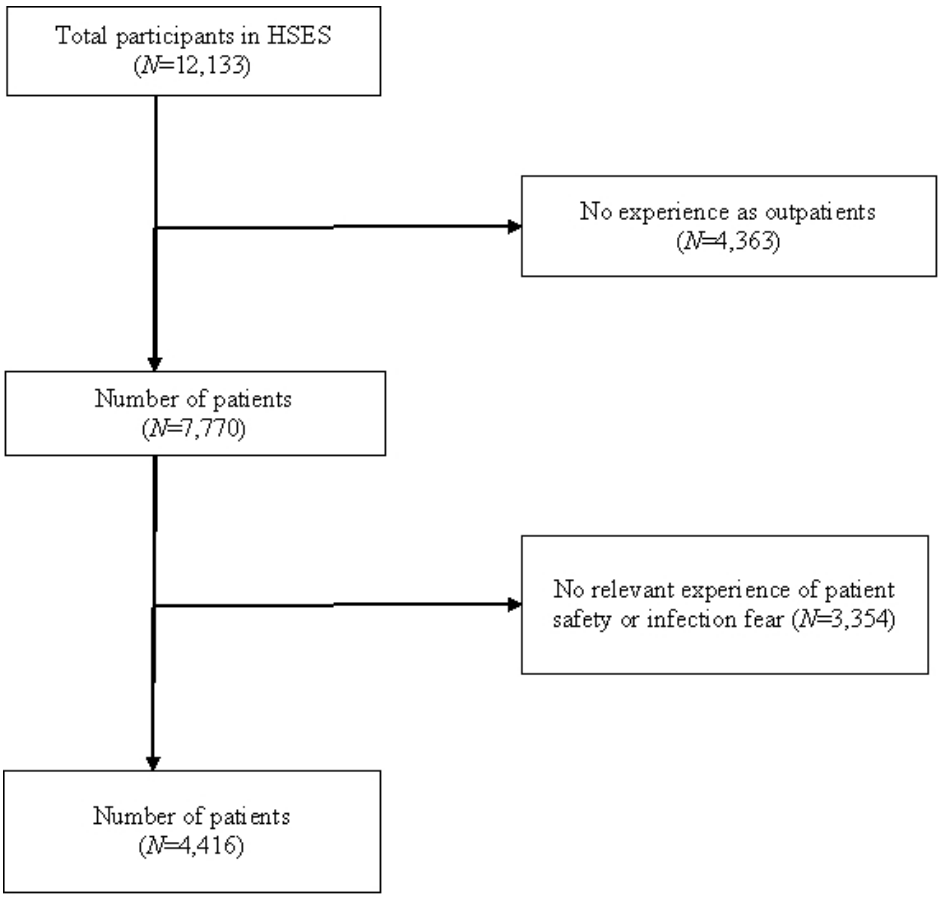
1 **Figure 1** Flow diagram of participant selection process



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The impact of hospital outpatients' experiences of patient safety on fear of infection: a secondary analysis of national data

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ABSTRACT

Introduction

Amid the COVID-19 pandemic, outpatients' concerns about infection risk have increased. It is crucial to understand the factors that contribute to this fear of infection to promote patient safety and encourage outpatients to seek proper follow-up treatment without fear. This study aims to understand the relationship between outpatients' experiences of patient safety and their fear of infection.

Design

This was a secondary analysis of national data from the Healthcare Service Experience Survey in 2020.

Setting and Participants A total of 4,416 patients with experience using outpatient services in the past year were included in South Korea.

Primary and secondary outcome measures Demographic characteristics, fear of infection, and safety experiences were assessed in the original survey. Fear of infection served as the dependent variable, with safety experiences —specifically, patient identification, pre-injection explanations, hand hygiene, proper use of injection supplies, skin disinfection, and adverse drug reactions—as the independent variables.

Results

Approximately 14% of outpatients had a fear of infection when receiving medical care. The unadjusted model showed that all patient safety categories were determinants of fear of infection, and the multivariate logistic model identified hand hygiene and medication safety experiences as significant factors associated with fear of infection.

