ORIGINAL RESEARCH

Emergency and Disaster Preparedness of European Hospital Pharmacists: A Survey

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ABSTRACT

Objective: This study was focused on reviewing the emergency and disaster preparedness of European hospital pharmacists.

Methods: An online survey based on International Pharmaceutical Federation (FIP) guidelines for natural disasters was sent to European hospital pharmacies, with the support of the European Association of Hospital Pharmacists. Additional questions were added about the characteristics of respondents, as well as preparedness and experience of manmade disasters. Descriptive statistics were used to analyze the results.

Results: Hospital pharmacists in France (20%) and Spain (19%) returned most of the 306 questionnaires completed in 27 countries. Half of the respondents had analyzed their regional disaster risk, but 65% had never practiced emergency drills. Fifteen percent of respondents had experienced at least 1 major emergency or disaster event in the last 5 years. Fifty-six percent of those respondents who experienced a disaster subsequently created and promoted internal standard operating procedures (SOPs) for future emergencies, versus 23% for those who had not experienced disasters. Among pharmacists having experienced disasters, 40% organized a post-disaster debriefing to improve their future response.

Conclusions: Results highlighted that most European hospital pharmacists were not fully compliant with FIP guidelines. However, respondents who had experienced disasters were more likely to create and promote SOPs for future disasters. Further worldwide analysis and benchmarking are necessary, and FIP guidelines should be more strongly promoted.

Key Words: disaster planning, mass casualty incidents, medical countermeasures, standard operating procedures, strategic stockpile

The world has recently faced more natural and manmade disasters than ever before. Natural events were mostly extreme weather (mainly floods and storms), but most of the deaths observed (56%, 747 234) from 1998–2017 were caused by earthquakes.[1] The resulting economic losses were highest in 2017 (US $337 billion worldwide), including US $24 billion of damage and about 536 dead and 3000 injured in Europe alone.[2] The greatest total disaster-related economic losses in Europe between 1998 and 2017 were in Germany (US $57.9 billion), Italy (US $56.6 billion), and France (US $43.3 billion). Disaster-related economic losses in the United States were US $944.8 billion in the same period. In Europe overall, 37% of economic losses were climate-related (storms, wildfires, floods, droughts, landslides, and extreme temperatures), and 54% resulted from geophysical disasters (earthquakes, volcanic activity, and mass dry movement).[1] A European Commission analysis showed floods to be the most probable risk, followed by other climate-related events (extreme temperatures and wildfires).[3] Concerning industrial-risk events, industrial accidents, infrastructure breakdowns, or collapses resulting in a loss of life, transport accidents, terrorism, and cyber attacks were also cited.[3] Table 1 shows the main disasters that occurred in Europe in 2017.

Even though the overall number of victims has decreased, these situations are very demanding for Europe's health systems because of increasing complexity.[4] Health care professionals (HCPs), including pharmacists, play key roles in adequately responding to and treating victims during disasters.[5] For instance, pharmacists in community, hospital, industrial, and administrative settings must offer their pharmaceutical knowledge, such as their logistical and technical skills (eg, drugs procurement, emergency drug supply, cold chain management in disaster area, or even specific drugs manufacturing). In addition, clinical skills, such as obtaining medication history, specific drugs, and antidotes counseling, and identification of therapeutic substitution possibilities with equivalent treatment can be also specifically useful in these crises situations. This contribution must be adapted

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TABLE 1

Major Emergency or Disaster Events in Europe, 2017 – Summary of the Swiss Re Institute Report 2018.[2]

