Nurses and Nursing in Mass Casualties Incidents

7

Ben Rozenblit

Before we begin our desiccation of the unique contribution and role of nurses in MCI, its best to first understand the phenomenon itself.

Intuitively and historically, the definition of an MCI was influenced by the absolute number of injured in the event. However, today, the more correct definition is:

> An event that ***overwhelm*** the local healthcare system, with a number of casualties that vastly *exceeds* the **local** *resources* and capabilities in a **short period** of *time* [1].

Such an event is possible by: natural disasters, transportation accidents, industrial accidents, manmade terror attacks, and many more.

From that definition we can learn that such an event is possible in every country/hospital and health care system, and not only that, but it can and will, happen by surprise and in the worst time possible. It is not a question of *if*, but a question of *when and how*.

In order to understand the scope of those incidents, let's look at some numbers and trends: according to the annual disaster statistical review 2016, "the numbers and trends," by the Centre for Research on the Epidemiology of Disasters (CRED) [2], the total number of people affected by disasters in 2016 (569.4 million) was the highest since 2006, far above its 2006–2015 annual average (224.1 million). The estimated economic losses from natural disasters in 2016 (US$ 153.9 billion) was the fourth highest since 2006; almost 12% above the annual 2006–2015 damages average (US$ 137.6 billion).

According to the Institute for Economics and Peace "global terrorism index 2017 [3]," two-thirds of all countries experienced a terrorist attack in 2016.

B. Rozenblit (✉)
RN, MPH. Emergency and Disaster Management, Tel Aviv University, Tel Aviv, Israel

Emergency Medicine Department, Sheba Medical Center, Ramat Gan, Israel

Nursing School, Tel HaShomer, Ramat Gan, Israel

© Springer Nature Switzerland AG 2020
Y. Kluger et al. (eds.), *WSES Handbook of Mass Casualties Incidents Management*, Hot Topics in Acute Care Surgery and Trauma,
https://doi.org/10.1007/978-3-319-92345-1_7

In 2016, OECD countries experienced the most deaths from terrorism since the September 11 attacks in 2001. There has been a 67% increase in attacks and a nearly 600% increase in deaths from terrorism since 2014. In 2016, the terrorist organization's activities affected 308 cities in 15 countries around the world, four more than the previous year.

Many more data are available in those documents and others like them, but the numbers are clear, and they are reviling a hard reality that all that are dealing with emergency preparedness must deal with: mass casualties, whether they are caused by a flood, hurricane, tornado, earth quake, or mass shooting, are here, and the medical system must be prepared for them as soon as possible.

Mass Casualties Incidents are not a new phenomenon. One would expect from the international health care systems to be prepared for such events, especially in light of the fact that all systems are being/were or will be affected by them at some point in time or another. A paper published in February 2016 in the World Journal of Emergency Surgery by Ben-Ishay et al. wanted to check this preparedness status. The surprising result was: "*the vast unfortunate experience of many countries around the world did not translate into a massive preparedness of hospitals towards a shattering event such as an MCI* [1]".

In other words, although there is a clear necessity to be strongly prepared for those incidents, most of the hospitals/medical systems are not.

To be fully prepared for a MCI, it takes all levels of the countries health care system.

In this chapter, I want to focus on improving the preparedness of the emergency department to a MCI, with the emphasis on the preparations that are being done by nurses.

Before we dive into the preparations themselves, first I would like to take a look at the unique characteristics of nurses and to demonstrate that nurses are one the most important professions in all aspects concerning MCI. The way I decided to do so is by looking at the historical connection between a nurse and emergencies and disasters.

A bit of history—what is so special about nurses and why do we need them in emergencies?

Nurses have been a part of disaster preparedness and response as long as nurses have existed. Although the early nurses who responded to emergencies during historic events have been something other than the fully educated, licensed, professional nurses as we know them today. But still, their described role then is consistent with a lot of the modern understanding of nursing:

attention to the injured or ill individual
assuring provision of water, food, clean dressings, and bedding
providing relief from pain and even something small as offering a human touch that says "I care [4]".

If we look at some specific examples from the history books, we find there are some examples of this historical connection between nurses and emergencies [5].

Pictures from the 1919 influenza epidemic show nurses caring for large numbers of patients placed on cots in rooms more similar to barns than wards.

