Assessment of the Capacity and Capability of Burn Centers to Respond to Burn Disasters in Belgium: A Mixed-Method Study

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Burn disaster is defined as a massive influx of patients that exceeds a burn center's capacity and capability. This study investigates the capacity and capability of burn centers to respond to burn disasters in the Belgian ground. Quantitative survey and qualitative semistructured interview questionnaires were administered directly to key informants of burn centers. The data collected from both methods were compared to get a more in-depth overview of the issue. Quantitative data were converted into a narrative to enrich the qualitative data and included in the thematic analysis. Finally, data from both methods were analyzed and organized into five themes. The Belgian Association of Burn Injury (BABI) has a specific prehospital plan for burn disaster management. Once the BABI Plan is activated, all burn centers respond as one entity. Burn Team (B-Team) is a professional team that is formed in case of urgent need and it is deployed to a scene or to nonburn specialized hospitals to help in disaster relief. The challenges for burn disasters response occur particularly in the area of triage, transfer, communication, funding, and training. We conclude that there is a variation in the capacity and capability of burn centers. Overall, the system of burn disaster management is advanced and it is comparable to other high-income countries. Nevertheless, further improvement in the areas of preparation, triage, communication, and finally training would make disaster response more resilient in the future. Therefore, there is still space for further improvement of the management of burn disasters in Belgium.

Burn disaster, also known as Burn Mass Casualty Incident (BMCI), is defined as a condition in which the number of influx patients exceeds the coping capacity and capability of a burn center.[1] The capacity of a burn center can be defined as the availability of space and supplies, while capability means the presence of sufficient and prepared staff to handle a sudden and massive influx of burned patients.[2,3] BMCI may result from a variety of accidents including man-made such as explosions, chemical, nuclear, biological attacks as well as natural disasters such as earthquake, volcanic eruption, and wildfire.[4]

Globally, there is insufficient awareness to BMCI since it is not common and it does not happen on a daily basis.[5] This results in a poor reaction from officials on funding and maintaining the activities that relate to burn disaster preparation and management. As a result, this leads to multiple gaps in planning which might not be discovered until a disaster becomes reality.

Belgium is known to have nuclear power plants and several petrochemical factories which makes it liable to the risk of burn disasters.[6,7] Among several burn disasters that happened worldwide,[8–10] Belgium was not immune. In the last 30 years, major disasters affected the country including the attack on the auditorium of the Catholic University of Louvain in Brussels, Switel hotel fire in Antwerp, Cockerill factory disaster in Liège, Ghislenghien gas pipeline explosion in Hainaut, and finally the 2016 terrorist attacks in Brussels. The objective of this study is to assess the capacity and capability of burn centers in Belgium and to explore challenges and possibilities that may arise in the event of a burn disaster.

METHODS

Research Design

This is a cross-sectional descriptive study using mixed methods (concurrent design approach). The concurrent implementation allows the use of both the quantitative and qualitative data equally.[11,12] In this study, both a quantitative survey and qualitative semistructured questionnaire were used.

To our knowledge, there is no predesigned checklist for assessing hospital preparedness to disasters in Belgium. Therefore, the quantitative survey was developed based on an extensive review of literature relevant to the preparation and management of burn disasters in other countries. We

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identified 60 questions related to burn disaster preparedness and management. Thereafter, the questionnaire was discussed by the research team, which includes burn specialists. This process resulted in the selection of 32 final questions. The questions were framed according to eight domains adopted from previous studies on burn disasters planning.[13,14] The response was dichotomized into 1 for yes and 0 for no and unknown answers (Figure 1 and Supplementary Annex 1).

Qualitative interviews with key informants provide an in-depth understanding of the process of disaster preparedness in the healthcare context.[15] It also provides insight into the attitude, practice, and perception of healthcare workers regarding disaster management and response.[16] The semistructured interview was designed based on the Consolidated Criteria for Reporting Qualitative Research.[17] An interview guide was prepared based on the relevant domains of preparation and management of burn disasters.[18] Probes were provided to allow the interviewees to expand on the topic covered. The interview was structured into five themes (Supplementary Annex 2).

Data Collection

All six Belgian burn centers (Antwerp, Brussels; Charleroi; Ghent, Leuven, and Liege) were targeted. Initially, we requested an appointment with the head of burn centers. When they could not participate (mostly due to schedule constraints), we interviewed the deputy or associate physicians. In total, five centers participated in the study and nine people completed the interview, including three principal physicians in three burn centers. In the fourth center, both the deputy physicians and the emergency physician were interviewed. For the last burn center, the author interviewed the deputy physician as well as hospital disaster manager, chief and deputy nurses of the burn unit. Table 1 shows the details of the participants.