	Events	Country (City)	Damages
Natural disaster	Winter storm Egon, icy winds, heavy snowfall, floods	France, Germany, Switzerland, Luxembourg	10 dead, 100 missing
	Heavy snowfall, icy winds, freezing	Italy	6 dead 50 injured
	Cold spell bringing frost damage in Europe — severe damage to agriculture	Germany, Austria, Italy, France, Switzerland, Spain, Croatia, Slovenia, Romania, Ukraine, Serbia	49 dead 71 injured
	Thunderstorms — 243 buildings, 2000 vehicles damaged	Russia (Moscow)	23 dead 24 injured
	Wildfires — 320 houses damaged, 45 328 ha of forest burnt	Portugal (Pedrógão Grande, Castanheira de Pera, Figueiró dos Vinhos)	65 dead 160 injured
	Drought in Europe	France, Italy, Spain, Serbi, Montenegro, Croatia	34 dead 11 injured
	Torrential rains trigger flash flood and wind damage, 1 tornado — severe damage to infrastructure	Croatia (Zadar, Knin)	16 dead 200 injured
	Cyclone Herwart	Germany, Austria, Denmark, Poland, Czech Republic, Slovakia, Hungary	123 dead 539 injured
Manmade disasters	Mass shooting at a nightclub	Turkey (Istanbul)	39 dead 70 injured
	Suicide bomb explosion at a metro station	Russia (St Petersburg)	15 dead 64 injured
	Suicide bomb explosion outside concert hall	United Kingdom (Manchester)	22 dead 116 injured
	Stampede during celebrations for sport	Italy (Turin)	1 dead 1500 injured
	Fire at a residential 24-story building — fire started in a faulty fridge-freezer	United Kingdom (London)	71 dead, 9 missing 74 injured
	Boat carrying migrants capsizes	Mediterranean Sea	35 dead
	Crash from a commuter train into a platform	Spain (Barcelona)	54 injured
	Gas cloud at beaches	United Kingdom (Beachy Head and Birling Gap)	150 injured
	Fire and explosion at a chemical plant	Germany (Ludwigshafen)	48 dead 46 injured
	Collision of a passenger train with a freight train	Germany (Meerbusch)	50 injured

to the available resources and crisis context, which is a specific aspect of disaster response.

Following the US September 11 attacks in 2001 and other further worldwide terrorist attacks, the global health care community decided to improve its preparedness and planning for responding to these types of events and to various disasters.[6-8] The main actors of this response are HCPs, especially those working in hospitals, and they have been encouraged to improve their preparedness because any gap could have serious consequences for patients. However, despite the US Department of Health having paid to improve hospital disaster-preparedness,[9,10] a 2008 study showed that a hospital preparedness gap still existed.

In 2003, the American Society of Health-System Pharmacists issued a statement on helping pharmacists improve their preparedness and describing the role which pharmacists should play during disaster situations. This statement underlined their key roles in disaster preparedness and response.[11] Then, Setlak proposed strategies to improve pharmacists' preparedness and response to bioterrorism threats.[12] Afterward, Ford et al. expanded it to

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disasters and divided the roles of pharmacists into several categories: patient management, response integration, pharmaceutical supply, and policy coordination.[13]

At the international level, the International Pharmaceutical Federation (FIP) also published in 2006 its own set of standards suggesting that pharmacists needed to be involved in manmade and natural disasters.[14] Then, in 2016, FIP released guidelines for the common areas of employment in pharmacy, advising how pharmacies should prepare and respond to natural disasters. The document proposes practical recommendations and sets out the professional standards for pharmacy staff, and especially pharmacists, in various settings (community, hospital, industrial, etc.). The document (1) suggests concrete actions and offers a very comprehensive review describing every step needed to respond correctly to any disaster; (2) covers many topics such as prevention, mitigation, preparation, response, and recovery; and (3) promotes the value of having updated standard operating procedures (SOPs) and testing them with simulations.[15] Finally, in 2017, FIP published a more general policy statement underlying the benefits of adequate disaster preparedness.[16]

These guidelines thus highlighted the important role of pharmacy and pharmacists in disaster preparedness[11,15,16] and described various disaster experiences.[17-21] In 2017, the level of preparedness of Europe's pharmacists was, however, unknown. Therefore, the present study's purpose was to review whether European hospital pharmacists had prepared for disasters in compliance with the recent FIP guidelines.

METHOD

A cross-sectional, Europe-wide study was conducted using a Web-based open survey designed on the SurveyMonkey® (San Mateo, CA; http://www.surveymonkey.com/) platform. This survey was based on the FIP recommendations, "Responding to disasters: Guidelines for pharmacy 2016."[15] We selected the guidelines' chapter concerning hospital pharmacies, and each item in this chapter was converted into 1 or more questions. Additional questions were added to increase our general knowledge on disaster preparedness in Europe: personal information (eg, function in the pharmacy, kind of hospital, number of hospital bed, experience of disasters), manmade disasters (eg, new safety precautions or protocols since the recent terrorist attacks in Europe and in the world), drug stock information (eg, composition of emergency stockpile, coagulation blood factors), and blood product management (eg, origins, amount). The questionnaire was organized into 7 clusters of questions: demographic questions about the respondent, prevention, preparation, response, recovery, drugs (information about emergency stockpile), and European risk perception (linked, for instance, to the recent terrorism across the continent). Altogether, it consisted of 55 questions in English and used *conditional branching* to create a custom path through the survey, depending on the respondent's answer. Therefore, not all participants needed to answer every question. Most of the questions were multiple-choice and allowed multiple answers. Participants who had not experienced any major emergency or disaster events in the previous 5 years (ie, from 2013 onward) took 10–15 minutes to complete the survey, and those who had had some experience with a disaster situation took 30–40 minutes.