Conclusions

This study revealed that patient safety experiences are associated with fear of infection in outpatient settings. Improving healthcare professionals' hand hygiene and managing adverse drug reactions are crucial for enhancing patient safety

Strengths and limitations of this study

- Our study sheds light on the psychological response to infection among patients in an outpatient setting.
- We have elucidated the interplay between negative patient safety experiences and fear of infection.
- This study strongly emphasizes the necessity of implementing a policy that focuses on promoting proactive behaviors among healthcare professionals.
- The survey items, which specifically address the fear of infection as a single question, have limitations in fully capturing a comprehensive range and various aspects of responses.
- The original survey investigated experiences of outpatient utilization within the past year, introducing the potential for recall bias.

INTRODUCTION

Patient-centered care has become an important concept for improving the quality of healthcare.[1] In patient-centered care, the patient's experience is crucial, and communication, the expertise of the healthcare team, and the connection between patients and healthcare team members are emphasized in order to achieve the best possible patient experience.[2] In the realm of patient safety, the focus is shifting beyond the healthcare provider system to patient engagement.[3] Patient safety encompasses patient identification, communication with healthcare providers, infection prevention, surgical safety, fall prevention, and more.[4] Patients experience a variety of encounters in the healthcare services they receive, and experiences of patient safety play a crucial role in improving the quality of healthcare services.

In the outpatient setting, individuals have shorter hospital stays than in the inpatient setting, but are more likely to be exposed to a larger number of unidentified individuals. Coronavirus disease 2019 (COVID-19) has notably disrupted the utilization of medical services, and visits to healthcare facilities have exhibited a more pronounced decline than hospital admissions.[5] While a myriad of governmental policies, such as lockdowns and vaccination drives, may have influenced this trend in various nations,[6] it is equally plausible that individuals have been reluctant to seek medical care due to apprehensions surrounding infection risks.[7] Consequently, these factors have likely precipitated substantial changes in patient safety experiences compared to previous norms.

Healthcare-associated infections (HAIs) are a growing concern in healthcare settings around the world because they pose a significant risk to patient safety.[8] Healthcare-associated infections refer not only to infections contracted during hospitalization, but also to infections related to medical activities within healthcare facilities, including outpatient care.[9] The

incidence of HAIs is estimated to range from 5% to 10% in South Korea.[10] As concern about HAIs has increased, and with the ongoing spread of COVID-19, patients have become increasingly anxious about the risk of infection from exposure to other patients, contact with healthcare professionals (HCPs), and invasive procedures such as injections or blood tests during their visits to medical institutions. In fact, the percentage of outpatients who felt anxious about infection during the use of medical facilities has continued to increase, from 3% in 2018 to 6% in 2019, and then reaching 31.2% in 2021.[11]

The fear of infection is a crucial issue, since it not only has a negative impact on a patient's psychological state but also has the potential to trigger avoidance behavior toward healthcare facilities.[12] Lau et al.[13] found that individuals with a higher fear of infection, particularly related to SARS, were more likely to avoid hospital visits. Chatterji and Li[14] analyzed the relationship between COVID-19 and hospital utilization, people tend to avoid visiting hospitals voluntarily when they perceive them as dangerous places due to the risk of catching infectious diseases. The utilization of medical services, including emergency rooms, inpatient settings, and outpatient settings, has decreased due to a fear of hospitals during the COVID-19 pandemic.[15] This is a significant healthcare issue that leads to unmet medical needs and delays in treatment. In particular, assessing the fear of infection among outpatients is important, given that voluntary participation in follow-up observations is especially critical for outpatients.

Fear of infection can prompt individuals to avoid making outpatient visits to medical institutions, which can lead to delays in medical treatment and decreased quality of care.[16] Research has indicated that fear of COVID-19 resulted in discontinuity of care and lost follow-up; it has even led to acute cardiovascular events among patients with cardiovascular diseases.[17] Hence, there is a need for empirical research on the fear of infection at medical

institutions in outpatient contexts, as well as for identifying the factors that would encourage patients to utilize hospitals without significant fear of infection.