Firstly, the interviewees were contacted by email. A short explanation of the protocol of the study was provided. The first author (Al-Shamsi) traveled to all centers to interview the participants between May and June 2018. The data collection included both the quantitative survey, which lasted around 30 minutes, and qualitative interviews on the same day. The entire process lasted between 60 and 90 minutes and the interview was conducted in the English language. During the interviews, notes were taken and the entire interviews were recorded and transcribed verbatim.

Data Analysis

We compared the data collected from the quantitative survey with the qualitative interviews to get a more in-depth overview of the preparedness and management of burn centers in the event of burn disasters. Typically, data from mixed-method studies are presented into a separated section or may be transformed from one type to another to converge the results.[19]

Data transformation is a method by which both quantitative and qualitative data can be integrated during analysis. For example, qualitative data could be numerically coded and included in the quantitative analysis or the reverse. In our study, quantitative responses were coded and entered into a Microsoft Excel 2013 spreadsheet and analyzed descriptively. Quantitative data were then transformed into a narrative and included in the qualitative thematic analysis.

The result of the qualitative interviews transcribed verbatim and organized according to the predefined themes. The transcripts were sent to all interviewees so that they review and confirm them. Finally, the data from both methods were analyzed and organized into five predefined themes: 1) preparation & plan; 2) command & communication, 3) transfer & triage; 4) capacity, capability, treatment; and 5) training.

Ethical Consideration

The participation of both the survey and the interview was voluntary and the researcher explained the protocol of the

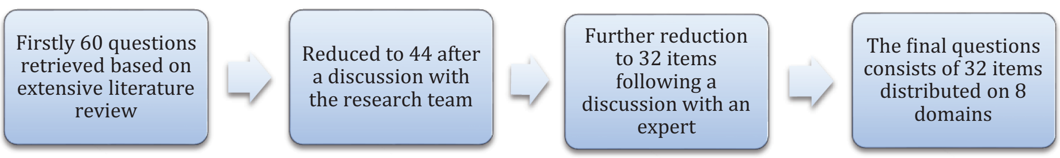

Figure 1. The iterative process of designing the quantitative survey.

Table 1. Demographic information of the interviewees

Interviewee Position	Profession	Burn Center Identity	Gender
Deputy physician	Plastic surgeon	1	Female
Head physician	Emergency & disaster medicine	1	Male
Head physician	Anesthesia and intensive care medicine	2	Female
Head physician	Anesthesia and intensive care medicine	3	Male
Deputy physician	Plastic surgeon	4	Male
Head nurse	Burn and intensive care nursing	4	Female
Deputy nurse	Burn and intensive care nursing	4	Male
Manager	Disaster management	4	Male
Head physician	Anesthesia and intensive care medicine	5	Male

study for every interviewee. Written consent was obtained from each of the interviewees. The interviewees informed about their right of withdrawal at any point during the interview. No financial incentive was offered to the interviewees. The researcher ensured that all information obtained would be kept confidential by anonymizing both the interviewees' identity and the data obtained from the centers.

RESULTS

We identified six operating burn centers in Belgium with a capacity varying from 6 to 26 beds, giving overall 75 operating beds all over the country. We obtained data from five out of the six burn centers (response rate of 80%). Out of the five centers that participated in the study, nine people completed the quantitative survey and participated in the qualitative interviews. Information about each theme was obtained from the interviewees and organized according to the interview guide of the questionnaire.

Preparation & Plan

The Belgian Association Burn of Injury Plan (BABI Plan) is a special plan for burn disasters in Belgium; it is led by the Military body. The Central Station (also known as the National Center of Regulation and coordination of Burn Beds or BABI Central) is set up within the department of intervention in the Military Hospital and it operates on a daily basis 7/24. The Central Station is responsible for maintaining the coordination and the regulation of prehospital response in case of a massive disaster. It is headed by a coordinator who is specialized in emergency relief and management. The coordinator manages the triggering and implementation of the BABI Plan and is assisted by an expert burn specialist.