Data were collected between November 2017 and June 2018 using our online, anonymous, self-administered questionnaire sent out by e-mail to the presidents and delegates of Europe's national hospital pharmacists associations, with the support of the European Association of Hospital Pharmacists (EAHP). They were asked to distribute the survey to all head pharmacists and pharmacists in their respective countries. The survey was also sent directly to national associations. The targets were about 4800 hospital pharmacies in Europe.[22] Reminders were e-mailed at 10 days, 2, 4, and 6 months after the first contact.

Study inclusion criteria were that participants were hospital pharmacists, in 1 of the EAHP's 35 member countries[23] or a neighboring one (Albania and Cyprus), and that at least the demographic questions were answered (first 6 questions). Raw data were exported into Microsoft Excel® 2010 software (Microsoft Corporation, Redmond, WA) to perform descriptive statistics. The Fisher's exact test for "experienced disasters or not" comparisons were carried out using STATA® version 14.1 (StataCorp, College Station, TX), and P-values < 0.05 indicate a significant difference.

RESULTS

Demographics

Only 306 survey responses out of a total of 339 answers were used (33 were excluded for failing to meet the inclusion criteria; Figure 1). Respondents from 27 countries (73%) participated in the study, with the most contributors coming from France (n = 61, 20%), Spain (n = 59, 19%), Germany (n = 36, 12%), Italy (n = 35, 11%), and Switzerland (n = 34, 11%). Other countries accounted for less than 10% each (see Figure 1). Large countries from which we received no survey answers were the United Kingdom (UK) and Turkey. It is also worth noting that 57% (n = 175) of participants worked in hospitals with 200 to 1000 beds (22% had < 200 beds; 21% had > 1000 beds) and that 65% (n = 199) were either university (n = 104, 34%) or military hospitals (n = 4, 1%). Figure 2 shows this demographic data.

Among the 306 hospital pharmacists included, 15% (n = 46) had experienced at least 1 major emergency or disaster event in the past 5 years. The main causes were human violence (24%; terrorism, rioting), transport accidents (24%), geophysical occurrences (17%; earthquakes), meteorological events (15%; extreme temperatures, storms), biological events (12%; epidemics, insect infestations, animal stampedes), miscellaneous accidents (7%; non-industrial collapse of

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FIGURE 1

Study Flow-Diagram.

