

Mass-casualty Response to the Kiss Nightclub in Santa Maria, Brazil

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Abbreviations:

CDM: Municipal Sports Center
HCAA: Hospital de Caridade Astrogildo de Azevedo
HUSM: Hospital Universitário de Santa Maria
ICU: intensive care units
SAMU: Mobile Prehospital Assistance

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Abstract

On January 27, 2013, a fire at the Kiss Nightclub in Santa Maria, Brazil led to a mass-casualty incident affecting hundreds of college students. A total of 234 people died on scene, 145 were hospitalized, and another 623 people received treatment throughout the first week following the incident.¹ Eight of the hospitalized people later died.¹ The Military Police were the first on scene, followed by the state fire department, and then the municipal Mobile Prehospital Assistance (SAMU) ambulances. The number of victims was not communicated clearly to the various units arriving on scene, leading to insufficient rescue personnel and equipment. Incident command was established on scene, but the rescuers and police were still unable to control the chaos of multiple bystanders attempting to assist in the rescue efforts. The Municipal Sports Center (CDM) was designated as the location for dead bodies, where victim identification and communication with families occurred, as well as forensic evaluation, which determined the primary cause of death to be asphyxia. A command center was established at the Hospital de Caridade Astrogildo de Azevedo (HCAA) in Santa Maria to direct where patients should be admitted, recruit staff, and procure additional supplies, as needed. The victims suffered primarily from smoke inhalation and many required endotracheal intubation and mechanical ventilation. There was a shortage of ventilators; therefore, some had to be borrowed from local hospitals, neighboring cities, and distant areas in the state. A total of 54 patients¹ were transferred to hospitals in the capital city of Porto Alegre (Brazil). The main issues with the response to the fire were scene control and communication. Areas for improvement were identified, namely the establishment of a disaster-response plan, as well as regularly scheduled training in disaster preparedness/response. These activities are the first steps to improving mass-casualty responses.

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Introduction

On January 27, 2013, at approximately 3:10-3:15 AM, there was a fire caused by the burning of polyurethane foam used for acoustic insulation in the Kiss Nightclub, located in the center of the city of Santa Maria, Brazil.¹ At the time of the fire, the club was at maximum capacity. The crowd inside was made up by mostly university students; the party was being promoted by the colleges of Agronomy, Veterinary Medicine, Food Technology, Zootechnology, Technology in Agricultural Business, and Education.^{2,3}

A black and toxic smoke (with cyanide and carbon monoxide) quickly spread, while the people inside tried to get out through the only exit door in the club. A total of 234 people died on scene, 145 were hospitalized, and another 623 people received treatment throughout the first week after the incident.¹ Eight of the hospitalized people subsequently died.¹

Santa Maria is a city located in central Rio Grande do Sul, in the southern region of Brazil. It has 262,368 inhabitants, many of whom are young people, as there are six university centers as well as technical courses and university preparation courses. There is also a Brazilian Air Force Base in the city, as well as the headquarters of the Brazilian Army. Santa Maria is 274 km from Porto Alegre, the capital of the state of Rio Grande do Sul.⁴

Disasters tend to follow a cyclical pattern consisting of four phases: preparedness, response, recovery, and mitigation/prevention.⁵ This case review describes and analyzes the community response to the fire at the Kiss Nightclub.

Report

Between 3:10–3:15 AM, the fire started at the Kiss Nightclub.¹ The Military Police were the first to arrive on scene; they were passing by during their nightly rounds soon after the incident occurred.¹ The fire department was notified at around 3:22 AM with calls from the Military Police team as well as from civilian bystanders.¹ The Mobile Prehospital Assistance (SAMU) of Santa Maria, consisting of three Basic Life Support ambulances and one Advanced Life Support ambulance, was informed of the event at 3:28 AM by the Municipal Fire Department.¹ The extent of the disaster was not communicated to the response workers, only that there was a fire and people were injured.¹ A command structure was established by an experienced emergency physician, Dr. Carlos Fernando Drumond Dornelles, who represented SAMU.

The entrance of a supermarket parking lot, located across from the Kiss Nightclub, was identified as an initial triage area. The patients were classified as red, immediate care/transport to hospital, or black, deceased. It was not possible to use the triage cards of the Simple Triage and Rapid Treatment method due to the chaos created both by the desperate bystanders who were trying to help on scene, as well as the number of victims that were in serious condition and needed immediate care and transportation for definitive care. Besides this, the number of capable first responders and available rescue supplies were insufficient for the number of victims in need.