The decision to activate the BABI Plan depends on the head of the dispatching center. EMS units who arrive at a scene call the emergency center 112 and declare the disaster situation based on their primary evaluation. The emergency center then calls the Central Station to activate the BABI Plan. The plan could also be activated by Federal Health Inspector of each province; the nearest burn centers; and even burn centers in the neighboring countries in case there is a national crisis. As soon as the plan is activated, the Central or BABI Station contacts the president of the BABI and all burn centers' heads by telephone to gather information on each burn center's capacity and capability, which ideally should be provided within an hour. Figure 2 presents the simplified process of activation of the BABI Plan.

All centers but one have a contingency plan that could be activated in case of delay in activation of BABI Plan or transfer of burn patients to other centers. The contingency plan is often part of the hospital's internal disaster plan. It consists of moving stable inpatients to other wards and expanding the burn beds, as well as the request for extra staff from other wards. However, this plan is only effective for small-scale burn disasters. On the other hand, none of the burn centers have a special plan for pediatric burn disasters. However, since most of the burn centers are part of a large university hospital, the respondents stated that it is possible to care for pediatric burn inside pediatric Intensive Care Units (ICU).

All burn centers faced and responded to a burn disaster at some point. Several challenges were identified by the respondents, such as difficulty in coordination and standardization of protocol for all centers. The BABI Plan is not a complete solution to disaster response and every hospital needs to have its own protocol to respond to burn disasters in addition to BABI Plan. Lack of funding of disaster-related activities represents a real challenge for maintaining and updating the plan. A high daily bed occupancy rate is another challenge that could create a bottleneck in case of a massive influx of patients. Receiving more than three severely burned patients is considered a big challenge for many centers. The major burn center in Belgium is well-equipped to receive a considerable number of burned patients, but not burn with comorbidities since other trauma specialties have not emerged in the same facility. Finally, deployment of emergency medicine physicians with little burn-care experience could influence the accurate estimation of TBSA burnt. Table 2 presents a summary on preparation and plan section.

> *There might be some challenges for this center; for example, better coordination and standardization of protocol. Even though there is BABI plan, it is not a complete solution for major disasters according to my opinion.........principal physician of the burn center 2*

Command & Communication

One burn center has the capability to send a mobile medical team to the field. It is essentially a specialized team called Burn Team (B-Team). The B-Team is dispatched either to the scene of a disaster or to nonburn hospitals where patients are being initially stabilized. The B-Team consists of a highly competent surgeon, anesthetist, and/or intensivist as well as a nurse, all specialized in burn care. The major role of the B-Team is to triage patients at nonspecialized burn hospitals, often in the first 12 to 24 hours following a major burn calamity. Moreover, it is responsible for following up and evaluating patients in the vicinity of a burn disaster. Table 3 summarizes the major roles of the B-Team. The remaining centers have a low capability in terms of burn specialists. Therefore, they depend on emergency physicians who have some experience in dealing with burn patients at the scene of a disaster.

> *B-Team; however, is able to do such a procedure, but it so complicated because the number of burn experts in Belgium is so low and a disaster is not the best situation to send burn experts outside the burn units, unless the center is overstaffed which is not the case in so many burn centers except, may be, the military hospital.........principal emergency and disaster medicine physician in burn center 1*

Regarding communication, the Central Station is considered the only focal point for communication between all centers. Apart from this, all centers depend on personal contact between faculty members, even with burn centers in neighboring countries. However, apart from the liaison office of the Central Station, there are no special channels through which burn centers could directly communicate with each other. There is also limited communication with fire units at the scene, which is currently informally undertaken through