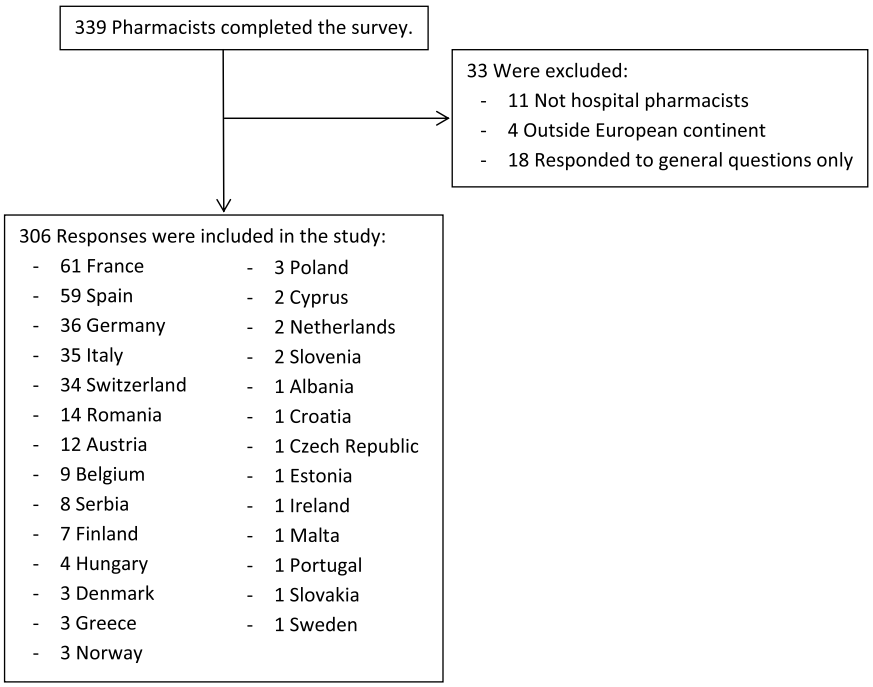
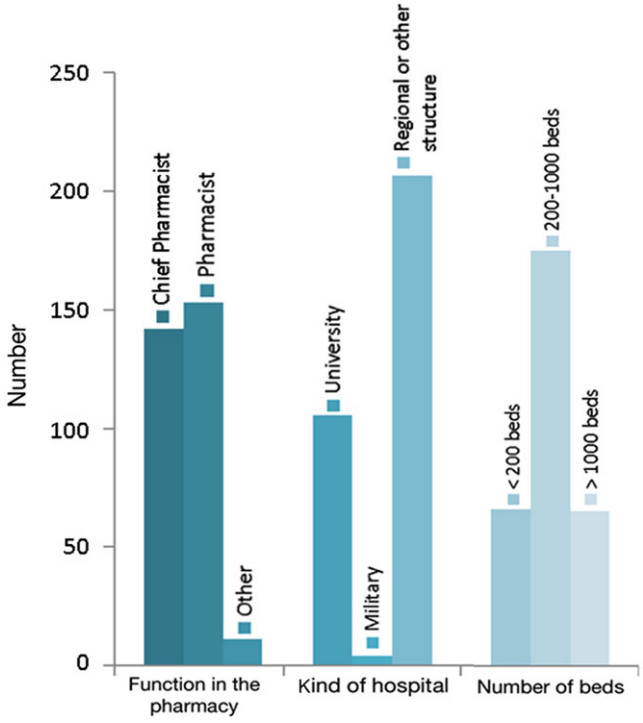


FIGURE 2

Demographic Data.



government services, communication, or agriculture), hydrological events (5%; floods, landslides), industrial accidents (5%; chemical spills, explosions, fires), and economic crises (5%; collapse in economic growth, financial crises).

Prevention

Of the 202 participants who answered the questions, 101 (50%) had performed an analysis of their region's disaster risk, and 71 (35%) had carried out emergency simulations or drills. Table 2 shows the differences with regard to questions about prevention between respondents who had disaster experience and those who did not.

Preparedness

Fifty-one (27%) of 188 respondents had created, provided, and promoted guidelines for impending emergencies. The others had not, either because their hospital director had not considered this a priority (52%), there were no capacities/resources (43%), the hospital's pharmacy director had not considered this a priority (26%), and/or there were no skills in the team to develop SOPs (16%). Table 2 shows the differences in preparedness between respondents who had disaster experience and those who did not.

Thirty-nine (93%) of 42 respondents had a drug stockpile, and half of them could ensure the sustainability of patients' drug

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TABLE 2

Impact of Disaster Experiences on the Preparedness of European Hospital Pharmacies

		Experienced a Disaster	Had Not Experienced a Disaster	*P-value**
Prevention	Analyze and measure regional disaster risks (n = 202)	69% (n = 20/29)	47% (n = 81/173)	0.048
	Analyze local risks (n = 202)	69% (n = 20/29)	45% (n = 78/173)	0.017
	Practice, simulations, or drills (n = 202)	62% (n = 18/29)	31% (n = 53/173)	0.002
Preparedness	Create, provide, and promote guidelines for impending emergencies (n = 188)	56% (n = 14/25)	23% (n = 37/163)	0.001
	Create, provide and promote guidelines for periodic testing of SOPs (n = 175)	33% (n = 8/24)	17% (n = 25/151)	0.087
	Pharmacists informed, at least in part, of their tasks in emergency situations (n = 159)	90% (n = 19/21)	76% (n = 105/138)	0.167

*Obtained by the Fisher's exact test.