Fear is an intense emotion triggered by perceiving an immediate threat.[18] Fear of infection encompasses multiple complex concepts, including the fear of becoming infected or infecting others, as well as the suspicion that people in the vicinity may transmit the disease.[19] These psychological responses are influenced by various factors, including personal characteristics, knowledge, experiences, and cultural backgrounds.[20,21] In fact, previous studies have shown that an individual's age, sex, marital status, medical coverage, economic activity, and prior experience with a disease are associated with their psychological response to infection.[13, 22-23] Although evidence has been published regarding factors influencing fear of infection among the general population,[13, 22-23] there is a lack of research that focuses specifically on experiences during hospital treatment. Since HAIs result from interactions between patients and HCPs, it is necessary to investigate the relationship between patients' fear of infection and their experiences during medical treatment by HCPs.

Therefore, this study aimed to investigate the perceived fear of infection among outpatients and sought to understand the relationship between their experiences of patient safety and their fear of infection.

METHODS

Study design

This study is a secondary cross-sectional analysis of existing data.

Source of Data and Data Collection

We utilized 2020 public data from the Korean Ministry of Health and Welfare's Healthcare Service Experience Survey (HSES).[24] This survey has been conducted annually since 2017 to

assess service levels at Korean healthcare institutions and public perceptions of the healthcare system. The HSES questionnaire was developed by incorporating the content of major patient experience surveys conducted in various countries and collecting expert opinions.[25] It was refined through focus group interviews and a pilot survey targeting the general population, leading to the finalization of the questionnaire and validation study was also conducted.[25,26] This survey was conducted using a face-to-face tablet-assisted personal interviewing (TAPI) process based on household visits by well-trained investigators from July 13 to October 7, 2020.[27] The participants were asked to recall their medical experiences over the past year, specifically from July 2019 to June 2020. [25] The investigators received a three-hour training session that covered an overview of the survey, survey completion guidelines, and survey system usage, along with practical training. They were also required to complete privacy protection training. Additionally, survey guidelines were developed and distributed for investigators to bring in the field. [25, 27] As the HSES was conducted using a TAPI system, outliers were automatically excluded based on the internal validation logic installed on the tablets. The HSES obtained informed consent voluntarily from all participants. However, if participants had impaired cognitive function or disabilities, informed consent was obtained from their respective family members. The HSES data are accessible to any individual through the Microdata Integrated Service (MDIS) website (https://mdis.kostat.go.kr),[24] and we obtained the raw data of the HSES after submitting a research proposal on January 16, 2023. Following the acquisition of the raw data on January 16, 2023, this secondary analysis was conducted through July 2023.

Study setting and sampling

The setting of this study was Korea. The target population comprised people aged over 15, totaling 42,254,722 individuals from 20,343,188 households. Among them, a sample of 6,000

households was selected using stratified two-stage cluster sampling methods. The strata comprised a total of 26 regions, and sample distribution was determined using square root proportional allocation based on the distribution of households in each stratum of the study population. The two-stage cluster sampling process consisted of first selecting survey areas and then secondarily selecting households and their members. In accordance with the 2020 HSES survey, [26,27] total number of participants was 12,133 of 6,000 households**.** After the raw data were obtained, the research selection process was conducted as illustrated in Figure 1. Initially, only those who had utilized outpatient services during the prior 12 months were included in the sampling frame, which excluded those (N=4,363) who had not used outpatient services. Additionally, those who answered "not applicable" to the dependent or independent variables were also excluded (N=3,354). As a result, a total of 4,416 participants were analyzed in this study.

Variables

Outcome variable: Fear of infection

Fear of infection was used as a dependent variable. The outcome variable was obtained from the survey question “Have you experienced fear regarding infection while utilizing healthcare facilities in the last 12 months?” Responses were categorized as “yes” or “no”.