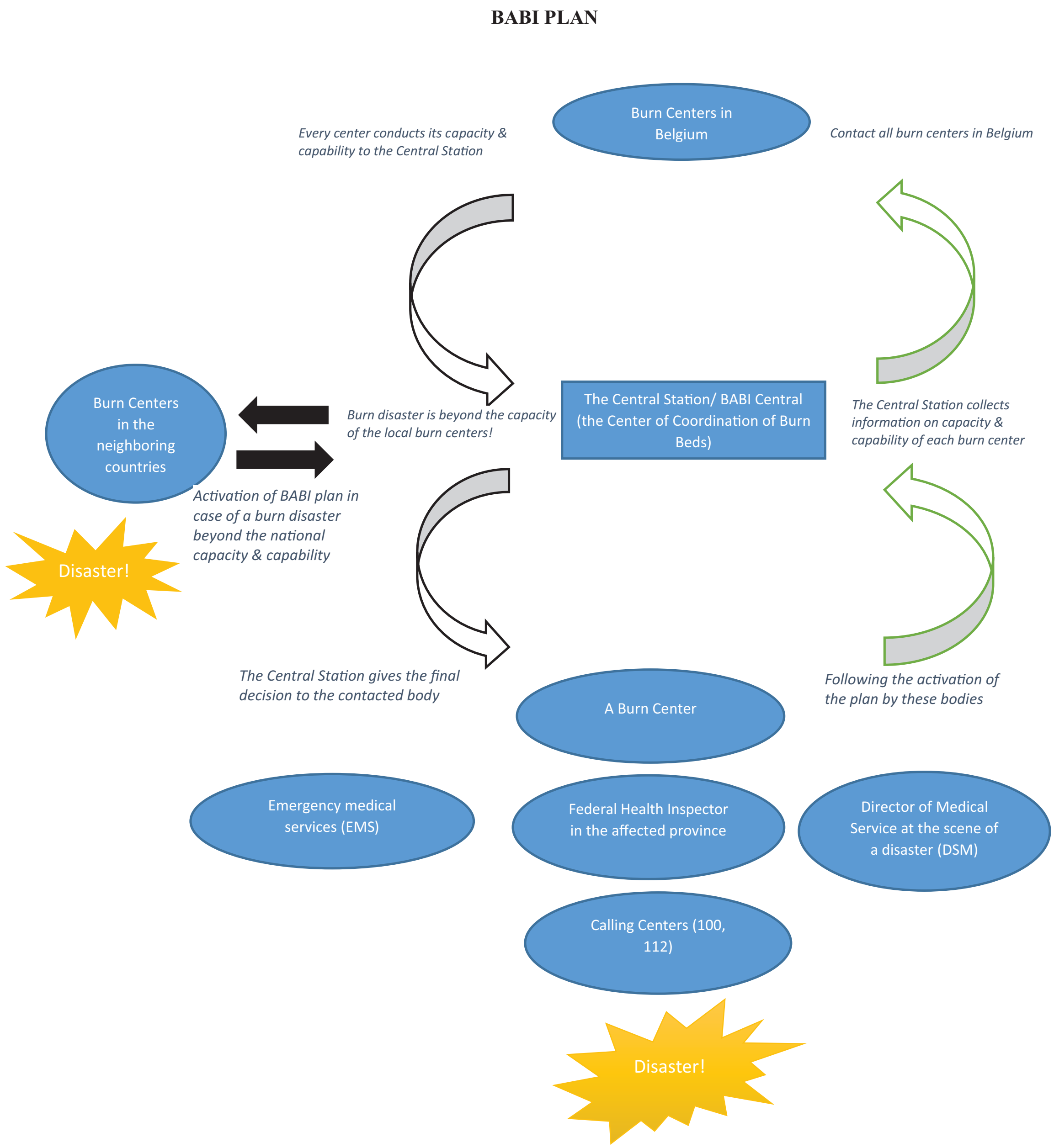

Figure 2. Activation of the Belgian Association of Burn Injury (BABI) plan.

Table 2. Summary of the respondents' answers on preparation and plan section

Items	Yes	No/Unknown
Burn disaster plan	5 (100%)	0
Fund for plan activities	0	5 (100%)
Contingency plan	4 (80%)	1 (20%)
Predefined agreement with nonburn specialized hospital	1 (20%)	4 (80%)
Pediatric burn disaster plan	0	5 (100%)
Daily information on burn bed status	4 (80%)	1 (20%)

personal contact also. Nonetheless, all emergency services in Belgium have a secured communication network called Digital Tetra Tracking Network (ASTRID), with fixed radio transmitters installed in every EMS hospital. Respondents see this network as an alternative in the event of a disaster should personal contact fail.

Triage & Transfer

Triage is often done by emergency physicians based on prior experience and personal decision without predefined policy and/or triage decision table that could be considered as a reference in the event of a disaster.

Transfer of patients to nonspecialized burn hospitals is also possible should burn centers be overwhelmed. However, this depends on personal contacts and is done according to the emerging disaster situation with no prior agreement or predefined policy. In fact, wild evacuation to close nonspecialized hospitals was an observed reality during many Belgian disasters (eg, Antwerpen 1995, Ghislenghien 2004, and Brussels terrorist attacks 2016) despite short delays for deploying a forward medical post that can do the triage of the casualties.