In the pre-antibiotic era, the major response to any large disease outbreak was comfort and support until the disease ran its course. In the late twentieth century, such was the initial response to what we now know as HIV and AIDS. In cities where this epidemic struck early, large numbers of seriously ill patients were admitted to hospitals for the purpose of receiving good, basic nursing care. This was all that could be done in the absence of any definitive treatment.

Wartime has also added to our understanding of human caring and response to emergencies and disasters. Nurses contributed to this learning, as well as the caring and response.

The origins of nursing, as we know it today, are often traced to the Crimean War experiences of **Florence Nightingale.**

Long histories and many Nightingale biographies are talking about the different methods that she used. The most important one is the presence of disciplined nurses committed to cleanliness and comfort. That in itself allowed more ill and injured soldiers to survive than would otherwise have been the case.

Perhaps even more significant is the later contribution of Miss Nightingale to the decrease in morbidity and mortality of the wounded soldiers through: application of basic statistical analysis, infection control measures, and what we would now consider quality improvement procedures.

Staying in nurses and wars, at the time of the First World War, the hospital units that traveled to Europe were composed of volunteer units, consisting of physicians and nurses from hospitals or communities coming together to fill the essential need for a health presence during and after battle. By World War II, formally organized nursing services had become a part of the military. Nurses in the military often had first exposure to the advances in health care that wartime exigencies stimulated, such as: the use of penicillin, the use of triage, and advanced trauma care [5].

Public health emergencies and nursing:

Nurses have historically played important roles in everyday, local public health emergencies. When a community is challenged by extreme weather, and many families and individuals are isolated, public health nurses work systematically to be sure that no one is abandoned, often traveling with public works crews for access to isolated areas.

As an emergency leads to the establishment of temporary shelters, public health nurses are routinely assigned to assist in triage and screening for health problems, administration of first aid and psychological support, implementation of infection control procedures, and monitoring, so that the congregate living situation does not lead to an outbreak of disease.

To conclude the historical part of this chapter: this part has highlighted some of the historic involvement of nurses in response to emergencies, whether caused by humans or by natural forces.

Without attempting to present an exhaustive listing of activities performed by nurses in emergencies, in past times and in present, the fundamental goal of nursing is to assist individuals to their highest possible level of functioning in the face of health and illness challenges, is never more needed than under emergency conditions.

So, once we emphasized the non-detachable connection between nursing and nurses and emergencies/mass casualties incidents, now I would like to dive back into the specific roles and responsibilities of nurses in preparing their hospital ED for such an event.

However with that being said, one would claim that this type of preparation is almost an impossible task, because every event/health care system/hospital is different. Because of the many differences, there is no only one way of good, professional nursing in an MCI. Nevertheless, there are common professional tasks that nurses take in an MCI, from the emergency department point of view, and those can be summarized as: “Taking care of all the little things and gluing it all together.”

This will be my “anchor” and predisposition along this part of the chapter.

So what do nurses do in an MCI? This huge question can be summarized as:

They make sure that everything is prepared **before** the event, taking care of all the “little things” **during** the event (that without them it is impossible to do anything), help to close the event **after** everything is over and finally, they organize the department so it will be ready for the next one.

7.1 Before the Event

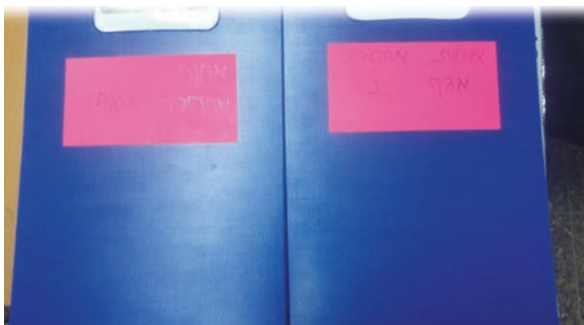
“You cannot build a dream on a foundation of sand” said *T.F. Hodge*. Although he was talking about something different, but it is still very true in regards to our subject, and in particular to: a **MCI protocol**.

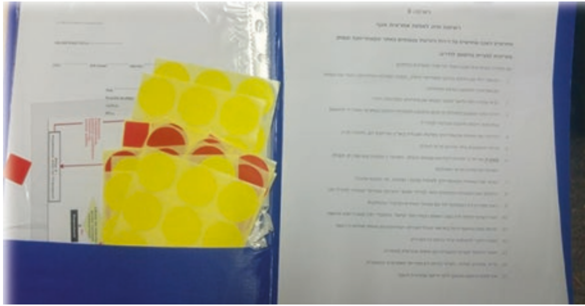
A pre-made protocol is a must have, because trying to decide what to do in a time of extreme pressure is almost an impossible task. MCI protocols usually exists (if your hospital/health care system is lacking of one, I strongly suggest to write it as soon as possible), and they are the products of the senior management.