Predictor: Experiences of patient safety

Patient safety refers to the prevention of harm or injury to patients during the course of their healthcare and encompasses a range of practices and strategies designed to ensure that patients receive safe, effective care.[28] In this study, six survey questions related to patient safety were included from the HSES. The first question concerned proper patient identification: “Did HCPs always verify your identity (name and date of birth) before administering injections, tests, surgeries, or procedures?” The next four questions were about injection safety topics, specifically providing an explanation (“Did HCPs explain the reason

for the injection before administering it?"), hand hygiene ("Did HCPs clean their hands with hand sanitizer before administering the injection?"), the proper use of syringes and vials ("Did you observe HCPs open the sealed syringe and injection supplies before administering the injection to you?"), and skin disinfection ("Did HCPs disinfect your skin before administering the injection?"). The sixth question pertained to medication safety: "Did you experience any adverse drug reactions while visiting this healthcare facility?" Each response was categorized as "yes" or "no."

Covariates

Sociodemographic factors and health status were used as covariates. Regarding the sociodemographic factors, we included sex, age, educational level, type of insurance, job status, and income level. Age was categorized into two groups: < 60 years and ≥ 60 years. Sex was classified as male or female. There were three levels of education: primary (elementary school graduate or no education), secondary (middle school or high school graduate), and higher (college, bachelor's degree, post-baccalaureate degree). Insurance type was either national health insurance or, for some participants with lower incomes, Medical Aid. In Korea, health insurance is mandatory for all citizens, and Medical Aid is provided for those in low-income groups and the economically vulnerable who cannot afford the cost of insurance. Income was categorized into quintiles; the first quintile represented the lowest 20% of the population's income, while the fifth represented the highest 20%. As health-related factors, we included underlying chronic disease status and self-perceived health status.

Statistical analysis

The original data collection method employed electronic systematic approaches to prevent non-responses and outliers by implementing error message pop-ups and setting predefined ranges to avoid the entry of outliers. Consequently, there were no instances of non-response

and outliers in our research variables. We analyzed the frequency and weighted percentages of each category to understand the general characteristics of the participants. Weighted percentages were used to generalize the findings to the population. To examine the association between the six patient safety experiences and fear of infection, we utilized the weighted chi-square test using the Rao-Scott correction and converted the results into F-statistics to determine statistical significance. Weighted univariate and multivariate logistic regression analyses were performed to calculate the likelihood that individuals would have a fear of infection at medical institutions. In the multivariate model, the patient's safety experience at the medical institution (based on the six survey questions mentioned earlier) was considered along with the specified covariates. A *p*-value of less than 0.05 was considered statistically significant using a two-tailed test. All statistical analyses were conducted using Stata/MP version 18.0.

Patient and public involvement

This study is a secondary analysis of existing data, consequently, no patients were directly involved in the study design, recruitment, or data collection phases. However, the findings from this analysis have the potential to significantly impact patient care by informing strategies to enhance outpatient healthcare experiences and improve patient safety.

Ethical considerations

The original HSES study obtained ethical approval from the institutional review board of the Korea Institution of Health and Social Affairs. For this secondary analysis, ethical approval was exempted by the Seoul National University Institutional Review Board (IRB No. E2302/004-003).

RESULTS

Table 1 shows the descriptive characteristics of the participants. Most of the participants were female (n=2,514, 54.9%), were younger than 60 years (n=2,569, 60.9%), had a secondary school education (n=2,302, 50.1%), subscribed to national health insurance (n=4,311, 97.5%), and were employed (n=2,451, 55.2%). For chronic diseases, the prevalence was highest for hypertension (n=1,137, 23.8%), followed by diabetes mellitus (n=540, 11.6%). The weighted percentage of all participants who responded that they had other diseases was less than 2%. Approximately 60% of the participants indicated that they perceived their health as good (n=2,268, 53.0%) or very good (n=497, 10.5%), while smaller proportions of participants reported their health as bad (n=454, 9.8%) or very bad (n=75, 1.3%).