There was a large number of people on scene. Many were inebriated, emotionally distressed, and others wanted to “save” relatives and friends. Initially, crowd control was not possible. Even under guidance of the Military State Police, there were bystanders that insisted on entering the disaster site filled with flames and toxic smoke. Only firefighters had the proper equipment to access the club, fight the fire, and save victims. Even though the bystanders (family and friends of the victims) were informed of the danger, many people died when entering the fire location without the suitable protective equipment. Of those who survived, some needed ventilator support and priority transportation to the closest hospitals. One firefighter required care from SAMU at the scene of the fire for smoke inhalation and emotional distress.¹

Approximately 30 minutes after the start of the fire, there were 10 ambulances (two were private ambulances from SOS UNIMED (Santa Catarina, Brazil) and one was a private ambulance from CAUZZO (Santa Maria, Brazil); one was from the Military Police Hospital; two from the City Hall of Santa Maria; and four were from SAMU), two fire trucks, three sedan-type vehicles from the Federal Highway Police, one vehicle from the State Highway Police, three vehicles from the Santa Maria City Guard, and 13 police vehicles from the Military Police on the scene,¹ in addition to many taxis and cars belonging to the lay population. All these vehicles were used to transport the injured to local hospitals.

Some patients were transported without attention to safety precautions by taxis, private cars owned by the population, and vehicles from the Military Police. For those victims helped by ambulances, only one was transported via stretcher, while other victims were transported on the seats or on the floor of the above noted vehicles. Of these victims transported, some were dead, but no one pronounced them as such at the scene, and as a result, they used the already limited transport resources. Since the victims’ bodies were still warm, volunteers who put them in the

ambulances didn’t allow them to be removed from these vehicles, believing they were still alive.

The rescue work was concluded at 5:20 AM.¹ Final control of the fire scene and rescue of victims ended at 6:30 AM.¹ A total of 234 bodies were taken from the scene of the fire.¹ Under the resolution of the City Hall, Civil Police, and Military Police, it was decided that the bodies of the victims would be taken to the Municipal Sports Center (CDM).¹ Approximately one hour later, at 7:30 AM, the site was ready with the support of many volunteers in place.¹ The volunteers received no formal training and had only a brief orientation as to their responsibilities. The team of the Forensic Medicine Institute of Santa Maria received the bodies at the CDM, where they collected blood samples which showed that the major cause of death was asphyxia. Psychologists accompanied the relatives during the recognition process of the bodies, while doctors provided medical services when necessary. A collective memorial took place at the CDM on January 28, 2013.

The emergency departments of five hospitals, the intensive care units (ICU) of six hospitals, and all of the free-standing emergency units of Santa Maria were crowded. It was decided jointly by the local hospitals and SAMU leadership that the patients in serious condition would stay in the Hospital de Caridade Astrogildo de Azevedo (HCAA) or in the Hospital Universitário (HUSM), both in Santa Maria, as they had more physical, material, and personnel resources available. Patients in less acute condition were sent to smaller hospitals and to emergency units in the city and in the region. On the day of the fire, health care professionals voluntarily stayed for several hours past their shift times in order to ensure the victims were evaluated and stabilized.

A catastrophe management group was formed in the HCAA around 7:20 AM. In a quick first meeting of about 15 minutes, the functions of each member were determined. Among them, there were four doctors, two nurses, the doctor who was the technical director of the HCAA,¹ and a representative of the state Regional Health Coordination. The command center was set up in the emergency room of the HCAA, the same place where the patients in serious condition were received coming from low-complexity hospital units and emergency units of the city. Both the HCAA and HUSM were the only hospitals in Santa Maria that could manage high-complexity cases. The meetings that followed also took place at the HCAA Auditorium. Sent by the federal government, the National Force of the Unified Health System arrived in Santa Maria in early afternoon of January 27th.

Communication was via landlines and cell phones, especially personal phones. Radios were also used by the state Regional Health Coordination. There was no noted line congestion, except for with the Registry of Volunteers. At first, each hospital and health care unit was responsible for its own communication with the press, assigning a team for the function. Later, representatives of the federal government undertook the task of communication with the press.

Health professionals arrived voluntarily to hospitals and were sent to units where their skills were needed. Ventilators were required from the state, neighboring cities, and other medium- and low-acuity hospitals and emergency units in the city. They were also taken from all the ambulances (mobile ICUs) of Santa Maria. Intensive care units were created at the HCAA to meet the immediate need for beds (eg, reduction of space between the already existing beds). At the HUSM, the patients were placed in

the ICUs and in the emergency unit. The Hospital Bed Organizing Center of Rio Grande do Sul would normally designate beds in many cities of the state, making transportation more complicated, longer, and presenting more risks to the patients. In order to address this issue, the Hospital Bed Organizing Center of Porto Alegre was contacted. Relocations were quickly arranged and appropriate beds were identified to receive patients in serious condition in the state capital. Air transportation was utilized since it proved to be fast, in addition to the fact that there was a Brazilian Air Force Base in Santa Maria that had one C-98 Caravan plane, one C-95 Bandeirante, and four UH-60 Black Hawk helicopters available.¹ Before air transport was initiated, three patients were transported by ground transport via intensive care ambulances¹ (two from SAMU and one from a volunteer private service) to the cities of Caxias do Sul, Cachoeira do Sul, and Canoas (nearby cities that are between 100-300 km from Santa Maria). It was determined that ground transfer be used since the state government planes would only arrive at night and there was no time to wait. But by Sunday morning, January 27, the airplanes from the Air Force were available and took off for Porto Alegre.