But what is the connection between those protocols and nurses? They can, and should, transform them from a huge pile of hard to read pages to an easy and practical tool to use in times of stress.

A small example: the original protocol of the Ministry of Health of Israel is about 83 pages [6], and the protocol of my hospital (Sheba Medical Center) is about 140 pages [7], impossible in a time of stress. In my ED, we prepared a short version of the same protocol, but not only that, we used it in a form a checklist, where each staff member according to the task that he needs to fill gets it in a small folder.

Those folders need to be in a place where they are easy to find, and everyone knows where they are (in the picture below: a folder with a writing: “nurse in charge of wing 2”).





Above is the folder when it is open. Inside there is a specific part of the protocol and a checklist mentioning what there is to do in this site in an alphabetical order.

Managing the man power—**Get more people**—there is no such thing as to many nurses/doctors in a true MCI!

Don't trust your memory, use prepared-in-advance list of essential personal.

A couple of ways to get more people:

1. Public address system (PA system) by the hospital speakers
2. A group call by text/beeper/phone
3. Calling by the "hand-held fan method"—it is a calling method in which one person is calling two more, those two are calling four more, and so on.
4. Calling by a radio or a television

Each hospital calling system and the list itself, needs to be updated three to four times a year and to be tested to see that it works.

Knowing "who's who"—Because there are a lot of staff members at the event, and many are not "organic staff," it is important to know who is who right at the beginning of the event, before "all hell breaks loose."

Above there is a picture of medical staff in a time of a MCI. On the left, there is a staff member with a writing of "Hospital attendant." The women with the yellow marking are nurses, and the man with the orange sign is a doctor.

Command and control—this is a huge subject, but from the nurses prospective it can be summarized as: Know in advance who is in charge of what.

The first step in distributing roles and responsibilities is: **making the decision** to declare a MCI.

Because that kind of declaration is one with very serious consequences and financial concerns, it is best to decide in advance how to make and who makes this critical step. It is preferred to leave this decision to the most senior managing position possible.

MCI usually starts in the pre-hospital phase. Once they understand that this is no ordinary event, they are letting the relevant hospital/s know about the event, giving them some time to prepare.

Whether if in your hospital EMS calls are answered by a doctor or whether by nurse, the first step to take is to make sure that the call is not a prank.

If in fact you are facing a MCI, the Head nurse or the nurse in charge, will notify the general manager of the hospital about it, and only he will decide to call the code.

Once the MCI is declared there are key positions that need to be filled.

I will go over on some of them, mainly the ones of nurses.

Head nurse, before the event begins, together with the ED doctor in charge, will do rounds across the ED and divide the existing patients there into three groups: those who need to be hospitalized but, they are waiting for a bed or are in the end of their medical workup but yet with no decision, will go straight to the wards. Those who can be discharged but again, with no such decision, will be discharged at once. The third group (should be the smallest one), those who are at that point can't go anywhere, those will be transferred to the remaining area at the ED and will continue to recieve care in time of the event. Those patients will need specific staff members, who will be in the ED but will not be able to help with the MCI. The purpose of all this re-arrangement: "making room for the incoming injured."

During the event the head nurse will be in charge of the event from the nursing and logistic spectrum. She will usually be right in the center of the ED and in direct communication with other sites managers. She is also assigning the nursing staff to the different work sites.

Trauma Nurse Coordinator—usually during the event will be by the side of the head of the trauma department ("Traumatologist"), helping taking care of the most critically injured patients. After the event has finished, a special team, led by the trauma nurse coordinator will go to all the wards where injured were hospitalized, and help the teams there/make sure, that all are in order and no further help is needed.

Head nurse of the hospital—will notify all staff members relevant to the event and help the ED head nurse in every way the she needs. Will be a part of the hospital Emergency headquarters.

Other than those senior charge nurses, there will be a nurse, alongside the doctor, in charge of every site in the ED. I will discuss about them and their responsibilities, a bit later in the chapter.