Table 1 Sociodemographic characteristics of participants[a]

Variable		Response	*n*	Weighted %
Socio-demographic	Sex	Male	1,902	45.1
		Female	2,514	54.9
	Age	<60 years	2,569	60.9
		≥ 60 years	1,847	39.1
	Education	Primary	601	11.8
		Secondary	2,302	50.1
		Higher	1,513	38.1
	Type of insurance	National health insurance	4,311	97.5
		Medical Aid	105	2.5
	Job status	Yes	2,454	55.2
		No	1,962	44.8
	Income	1st quintile	827	20.9
		2nd quintile	860	18.4
		3rd quintile	811	19.4
		4th quintile	914	19.6
		5th quintile	1,004	21.7
Health-related variables	Hypertension	No	3,279	76.2
		Yes	1,137	23.8
	Diabetes mellitus	No	3,876	88.4
		Yes	540	11.6
	Mental disorders	No	4,403	99.8
		Yes	13	0.2
	Respiratory disease	No	4,326	98.2
		Yes	90	1.8
	Heart disease	No	4,287	97.4
		Yes	129	2.6
	Cerebrovascular disease	No	4,344	98.5
		Yes	72	1.5
	Neurological disorders	No	4,321	98.2
		Yes	95	1.8
	Cancer	No	4,360	98.9
		Yes	56	1.1
	Thyroid gland disorders	No	4,313	98.0
		Yes	103	2.0
	Liver disease	No	4,382	99.2
		Yes	34	0.8
	Chronic kidney disease	No	4,402	99.6
		Yes	14	0.4
	Miscellaneous disease	No	4,096	93.1
		Yes	320	6.9
	Self-perceived health	Very good	497	10.5
		Good	2,268	53.0
		Neutral	1,122	25.4
		Bad	454	9.8
		Very bad	75	1.3

[a] Frequencies are raw values and percentages are weighted.

The results regarding the participants' experiences of patient safety at medical institutions and their fear of infection are reported in Table 2. Participants reported that HCPs failed to follow the patient identification process properly (n=118, 2.3%). With regard to injection safety, participants reported that HCPs failed to provide proper explanations prior to administering injections (n=327, 7.2%), HCPs failed to clean their hands prior to administering injections (n=527, 10.9%), HCPs did not open sealed syringes and vials in their presence (n=316, 7.4%), and HCPs neglected to disinfect injection sites (n=248, 5.9%). Furthermore, some participants reported experiencing adverse drug reactions while receiving care at a medical institution (n=584, 12.8%). Lastly, 786 outpatients (14.1%) reported having a fear of infection while utilizing the medical institution's outpatient services, whereas 3,630 outpatients (83.9%) stated that they did not have a fear of infection.

Table 2 Experiences of patient safety in medical institutions and patients' fear of infection[a]

Experience of patient safety	Yes		No	
	n	**Weighted %**	***n***	**Weighted %**
Patient identification				
HCPs verified the patient's identity	4,301	97.7	115	2.3
Injection safety				
HCPs provided an explanation for administering the injection	4,089	92.8	327	7.2
HCPs performed hand hygiene before the injection	3,889	89.1	527	10.9
HCPs opened the sealed syringe and injection supplies in the patient's presence	4,100	92.6	316	7.4
HCPs disinfected the skin before administering the injection	4,168	94.1	248	5.9
Medication safety				
Experience of adverse drug reactions at medical institution	584	12.8	3,832	87.2
Fear of infection	786	14.1	3,630	83.9

Abbreviations: HCP, healthcare professional

[a] Frequencies are raw values and percentages are weighted.

The result of the cross-tabulation analysis between patient safety experiences and fear of infection revealed significant associations with several patient experiences of patient safety factors (See Table 3): patient identification experience (F = 9.38, p = .002), experience of HCPs providing explanations when administering injections (F = 6.11, p = .014), patient experience with HCPs' hand hygiene (F = 76.72, p < .001), experience regarding HCPs' proper use of injection supplies (F = 6.35, p = .012), and experience of adverse drug reactions (F = 429.81, p <.001).