Table 3. Organization of the Burn Team

The B-Team
Where to go
• Nonspecialized burn centers
• Disaster scene
What to do
• Primary triage
• Secondary triage
• Follow-up and evaluation
• Consult & advice
• Transport
How to help
• Estimation of burn bed surge capacity
• Close coordination with Incident Commanders

The transfer is done exclusively by EMS through a central dispatch office in each province. A Medical Director at a scene acts as an Incident Commander. Typically, the Medical Director has experience in dealing with burn casualty situation and could assess the disaster situation. In case of a burn disaster, communication is established between the BABI Central Station and Incident Commander at the scene of a disaster. Basically, all centers wait for a signal from the Central Station to transfer or receive patients. If the local burn centers' capacity and capability are sufficient, patients are transferred to the Belgian hospitals. However, if the number of patients is beyond the capacity and capability of the Belgian burn centers, a transfer to neighboring countries is decided (Figure 3).

> *Incident Commander liaises with BABI Central Station then a decision is pursued whether there is a capacity or not. In case there is a capacity, patients are distributed to the Belgian hospitals; however, if the Incident Commander and BABI office see that the number of patients is beyond the capacity and capability of the burn centers. A transfer to neighboring countries is decided………Principal physician of the burn center 5*

All centers have the capacity and authorization to transport patients outside Belgium through air transfer. This is often done in coordination with the Belgian Military after activation of the BABI Plan. The transfer is often started from the military or the civilian sanitary rotary-wings platforms in Belgium (Brugges and Bra-sur-Lienne) or in the neighboring countries

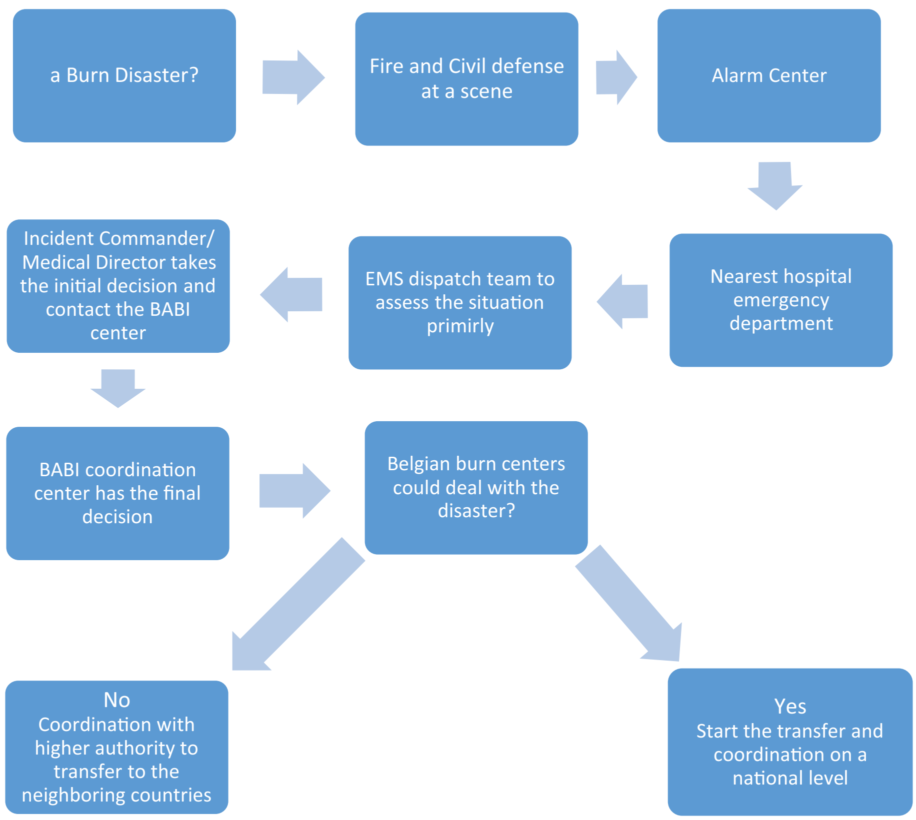

Figure 3. Communication and transfer hierarchy in the event of a disaster.

Table 4. Summary of the respondents' answers on triage & transfer section

Items	Yes	No/Unknown
Triage held according to predefined policy	0	5 (100%)
Presence of triage decision table	0	5 (100%)
Trace and track system	1 (20%)	4 (80%)
Capacity to request air transport	5 (100%)	0
Capacity to transfer patients outside the country	5 (100%)	0
Capacity to send a mobile medical team	1 (20%)	4 (80%)

(France, Luxembourg, and Germany). Nevertheless, trace and tracking system where patients could be followed does not exist in the Belgian healthcare system, but one center used an internal system that could follow up patients admitted in the hospital providing that they were transferred within same hospitals' group. Table 4 presents a summary on triage and transfer.