Before the MCI reaches your ED, you have to make sure that other very important personal are notified about the event and that they are getting ready. Usually the

notification to them goes through the receptionist, but as the charge nurse, you have to make sure/help to get this job done, "the time is on the essence."

Logistic manager—He works very closely with the head nurse and the doctor in charge (under their Giddens). He is responsible for the sanitary workers, drivers, putting signs of the different sites, bringing the equipment carts and makes sure that "other important personal" are present, such as: admin employees, people to "run errands," people who are responsible for oxygen cylinders and more. Another very important job that he has is to be responsible for the **registry team**.

Manager of the blood bank—supposed to come to the ED and be in charge of making sure that the right patient receives the right blood product at the right time. He also manages the blood supply.

Security—are responsible for clearing all the roads leading to the ED and directing essential personal to the right location (keep in mind that closing the roads to cars and clearing them for the ambulances will prevent the medical personal as the other "common people" from getting to the ED. Make sure that they know who needs to be there and who's not). Another job that they have is making sure that at the time of MCI the only people in the ED are those who need to be there, closing the ED so that no family members or press will be allowed to enter.

A quick summary of command and control, as we can see, it is not "a one man show." The command needs to be **decentralized**, but regular updates to the hospital Emergency headquarters are crucial.

The hospital Emergency headquarters—include among others: Hospital manager, Nursing manager, Administration manager, Emergency coordinator, someone from human resources, and more. The biggest role of the headquarters is to supply the best framework to the MCI staff in handling the event.

So, we got the personal and the framework for the event; now we need to organize the ED in a form of different working sites. The main idea is: in order to be able to work in order in a chaos environment you have to "**divide and concur**," meaning divide your ED into different sites so it will be easier to control.

Forward triage—This site is under the responsibility of one of the senior ED doctors and a senior ED nurse. Other staff members who are there—security personal and registry personal. Two major things are happening there: deciding which site the injured needs to be sent to and first aid in a form of stopping bleeding through a tourniquet and helping problems with A/B through "ambu" ventilation.

The Immediate site—those are the most critical patients who have immediate danger to one of their vital systems or an organ. The estimates are that from all the injured about a one third are those.

Key points about the site: One way movement!—x-ray/medical ward/OR. Authorized personal only! Needs special equipment and lots of it. A doctor and a nurse manager.

The "Waiting site"—those are patients with no immediate danger but may require different tests/treatment/hospitalization or discharge. The estimates are that from all the injured about a two thirds are those. Because they can be sent home from this site you got to have a **discharge station/site.**

The purpose of this station/site is to make sure that all got all of their treatment, vaccines if needed (DT/HBV), referral to a clinic, and so on.

The patient will be discharged **only after a 6-h stay at least**.

This site and others like it (“not critical patients”) have also other needs such as food and drinks, mental support, information, and more. All of those are under the responsibility of the site nurse through the logistic manager.

Delay before evacuation—In case of inability of the hospital to care for the injured that arrived there (to many victims or lack of a certain profession such as neurosurgery and others), the hospital will become a triage hospital and will transfer the injured to other hospitals. In Israel, the order for that needs to come through the Ministry of Health and will be coordinated with Home Front Command medicine.

Managers of this site are a doctor, nurse, and someone from logistics.

Important to remember about this site: Before the patient can be transferred, the doctor needs to declare certain things such as the way the patient needs to be transferred—either needing supervision of a paramedic/nurse/doctor or special equipment such as a vent, drugs, and also what to notify in advance to the receiving hospital.

Before going, the nurse in charge of this site must make sure that the patient has with him all discharge papers, demographic details of the patient, and a photo of the patient. What was his condition at time of discharge, the name and phone number of the doctor who treated him and what kind of tests (laboratory, X-ray, etc.) did he do and what medicine he got.

Everything will be in two copies, one for each hospital. The information about the transfer will pass to the hospital’s Emergency headquarters as well as to public information center.

Dying/critically injured—In case of a large event, those patients will receive a low priority.

Very important to remember: direction to this site is only after an evaluation in the ED and not directly from the triage area! It needs to be separate from the main area.

Primary goal is to ease the pain. In case of casualties, the rule is to leave the police to deal with photographs, ID, registry, etc.

Traumatic stress victims—a victim of this sort will be declared as such only after a primary checkup with the doctor, usually the doctor at the “waiting site.”

This site needs to be away from all the other sites, preferably in a quiet remote location. Main staff members here are social workers, psychologists, and mental health personnel.