Table 3 Cross-tabulation analysis of patient safety experiences and fear of infection

Experience of patient safety	**Fear of infection**		$F(p)$[b]
	Yes (%)[a]	**No (%)**[a]	
Patient identification			9.38(.002)
Yes	15.8	84.2	
No	28.3	71.7	
Explanation			6.11(.014)
Yes	15.6	84.4	
No	2.2	7.8	
Hand hygiene			76.72(<.001)
Yes	13.5	86.5	
No	37.6	62.4	
Proper use of injection supplies			6.35(.012)
Yes	15.6	84.4	
No	22.3	77.7	
Skin disinfection			2.01(.157)
Yes	15.9	84.1	
No	20.5	79.5	
Experience of adverse drug reaction			429.81(<.001)
Yes	55.7	44.3	
No	10.3	89.7	

[a] Percentages are weighted

[b] To account for the weights in the data, we used a design based on F-test statistics and the corresponding p-values

In the unadjusted logistic regression model (Table 4), all items but one in the patient safety experience questionnaire—disinfection before an injection—were found to influence participants' fear of infection. Participants who interacted with HCPs who had overlooked the patient identification process were 2.10 times more likely to have a fear of infection (odds ratio [OR]: 2.10; 95% confidence interval [CI]: 1.34, 3.28). Participants who observed HCPs disregarding the injection safety process were also more likely to have a fear of infection. Those who reported not receiving an explanation for their injection were 1.54 times more likely to have a fear of infection (OR: 1.54; 95% CI: 1.13, 2.08), and those who reported that HCPs had omitted hand hygiene were 3.85 times more likely to have a fear of infection (OR: 3.85; 95% CI: 3.08, 4.80). Participants who reported that HCPs had not opened the sealed syringe or vials for injection in their presence were likewise 1.55 times more likely to have a fear of infection (OR: 1.55; 95% CI: 1.15, 2.09). After covariates were accounted for in the multivariate logistic regression model, experiencing an adverse drug reaction and poor hand hygiene by HCPs were found to be significantly related to participants' fear of infection. Participants who experienced an adverse drug reaction were 13.96 times more likely to have a fear of infection (OR: 13.96; 95% CI: 10.94, 17.87), and those who reported that HCPs had omitted hand hygiene were 8.00 times more likely to have a fear of infection at the medical institution they visited (OR: 8.00; 95% CI: 5.64, 11.33). However, other safety experiences did not show significant results in the multivariate logistic regression analysis.

Table 4 Association between experience of patient safety and fear of infection

Variable	Unadjusted model		Adjusted model[a,b]	
	OR	95% CI	OR	95% CI
Patient identification (reference, yes)	2.10**	[1.34, 3.28]	0.76	[0.45, 1.30]
Explanation (reference, yes)	1.54**	[1.13, 2.08]	0.62	[0.32, 1.21]
Hand hygiene (reference, yes)	3.85***	[3.08, 4.80]	8.00***	[5.64, 11.33]
Proper use of injection supplies (reference, yes)	1.55**	[1.15, 2.09]	0.79	[0.41, 1.54]
Skin disinfection (reference, yes)	1.37	[0.97, 1.91]	0.78	[0.38, 1.61]
Adverse drug reaction (reference, no)	10.89***	[8.77, 13.53]	13.96***	[10.94, 17.87]

Abbreviations: OR, odds ratio; CI, confidence interval.

[a] LR $Chi^2(29) = 551.20$, Prob > $Chi^2 = <.001$

[b] Effects of sex, age, educational level, insurance type, income grade, job status, underlying disease, and perceived health status were controlled for in the regression analyses.

*$p < .05$, ** $p < .01$, *** $p <.001$

DISCUSSION

Our study found that 14.1% of Korean outpatients experienced a significant degree of fear of infection. This finding may be generalized to the entire Korean population who have utilized outpatient services in the past year. Additionally, we found that outpatients' experiences of HCPs' hand hygiene and medication safety may play a significant role in influencing their fear of infection. The findings of our study are noteworthy for revealing the influence of patient safety experiences in hospitals on outpatients' fear of infection. Previous studies have mainly emphasized the importance of patient safety activities such as hand hygiene and patient identification in reducing hospital-acquired infections.[29] Our study builds on these findings by indicating that patient safety activities inside hospitals may have an impact not only on patients' physical health but also on their psychological well-being.