In the management center, work shifts were created for volunteer doctors, nurses, and nurse technicians to accompany the victims on their flights. They received instructions on which patient they were responsible for, including their condition, and the destination hospital. Thenceforth, they were taken to a boarding location by intensive care ambulances escorted by motorcycles and cars from the Federal Highway Police. The UH-60 Black Hawk helicopters and the C-95 Bandeirante plane were capable of transporting two patients at a time, whereas the C-98 Caravan could carry an average of three patients. The entire operation was closely supervised by an Army and Brazilian Air Force liaison officer who was stationed with the management team. At the time of departure, the SAMU of Porto Alegre was informed of the estimated travel time, name of the patients, and their destination. The SAMU of Porto Alegre maintained communication with INFRAERO (Brazilian Government Corporation responsible for operating the main commercial airports in the country) and would coordinate transportation with their ambulances and private service ambulances. They also counted on the support from the Military Police, the fire department (who ensured safety at the landing location), and escorts from the Public Company of Transportation and Circulation for the transfer to the hospital units.

Throughout Sunday, January 27, the transportation proceeded in this way. That night, the Army and Brazilian Air Force provided a larger plane (C-105 Amazonas) that was adapted as an air ICU and went from Porto Alegre to Santa Maria with a team of emergency physicians. Each flight transported seven patients, each in critical condition.¹ The flights began at 9:20 AM on January 27th and the last patient was transferred to Porto Alegre on February 11th.¹ A total of 54 patients¹ were transported to the following seven public hospitals in Porto Alegre: Mãe de Deus, Moinhos de Vento, Complexo Santa Casa de Misericórdia, Hospital de Clínicas, Hospital de Pronto Socorro, Hospital Cristo Redentor, and Hospital Nossa Senhora da Conceição. The first two hospitals mentioned were private hospitals.

Discussion

There was no disaster-response plan in Santa Maria, which made the organization of the response to the event difficult, especially

the prehospital response. Because of their lack of training and experience, the police officers did not successfully fulfill their primary roles, which were to isolate the area and provide safety and security. The first to arrive on scene should have quickly analyzed the event and informed the other government agencies of the scope of the disaster when notification took place; this would have made the response more effective. Nevertheless, the police were fundamental in transporting victims to the hospitals. There was initially only three firefighters on the scene (they subsequently received additional staff), and this lack of staff made it impossible to maintain order, enforce an evacuation of the neighboring buildings, and to ensure the safety of the rescue teams, including volunteers.

Command is the act of directing, organizing, or controlling by virtue of explicit authority, regulatory or delegated. In a mass-casualty incident, the incident commander is the individual who assumes decision-making responsibility. The incident commander must have the level of training, expertise, and experience to fill this position effectively. Dr. Dornelles' initiative of assuming command in the event location was appropriate, as he was the most capable person present at that moment.⁶

As there was no physical delineation of the area; it was not possible to establish a proper location for triage, ambulance access, and for the arrival of the volunteers. This caused more chaos at the scene of the event, hampering the flow of people and response vehicles. Many victims were taken to hospitals needlessly, as they were already dead on scene.

Regarding communication, there was congestion only of the landlines and cell phone lines given by the Civil Defense for volunteers to call and register. In addition, several people who registered were never called, despite the need for additional professionals; this was especially true for psychiatrists. It was unclear where the breakdown in communication with volunteers occurred, whether in the registry itself, the communication with volunteer providers, or other factors.

The official public information should have been disseminated only in press conferences, by a team designated before an event occurs, preferably with training in risk communication. A designated Public Information Officer was only established after some time. This may explain the mistakes in the number of victims reported by the press early in the response to the disaster.

Some of these problems in the response to the fire at the Kiss Nightclub could have been avoided if there had been a disaster-response plan previously written for the city of Santa Maria, and if previous training for this kind of situation, according to the written plan, had taken place. Still, the work done by the rescue teams and volunteers was successful in that a significant portion of victims received ventilator support and early treatment, which reduced the potential mortality of the incident. Training for institutions, government agencies, and the general public about disaster preparedness and response is essential to achieve better success in the management of these types of events.

The inter-municipal transportation was well performed, with specialized teams of emergency physicians assisting in air transport, allowing for efficient, high-quality care to be delivered. Even though the patients had serious lung lesions, none of them died during transfer. The intra-hospital organization also yielded good results, as ICU beds were provided for all the seriously ill patients.

Conclusion

The main problem in the response to the fire at the Kiss Nightclub was related to the management of volunteers and the coordination of the many institutions involved at the scene of the

incident. Obtaining beds for patients who required hospitalization functioned well. Development of a disaster-response plan, in addition to regularly scheduled disaster preparedness training sessions, would likely improve the response to future disasters.

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