TABLE 3

Management of Pharmaceutical Stockpiles in European Hospital Pharmacies

How Is Your Pharmaceutical Stockpile Managed? (n = 42)	Number	Percentage
Organized systematically so that pharmacists and technicians can quickly and efficiently access appropriate medicines	29	69%
Prepared to sustain an extra 100 patients for a minimum of 24 hours	21	50%
Specific to the region and population demographics	15	36%
Consistent with other institutions' emergency plans, such as community and industry, within the same region or municipality, and thus avoiding redundancy	14	33%
Kept in alternative, secure storage areas to reduce the risk of medicine stocks being compromised	14	33%
Other (please specify)	1	2%
No stockpile	3	7%

supplies for a minimum of 24 hours. Table 3 shows the management of stockpiles in the responding hospital pharmacies.

Thirty-three (19%) of 175 respondents had created, provided, and promoted guidelines for periodic testing of SOPs. The others had not, either because this was not a priority for the hospital director (45%), there were no capacities/resources to do so (41%), it was not a priority for the hospital pharmacy director (25%), nobody in the pharmacy team had the skills to develop SOPs (14%), and/or other reasons (17%). The results were dependent on whether respondents had experienced an emergency or disaster situation (see Table 2).

In 38 (24%) out of 159 respondents, local personnel and affiliates were informed of the tasks to be carried out in emergency situations, 86 (54%) were only partially informed, and 35 (22%) were not informed. Again, this result changed depending on disaster experience (see Table 2). In total, 82 (78%) out of 105 pharmacy directors were at least, in part, informed of their tasks in emergencies.

Response and Recovery

Sixteen (70%) of 26 pharmacists having experienced disaster situations had adequately implemented their local emergency SOPs, and 8 (40%) out of 20 had learnt lessons from using their SOPs to improve future approaches and to incorporate into SOPs after an emergency event.

Drugs

One hundred seven (79%) of the 136 respondents stated that their pharmacies had a dedicated stock for emergency and disaster situations, containing various therapeutic classes of drugs. This stock was most frequently composed of perfusions, antidotes, anti-infective, and analgesics (Table 4).

Risk in Europe

Five (4%) out of 133 respondents had recently experienced manmade disasters, but 25 (19%) out of those 133 had re-evaluated their regional risk profiles following recent manmade disaster events in Europe (notably, terrorist attacks) to adapt their preparedness. For 24 of the 133 respondents (75%; n = 18), human violence had been identified as 1 of the 3 main current risks, followed by industrial accidents (67%; n = 16) and transport accidents (46%; n = 11). However, only 8 (6%) of 133 respondents had added new safety precautions or protocols to their internal guidelines.

DISCUSSION

The present study assessed the emergency and disaster response preparedness of European hospital pharmacies. To

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TABLE 4

Stock Composition for Emergency or Disaster Situations in European Hospital Pharmacies

Drug Classes (n = 136)	n	%
Perfusion (ATC B05) and irrigating solution (ATC B05C)	59	43%
Antidotes (ATC V03AB)	57	42%
Anti-infective for systemic use (ATC J)	53	39%
Analgesics (ATC N02)	52	38%
Anesthetics (ATC N01)	50	37%
Cardiovascular system (ATC C)	44	32%
Blood and blood-forming organs (ATC B)	37	27%
Respiratory system (ATC R)	35	26%
Dermatological antiseptics and disinfectants (ATC D08)	31	23%
Vaccines (ATC J07), immune sera and immunoglobulins (ATC J06B)	26	19%
Medicated (ATC D09) and surgical dressings (ATC V20)	25	18%
Psycholeptics (ATC N05) and psychoanaleptics (ATC N06)	17	13%
Contrast media (ATC V08)	14	10%
Alimentary tract and metabolism (ATC A)	12	9%
Other (please specify)	17	13%
No specific stock	29	21%

Note: This list summarizes the drugs stored in European hospital pharmacies for disaster situations (ie, considered as most useful by hospital pharmacists in reverse order of importance).

reach this objective, a survey was spread to the thousands of hospital pharmacies across Europe. Only 339 potential participants responded, and only 306 respondents met our criteria. This low participation rate might be due to a lack of interest in the topic or to logistical issues. However, surveys were returned from 73% of EAHP member countries, providing us with a broad sampling of the situation in Europe. It should also be noted that respondents from 5 countries made up the majority of the survey participants; 2 of them – France and Germany – have the highest number of hospitals in Europe.[24,25]