Prior research on the general fear of infections within hospitals, not specific to any particular infectious disease, is limited. Therefore, this study compared a general fear of infection in hospitals to existing research on COVID-19 fear. Fear of COVID-19 in various cohorts ranged from 18.1% to 45.2%,[21] whereas in our study, the fear of infection in hospitals amid the COVID-19 pandemic was relatively low. The difference in findings may be attributed to differences in how infection fear was measured. Previous studies focused on fear of COVID-19 infection using structured instruments, while our study measured a general fear of infection during the first year of the COVID-19 pandemic.

The analysis of participants' experiences with patient safety revealed that HCPs had the highest compliance rate with patient identification activities and the lowest compliance rate with hand hygiene activities. Our result is in line with previous studies, which have identified hand hygiene as one of the most frequently omitted infection-control activities by nurses.[30] Despite a significant improvement in the hand hygiene compliance rate after the COVID-19 pandemic began,[31] our results suggest that additional solutions should be sought

to improve compliance further. Additionally, the incidence rate of medication safety issues reported in our study was higher than the 8% rate among the Swiss public.[32] However, compared to the medication error rate that may be extracted from electronic records, the rate of patient-reported medication safety incidents was relatively low.[33] These discrepancies in rates across measurement methods may arise from a lack of patient awareness concerning the extent of medication safety. Patients may neglect to report adverse effects if they have limited knowledge of medication safety, or they may report only severe cases.

Our research indicates that two kinds of patient safety experiences affected outpatients' fear of infection. First, outpatients who had positive experiences with proactive HCPs were less likely to develop a fear of infection. Our results provide evidence to support an earlier study, which suggested that patients' fear of infection was influenced by HCPs' proactivity in infection control.[34] According to the previous study, patient experience, knowledge, and hygiene sensitivity are related to a patient's general awareness of safety issues.[34,35] Therefore, both institutional and patient-level actions are needed to improve patient safety experiences in hospitals. Second, patients who experienced medication safety incidents had a higher level of fear of infection in healthcare facilities. Our research is consistent with the result of a systematic review which revealed that negative experiences related to patient safety incidents can lead to a negative perception of healthcare institutions.[36] A systematic review of studies of patients' experiences of adverse events in healthcare noted that patients may feel distressed by such experiences.[37] Our study provides evidence for the importance of implementing effective patient safety activities to prevent and manage patient safety issues, not only to improve patient outcomes, but also to enhance patients' trust and assurance in healthcare institutions.

This study has important policy and practical implications. Our research highlights the need for both institutional and patient-level actions to enhance outpatient patient safety.

Institutionally, it's crucial to strengthen infection-control education and improve infrastructure to prevent adverse drug reactions. South Korea has improved its infectious disease management, mandating dedicated infection-control staff for hospitals with over 100 beds .[38] However, there is a gap in government agencies' oversight of how medical institutions manage infection-control education and activities.[39] There is also a need for tailored infection-control education to support outpatient services, since current educational offerings focus primarily on inpatients. In addition, staff shortages, patient overcrowding, and heavy workloads have been reported as barriers to patient-safety compliance.[40,41] In fact, the consultation time per patient in Korea was only 6.2 minutes per patient, corresponding to half of the average OECD outpatient consultation time, of 12.6 minutes.[42,43] It has also been reported that outpatient nurses experience job stress due to insufficient staffing,[44] which may lead to inadequate explanations and omission of patient safety behaviors, such as careful observation of infusion-related reactions or performing hand hygiene. To improve the quality of outpatient medical services, it is necessary to implement a reinforced staffing policy that expands personnel for outpatients.