Capability, Capacity, and Treatment Strategies

There is the possibility to call for the assistance of professional staff in case of a massive influx of patients. This varies across different centers and it is easier and more feasible in burn centers nested in large university hospitals. Since burn management involves complex dressings that require experienced nurses, the recruited staff members should work under the supervision of experienced nursing staff. However, there is still no official predefined policy and protocol to request for extra staff from other hospitals, since health insurance does not cover staff operating outside their facilities. Nonnursing staff members could provide a valuable contribution in case the conventional staff is overwhelmed. Most burn centers have the possibility to recruit occupational and respiratory therapists as a part of the enforcement team to do burn-related procedures. Furthermore, in all burn centers, there is a special EMS team that could be made available to accompany intubated patients if a transfer is needed.

Measures to increase capacity could include expanding the conventional burn beds and operation theaters to handle more patients. This is the main strategy to deal with a massive influx of patients. Nevertheless, such expansion should be accompanied by increasing the experienced staff, which may not be immediately possible. As part of assistance, three centers have a specially designed burn cart that could be deployed to a scene or to a nonspecialized center where patients are being initially stabilized.

> *We can increase the free beds. For example, we have inpatients waiting for medication and rehabilitation. We could ask the rehabilitation unit to take patients quicker or we send patients in a normal unit while waiting for the transfer to the other burn centers in Belgium. So patients with minor injuries will be transferred to non-burn wards while those with major burn kept in burn center……… deputy physician of the burn center 4*

Respondents stated that all burn centers have enough medical supplies and equipment such as ventilators; however, the exact capacity could not be determined. The usual procedure to maintain adequate supply during the mass casualty situation is to contact central pharmacies of the corresponding hospital and request the medications and equipment. Generally speaking, the maximum capacity in all burn centers is the admission of three to five severely burned victims.

Regarding treatment strategies, three centers express the possibility of using alternative dressing in case of disaster austere conditions, including the long-term antimicrobial dressing (such as Aquacel Ag® and Flammacerium®). However, this is not a standard protocol in all Belgian hospitals. Telemedicine technology has a well-known role in disaster management[20]; however, none of the centers has this capacity until now. Table 5 presents a summary of capacity and capability.

Training

Participants expressed that, since Belgium is a safe country, less attention is paid from the authorities on funding disaster-related activities. Two centers have the ability to hold disaster drills on an annual basis. However, both hospital management and health workers are less motivated to participate in disaster drilling and exercises. In addition to this, the cost of this kind of exercise is covered neither by the health department nor by the individual hospitals; another reason that makes them less appealing for healthcare workers. Only one center had performed disaster drilling in the past. Nevertheless, it was part of a hospital internal disaster plan and it was not about burn disaster in particular. All respondents felt that there should be more training and disaster drilling in the area of burn and massive casualty incidence.

> *In Belgium, training such as Advanced Burn Life Support ABLS is not mandatory. Our staff are not usually enrolled in such training since we are not the one who is going to a scene………(Principle Physician of the burn center 3)*

DISCUSSION

To our knowledge, this is the first English written paper that discusses burn disaster management in Belgium. In our study, we only interviewed people responsible for running, but not the implementation of the disaster plan. Therefore, this research focuses mainly on a strategic rather than an operational level. Our findings reveal that there is a special predesigned plan for burn disaster in Belgium. This plan (BABI Plan) regulates the response between different Belgian burn centers at the prehospital setting and it represents the backbone for burn centers not only in Belgium, but also in the neighboring countries in the event of a massive casualty. It was executed successfully in disasters before such as in Ghislenghien disaster and 2016 Brussels' attacks. Moreover, in 2001, in the aftermath of the café fire in Volendam in the Netherlands, Belgian burn centers admitted 20 severely burned casualties and in 2015, the Brussels Burn Center admitted eight casualties from the collective nightclub fire in Bucharest. The concept of BABI Plan is similar to burn disaster plans

Table 5. Summary of the respondents' answers on the capacity & capability section