A basic algorithm to suggest number and layout of the different medical personnel:

Blood bank manager	Social worker	Sanitar/ driver	Nurses assistant	Registry	Nurse	Doctor	Profession/ severity of injury
1 for all sites	–	1:3	1:5	1:2	1:1	1:1	Immediate
	1:20	1:10	1:10	1:5	1:5	1:10	Waiting
–	1:5	1:20	1:10	1:20	1:10	1:5 Psychiatrist	Stress reaction

After re-arranging your ED, getting the right people there, and taking care of the framework for the event, and right before the first victim has arrived… you need **more equipment!**

Equipment—(if we are discussing nurses, it is a known fact, even if it is an informal one, that nurses taking care of equipment).

Because this is another huge subject I will give only key points about it:

The equipment must be arranged in carts (pre-made), where on every cart must be a sign for what it is used for (to which site it needs to go to and a check list of what is in there). Every now and then, all equipment must be checked to make sure that it is ready when needed.

Every staff member needs to know where the carts are placed, so even if the MCI will happen in the middle of the night, where usually the more junior staff is present, they will all know how to begin the preparations until more senior staff arrives. The responsibility of deploying the carts is on the logistic manager under the giddens of the charge nurse.

Some of the special carts are:

1. A and B cart—a breathing cart. Filled with "ambu" devices, laryngoscopes, ET tubs, and so on. Will be deployed at the forward triage site and the immediate site.
2. Children's cart
3. Burn victim's cart—filled with sterile sheets, bottles of saline, ointments such as "silverol," and more.
4. Orthopedic cart—filled with splinting devises, equipment for sowing wounds, ointments such as "polydine," casts, and more.
5. Carts for unconventional MCIs such as biological MCI and chemical MCI

Above, we can see an example from “Sheba Hospital” This is one of the site’s carts. On the right, we see a check list of what is in the cart. Below, the middle picture, we see a sign in red saying where this cart needs to go.

Above are more examples of carts. On the left is the triage cart. In the middle the A and B cart and on the right is an unconventional MCI cart.

7.2 End of the Mass Casualties Incident

It is important not only to begin and continue the MCI in a correct way, but also to end it.

Only the manager of the MCI—The Head of Trauma—will declare that the event is finished, until then, the ED will continue to work in the “special form” that was discussed.

After this declaration was made, a couple of major things need to happen:

1. A team led by the trauma nurse will go and assist the different wards where the injured were hospitalized in every way that is needed.
2. The head nurse of the ED, together with the rest of the nursing staff, will return the ED to his original state before the event.
3. One of the senior ED nurses will take all the MCI carts and equipment, and together with other non-medical personal will fill in the missing equipment and return them back to storage.
4. A senior doctor together with a nurse, will go to the remaining area of the ED where the “third group of patients” remained, and assist them in whatever way is needed.
5. The Head nurse, together with the head of the ED and other essential personal, will meet in the hospital’s headquarters to summarize the event.
6. “Back to reality.”

To summarize this chapter, I would like to leave you with a very important but easy to remember tip: **KISS**—keep it simple, stupid, meaning—a MCI is not an event in which you trust your memory or trying to "reinvent the wheel."

This is an event in which everything should run automatically. With that said, be prepared in advance **but** expect surprises. One last thing, don't trust technology! In the worst time possible it will fail you. Use manual charts, simple equipment, not very sophisticated vents. Use the simplest communication methods—"runners" or megaphones.

> Everything should be made as simple as possible, but not simplier.
> *Albert Einstein*

References

1. Ben-Ishay O, et al. Mass casualties incidents: time to engage. World J Emerg Surg. 2016;11:8.
2. Centre for Research on the Epidemiology of Disasters (CRED) Institute of Health and Society (IRSS). The numbers and trends. Université catholique de Louvain—Brussels, Belgium. Annual disaster statistical review 2016.
3. Measuring and understanding the impact of terrorism. Institute for Economics and Peace. Global Terrorism Index. 2017.
4. The contribution of nursing and midwifery in emergencies. Report of a WHO Consultation. Geneva: WHO Headquarters; 22–24 Nov 2006.
5. The role of the nurse in emergency preparedness. J Obstet Neonatal Nurs. 2012;41(2):322–24.
6. State of Israel, Ministry of Health, MCI protocol. July 2011.
7. Haim Sheba Medical Center. Emergency Department. MCI protocol.