"The Institute of Medicine Committee on the Quality of Health Care in America noted in 2000 that "to err is human". [45] Thus, unintended errors are always possible simply because HCPs are human. To prevent patient safety incidents, multiple layers of mechanisms are required to avoid safety behavior omissions resulting from human error. Patient participation in patient safety activities may also serve as part of the overall mechanism for preventing such incidents. Patients should actively engage in their safety by asking questions, seeking information, and participating in their treatment.[46] In a study on patient safety behaviors and patient willingness to participate, patients were reluctant to ask challenging questions to HCPs, such as "Have you washed your hands?" or "Would you check that this is the correct medication for me?".[47] Based on the traditional relationship between HCPs and

patients in which the latter are regarded as passive recipients of the former's care,[48] patients may hesitate to challenge an HCP's authority fearing potential negative consequences for themselves. To reduce patient concerns about contracting infection at hospitals, it is necessary to cultivate a hospital culture where patients feel comfortable speaking openly about factors that contribute to their fears. Supportive and permissive attitudes of HCPs may encourage patients to ask challenging questions and voice their opinions on safety issues.[49-51] Therefore, education programs should be implemented for both patients and HCPs, with the goal of improving awareness and creating an environment that fosters open communication.

Strength and Limitations

Our study explores the impact of patient experiences of patient safety on the fear of infection, extending existing research beyond physical health outcomes. This approach underscores the importance of psychological aspects in patient care, which have often been overlooked in traditional studies focused solely on infection rates and physical health outcomes. However, this study has several limitations. Firstly, while data were collected during the COVID-19 pandemic, its direct external effects were not considered. Given COVID-19's known influence on infection fear, future research should account for these effects. Secondly, relying on a single question for infection fear may not comprehensively capture all aspects of the psychological responses related to the fear of infection. Future studies should use validated tools to assess various dimensions of fear. Thirdly, while participants were advised to respond based on their most recent experience within the past year of outpatient utilization, for those with medical experiences in the more distant past not closely aligned with the data collection period, recall bias may have occurred. Also, it should be noted that the questionnaire utilized to evaluate patient safety experiences primarily provided binary response options. To improve research quality, adopting more refined methods like Likert scales and validated assessment tools is essential. Lastly, our study was a

secondary analysis that only used existing data on patient safety experiences, which primarily focused on injection safety. This is a limitation because in reality, patient safety experiences encompass a broader range of phenomena, including patient participation and facility safety. Future research should consider a wider variety of patient safety experiences.

CONCLUSION

The findings of the current study suggest that the perceived fear of infection in medical institutions was significantly associated with patients' experiences of safety in outpatient settings. Among the patients' safety experiences, HCPs' hand hygiene and patients' prior experience of adverse drug reactions were found to have significant impacts. In our study, the most deficient service in patients' experiences was healthcare professionals' hand hygiene. These results highlight the importance of HCPs' proactive behavior and the need to minimize adverse drug reactions to enhance outpatients' psychological safety concerning infection.

POLICY IMPLICATIONS

Given the larger number of unidentified individuals encountered in outpatient settings, it is crucial to ensure that patients receive treatment safely from healthcare professionals. To achieve this, training for HCPs should focus on patient safety practices to ensure that patients feel confident in their care. Particularly, there is a need to expand the dedicated infection control personnel in outpatient services to reinforce proactive behavior monitoring and education. It is also necessary to minimize adverse treatment experiences, such as adverse drug reactions, as they are associated with higher levels of infection fear based on our findings. To minimize adverse drug reactions, a robust adverse drug reaction reporting system should be implemented, and this information should be shared inter-professionally. This approach will help prevent recurrence and improve patient safety. Additionally, to

empower patients to actively participate in managing their health and infection risks, institutional measures that promote patient engagement should be developed and implemented.

Author contributions

HK designed and conceptualized the study, analyzed the data, and drafted the manuscript. / HK is the guarantor.

ML contributed to the conceptualization of the paper, and critically reviewed and provided feedback on the manuscript. / HK is the guarantor

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Data acquisition and data availability

The data used in the study are available on the Microdata Integration Service at https://mdis.kostat.go.kr. To download the original data, interested parties must first register as a member and then submit a research proposal. We also acquired the HSES data after submitting a research proposal and downloaded after permission from the Microdata Integration Service.

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Declaimer

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Competing interests

None declared.

Patient and public involvement

Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication

Not required.

Provenance and peer review

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Figure 1 Flow diagram of participant selection process

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