Items	Yes	No/Unknown
Burn cart ready for deployment	3 (60%)	2 (40%)
Requesting equipment and supply from other hospitals	0	5 (100%)
Capacity to expand ICU bed	4 (80%)	1 (20%)
Capacity to expand the conventional beds	5 (100%)	0
Capacity to expand operation theater	3 (60%)	2 (40%)
Capability to request extra burn surgeon	5 (100%)	0
Capability to request extra staff from the same hospitals	3 (60%)	2 (40%)
Capability to recruit nonnursing staff	4 (80%)	1 (20%)
Capability to request staff from outside hospitals	0	5 (100%)
Presence of dedicated team that could accompany burned patients	4 (80%)	1 (20%)

ICU, Intensive Care Unit.

in other high-income countries, such as the American Burn Association plan,[21] Australian Burn Plan,[22] United Kingdom National Major Incident Plan for Burn Injuries,[23] the Dutch National Mass Disaster Plan,[24] Swiss burn plan,[24] and the Sweden National Burn Disaster Management Plan.[25]

The BABI-Plan provides a framework to coordinate response in the decentralized Belgian healthcare systems. It is led by the military body which is responsible for coordination between different centers. This is considered a strong point toward burn disaster response and management due to the fact that governments usually invest well in the military sector. The military is often well-equipped and has both the capacity and capability to respond to large-scale disasters.[26] Hence, in case of a disaster, the Belgian burn centers are supposed to respond as one entity in contrast to disaster systems in other countries.[21,27]

The B-Team is a special team that can act as an Incident Commander and directly involved in the coordination of response to mass casualty events. It could be deployed to augment burn team in specialized hospitals as well as to give consultation to not-specialized one. Additionally, it optimizes the use of burn surge capacity and resources, and organize the transfer and triage procedures. This has been proven to improve the outcome of burn disasters' response in general.[22] The concept of B-Team also exists in other countries.[4,28] It is clear that the deployment of such a team to hospitals is an effective solution in austere conditions since it can be easily assembled within days or even hours.[9]

Coordination of the transfer is organized by the Central Station and the medical director on the site of the disaster to guarantee the rational distribution of patients according to local capacity and capability. An advantage is that Belgium is a small country with a good road network, making rapid movement between different centers possible.[29] Furthermore, in large-scale disasters, the military becomes the main body responsible for the transfer, particularly outside Belgium. This is another advantage since the military means is often more capable than the civilian one.[30]

Requesting extra staff from the same facility is possible in some centers. It is known that staff shortage would be a bottleneck in case of massive casualty, providing enough space is available.[31] Therefore, having a clear contingency plan that defines staff duties is crucial at both national and local level.[32] Moreover, a large catastrophic incident with a large number of victims requires extra staff not often directly involved in burn care and intervention. Those would provide a valuable contribution; for example, physiotherapists and psychologists.[33] Fortunately, this is possible in most of the centers.

Burn disasters are not common, this leads to a relative apathy to follow up and update plan and contact details. As a result, multiple gaps in burn disaster planning might not be discovered until disaster becomes reality.[28] Despite the above advantageous points of the BABI Plan, there are some challenges and limitations for the response to burn disasters in Belgium.

Firstly, lack of coordination between burn and nonburn hospitals. A burn disaster may happen at any time. It will be challenging to transport all victims to definitive burn centers immediately, especially in case of mass casualty disasters. Therefore, it is imperative to have prepared facilities to resuscitate patients even in a small country with good transportation network.[24] This is done by identifying enough resource and experience in advance as well as coordination with nonspecialized hospitals.[34]

Secondly, lack of specific pediatric burn disaster plan. A pediatric burn disaster is likely to occur such as burn in school or kindergarten; therefore, the pediatric plan is an essential part of any disaster planning.[35] This is because this group of patients is negatively affected when the resources become scarce.[36] Full pediatric plan means not only unified treatment guidelines, but also special protocol, communication channels, and equipment.[30,37]

Thirdly, lack of funding for BABI Plan activities. Funding is an indispensable part of any disaster plan. In the United States, for example, both the burn disaster plan and burn team have a special fund that could be activated in case of disaster.[38] Unfortunately, BABI Plan lacks specific fund and once the plan is activated, it totally depends on the hospitals' initiative with no clear roadmap of funds. This issue could be mitigated by including BABI Plan fund in the national disaster fund, for example, the special fund that already allocated to face the danger of epidemics or natural disasters. This at least would ensure the maintenance of the BABI Plan and B-Team during a massive disaster.[38]

Fourthly, many decisive steps depend solely on personal contact. Although Central Station is responsible for coordination in the event of a disaster, the presence of predefined communication channels between burn centers, and between burn centers and directors at a disaster scene is vital. Those bodies play a vital role in the distribution of patients to the available resources, in particular, in the first hours of a disaster.[39] Additionally, normal means of communication are usually disrupted during disastrous situations, which makes them unreliable.[40,41]

Finally, there is no national tracking and tracing system of burn patients, which is regarded as one of the greatest challenges in disaster setting that might affect the response in term of triage and transportation.[42,43] A system following patients from the point of registration until discharge would optimize disaster response in a resource-limited environment.[44] This system has been developed effectively in the Netherlands.[42] However, it is still under development in Belgium.