Concerning prevention and preparedness, risk analysis is the first issue covered in the FIP guidelines. These recommend that hospital pharmacists analyze their regional risks in order to develop adequate natural disaster responses.[15] Only half of the respondents in our study had done so. The FIP guidelines specify that SOPs should include this information because it is more difficult to develop appropriate and specific responses to disasters without knowing the exact risks in the hospital's local area. Despite this, the European Commission analyzed general risk and identified floods as the most frequent risk, followed by meteorological events[3]; this general analysis should be adapted locally by each hospital for a more individual response to disaster events. For these reasons, both natural and manmade risks should also be periodically re-evaluated. In Europe, the recent terrorist events seemed to have only a few influenced hospital pharmacies. Indeed, only 19% had subsequently changed their risk analyses even though *violence* was the main risk cited by our study participants (75%). This perception is also put forward by the European Commission, which raised the overall risk level for natural and manmade disasters in Europe.[3] Furthermore, the Global Terrorism Index has reported that terrorist acts had increased in Europe (129 attacks, including 14 deaths, in 2002, versus 630 attacks, including 826 deaths, in 2016), as had the number of countries affected (77 countries in the world were affected by at least 1 terror-related death in 2016, versus 65 in 2015).[26] However, the risk of terror-related death was lower than the risk of dying in a flood or meteorological events.[3] In this context, the hospital pharmacies SOPs for emergency and disaster situations should be adapted accordingly, without neglecting the importance of a regional risk assessment.

Preparedness is recommended in many guidelines,[11,15] and disaster management plans are essential to ensuring hospital staff and hospital pharmacists' preparedness and response.[27] A lack of preparedness can cause additional damage during a disaster situation.[10] In our study, however, only 27% of respondents had a disaster management plan in their hospital pharmacy; the others did not, mainly because it was not a priority for their hospital director. A study in New Jersey's hospitals demonstrated that all of its respondents (n = 18) had institutional disaster preparedness protocols in place, but that only 1 included a clear description of its hospital pharmacy's role.[28] The rates of institutional disaster preparedness protocols were similar in other hospitals studied in Switzerland (92%)[29] and in Italy (100%).[30] One could make the hypothesis that hospital preparedness protocols exist more frequently than specific hospital pharmacy preparedness protocols because hospitals are under more direct governmental pressure to be ready to respond to disasters than pharmacies. Knowledge about disaster preparedness is certainly more well-rooted in general health care culture than in a specific pharmacy culture. Indeed, the study in New Jersey indicated that only 56% of hospital pharmacies had a dedicated plan.[28] However, the majority of regional hospital respondents in a Maryland study judged pharmaceutical preparedness as relevant to general disaster preparedness planning, and 74% of hospital pharmacies had a specific stockpile for dealing with biological and chemical events.[31] Extrapolating these results and comparing them to ours suggest that US hospital pharmacies have a higher rate of emergency and disaster preparedness than European ones. One hypothesis to explain this difference may be that the hospital directors and pharmacy heads in Europe might be less aware of the risks of disaster and of the roles played by pharmacists in dealing with them than in the United States. Indeed, after September 11, 2001, the US government intensively promoted its disaster preparedness program,[32-35] but this has not been the case in Europe.

One good point, however, was that the majority of respondents in our study did have an emergency stockpile, even if they were not fully compliant with every FIP recommendation. In the

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Maryland study, 85% of hospitals expected to have enough stockpiles to operate at normal capacity for either 48 or 72 hours, even with an additional 100 patients.[31] This capacity is much larger than observed in Europe, where only 50% of respondents in our study declared that their hospital could sustain an extra 100 patients for a minimum of 24 hours. Stockpiles of chemical antidotes were available in 51% of 23 hospitals in Los Angeles, versus 42% (n = 57) of those in our study. Additionally, 42% of those Los Angeles hospitals[36] had antibiotic stockpiles versus 39% in our study in Europe. Although probably not significant, these slight differences could be explained by the fact that the US government has promoted the development of a national strategic stockpile to counter the threat of a bioterrorist attack.[31,37] In our study, the majority of respondents had emergency drug stockpiles, mainly including perfusions, antidotes, anti-infectives, and analgesics that are among the most commonly used medications during disasters.