Strength and Limitation of the Study

This is the first study aiming to describe current preparation to the massive casualty burn incidences in Belgium. The study used a combined quantitative and qualitative methodology, an effective approach in health research.[45] All interviews were held directly by the lead researcher with key informants from the burn centers. Nevertheless, there are some limitations to this study. Firstly, not all burn centers participated in the study, we could not get an appointment from the sixth burn center despite frequent contact, but the response rate was 80%. Therefore, we believe that this does not adversely affect our findings. Secondly, there might be a social desirability bias. A typical issue in the interview-based research where interviewee tries to manipulate the conversation based on their wishes. This issue was mitigated by informing the participants that their identities and burn centers would be anonymized. Thirdly, although the interview was initially directed toward the heads of burn centers, the researcher could not interview all of them. Additionally, in some center, we had the opportunity to interview people more directly involved in disaster response such as the emergency physician officer and hospital disaster manager. This might also create an unbalanced response between different centers. Fourthly, some of the questions were difficult to address exactly since interviewees are not directly involved in; for example, the items of equipment and supply. Furthermore, the questionnaire was not validated before for Belgium, but it was constructed based on an extensive literature review so some of these questions may be hypothetical for Belgium since each country has its own possibilities and challenge to respond to certain calamities. Nevertheless, the questionnaire was validated by a Belgian burn expert. Additionally, the interview was held in the English language, but neither the researcher nor the interviewees are native of English. Therefore, the language may have affected the interpretation of some questions. Nevertheless, the results were sent after the interview to all participants to ensure the best possible response. Finally, this study targeted key informants from the burn centers, in other words, it is based on a strategic level perception, and not operational. To have a detailed view on operational issues related with burn disaster management, we recommend further studies to complement this one; for example, a study that includes views and experiences of frontline responders.

CONCLUSION

There is a specific plan for burn disasters in Belgium. This plan mainly coordinates the prehospital setting in the event of massive disasters such as the deployment of a highly specialized team to optimize the distribution of patients according to the available resources. Moreover, the plan functions to coordinate cooperation between different centers and ensures the smooth transfer of patients. Generally speaking, the capacity to respond to burn disasters varies across different centers in term of staff, space, and supply. This is, nevertheless, mitigated by the BABI Plan which ensures a balanced response between different burn centers based on their capacities and capabilities.

However, our study identified some challenges in disaster management and response in Belgium. These include lack of special pediatric burn disaster plan, defined triage protocol, funding to the burn disaster plan activities, and deficient national track and tracing system. Moreover, specific training and drills on burn disaster seem to be a real challenge because such training makes the healthcare professional more oriented and resilient should they encountered by massive casualty burn situation.

Overall, planning and preparation for burn disasters have developed in Belgium. It is not a coincidence that Belgian burn centers have previously responded to burn disasters successfully. However, we identified some areas that need improvement in order to achieve an efficient response. These include but are not limited to communication, triage, transfer policy and agreement, and finally the funding and training which needs to be further sought by stakeholders in Belgium. Therefore, we recommend frequent revision of the plan and more coordination between the directors of burn centers and stakeholders in order to identify the possibilities and challenges and, thus, ensure a better response in the future. This includes, in particular, more effort to fundraise the disaster plan with its associated activities as well as training programs that ensure the readiness of the staff to handle massive casualty situation. Furthermore, we recommend that further steps are taken to establish formal communication channels between burn and nonburn centers. Last but not least we believe that this study would provide a benchmark for policymakers to further improve the preparation and response to burn disasters not only in Belgium, but also in other countries in Europe. The fact that there are few studies have been done on burn disaster planning in Europe justifies the uniqueness of methodological approach in this study.[46] Except for narratives, mixed methods of research have not been used in this context, but they represent a useful and efficient way to assess flaws and strengths of disaster plans.

SUPPLEMENTARY DATA

Supplementary data is available at *Journal of Burn Care & Research* online.

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