Additionally, guidelines recommend to test and inform staff about SOPs to improve disaster response.[15] Thirty-five percent of European respondents in our survey had practiced emergency drills, and 19% of hospital pharmacists had created, provided, and/or promoted guidelines for periodic testing of SOPs. In comparison, 84% of regional hospital pharmacies in Maryland had participated in a drill.[31] This latter study concluded that pharmacies were best prepared for biological incidents, followed by chemical and then radiological events. In our study, most hospital pharmacies did not practice drills because the head of the hospital director did not consider it a priority. One hypothesis is that the role of pharmacists in disaster response has not yet become a widespread consideration in European health care culture. This would certainly influence the availability of dedicated pharmacy capacity or the development of specific team skills. In contrast, most of the European hospital pharmacy personnel in our study (78%), including head pharmacists, were partially or fully informed and aware of the tasks that they should carry out in emergency situations. Indeed, SOPs are only useful if the staff is familiar with them, knows its content, and how to use the tools. Drills are a method to train the staff about plans and the staff's tasks.

In our study, the respondents who had experienced at least 1 disaster were more likely to have worked on their hospital's response preparedness and developed adequate local implementation policies for their SOPs for emergency and disaster situations according to FIP guidelines. They were statistically significantly more careful to analyze risks and to create, provide, and promote guidelines for impending emergencies. They also practice drills more often than respondents who had not experienced an emergency or disaster situation. To the contrary, the hospital pharmacists who had not experienced major emergency or disaster situations were less likely to promote the need for improved preparedness and adequate response. One hypothesis is that the pharmacists who had experienced disaster situations were more sensitive and aware of the risk than the others, probably because the impact of such an experience has similar benefits to a drill. Those who had experienced disaster situations were also better informed (90%). Actually, some studies reported that populations who had experienced disaster situations are more likely to prepare for future disaster events.[38,39] To the contrary, a study highlights that, although Iran has experienced more disasters than Sweden, Swedish hospitals are better prepared than Iranian hospitals because of the higher socioeconomic level of Sweden.[40]

Concerning the response and recovery, only a few of the hospital pharmacists (15%) in our study had experienced a major emergency or disaster situation and were thus able to respond to this specific part of the questionnaire. Surprisingly, less than half of those hospital pharmacists stated that they had learned from their experience and modified their SOPs accordingly. Performing a post-disaster review process should be routine because it is important to learn from any disaster situation, implement a potential new protocol, and thus allow the pharmacy team to react even better next time. A similar debriefing approach should be achieved after drills to improve knowledge by own experiences.[41,42]

The present study had some limitations. The first was the lack of participation by representatives of some major countries, such as the UK. The data should thus be interpreted with caution, and answers should represent the opinions of the responding hospitals only. Additionally, response rates varied significantly from country to country and failed to reflect the weights of their respective populations. Some pharmacists may not have been able to answer the survey because it went out in English only, but this would not explain the complete lack of respondents from the UK. Furthermore, the total number of pharmacists who actually received the survey is unknown because of logistical limitations (we had no direct access to the European database of the heads of hospital pharmacies and pharmacies staff). As a result, the statistics are based on the respondents only, and the proportion of participants who did not answer remains unknown. Moreover, some participants failed to complete the survey, making a comparison difficult between some answers. Another limitation is that the questionnaire was sent to hospital pharmacists without the possibility to determine afterward whether the respondents were in similar or different hospitals. The results reported therefore reflected data for pharmacists and not hospital pharmacies. Finally, the 8 months necessary to collect the maximum number of survey answers were relatively long. However, no major emergency or disaster situations that could have biased the answers occurred at the respondent hospital pharmacies during the data collection period.

CONCLUSION

These results demonstrated that European hospital pharmacists today are still not fully compliant with the FIP

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disaster guidelines. However, respondents who had previously experienced an emergency or disaster situation were more likely to have created and promoted internal SOPs for dealing with future events. Further worldwide analysis and benchmarking are warranted, as is the development of a compliance score to better compare different countries or types of hospitals.

Hospital pharmacists bear an essential role in emergency and disaster preparedness when drug management is essential. Educating and training pharmacists about these situations require significant improvement, and their responsibilities still need to be clarified in several countries. The FIP guidelines, or similar disaster preparedness guidelines, also require promotion and awareness rising at national and local levels.

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Conflict of Interest Statement

The authors declare no conflicts of interest.

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