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Role of Primary Health Care System in Response to a Major Incident: Challenges and Actions

Abdulnasir Falah Huaidi Al-Jazairi

Abstract

There is obvious increase in world population and in term of number of major incidents (MI) all over the world, there is a need for faster and wider responses. To achieve this aim and keep losses to the minimum, we need to optimize our methods and protocols of the response to decrease the losses, pain, and suffering of people and losses of infrastructures, belongings, and the country's future. Primary health care (PHC) system, which is present in all residency gatherings in cities and towns, provides suitable potential for this improvement. This role has been formulated in 1978 in Alma-Ata meeting, which changes the scope of service of primary health care system to take responsibility of the community in addition to patients' care. The involvement of the primary health care in response to major incidents shows good results, and there is a need to strengthen the major incidents' response plan in the primary health care to provide better response and help to all populations especially the vulnerable ones.

Keywords: primary health care, major incidents, vulnerable population, planning, response, recovery

1. Introduction

There is a noticeable increase in major incidents (MI) of different types affecting the world in the last three decades with increased human and financial losses. There are different types of incidents: natural, man-made, and infectious epidemics. For optimum response to those incidents, there should be multidisciplinary coordinated teams' response [1].

Shortly after I started writing this chapter, the COVID-19 epidemic in China expanded to be a pandemic, affecting too many countries and hundreds of thousands of people and killing more than 50,000 all over the world. This has a clear effect on my chapter to concentrate on this type of major incidents.

Primary health care (PHC) system scope of service was concentrated on disease consultations and prescription of medication. This scope had been changed in 1978 by the Declaration of Alma-Ata, which considered health care as fundamental human right. Section V in the declaration stated clearly that the primary health care system is the key to achieve the targets of the declaration. This declaration leads to the change of the scope of work of the PHC from giving advice about patients' symptoms to the comprehensive health care of the community [2]. This aim of comprehensive health care of the PHC was reviewed in WHO report in 2008 [3], which centered on taking the PHC service from hospitals and specialized centers to

be nearby people in general walk-in clinics that are easily reached by community. This proved to have many benefits in:

- Relief suffering
- Prevention of illness and death
- Improved health equity

The PHC system, with its distribution in all areas to be near to large population, can play an important role in response to any MI affecting its catchment area. The PHC staff have better knowledge in their area population and the special needs categories. Those abilities enable the PHC system to play a crucial role in response to major incidents in all their stages.

2. Definitions

2.1 Primary health care system

PHC is a whole-of-society approach to health that aims to ensure the highest possible level of health and well-being and their equitable distribution by focusing on people's needs and preferences (as individuals, families, and communities) as early as possible along the continuum from health promotion and disease prevention to treatment, rehabilitation, and palliative care and as close as feasible to people's everyday environment [4].

2.2 Comprehensive health care

"The practice of continuing comprehensive care is the concurrent prevention and management of multiple physical and emotional health problems of a patient over a period of time in relationship to family, life events and environment" [5].

2.3 Major incident

In health care system, "A major incident can be defined as any incident where the location, number, severity or type of live casualties requires extraordinary resources" [6].

2.4 Vulnerable populations

Vulnerable populations include patients who are racial or ethnic minorities, children, elderly, socioeconomically disadvantaged, underinsured, or those with certain medical conditions. Members of **vulnerable populations** often have health conditions that are exacerbated by unnecessarily inadequate health care [7].

3. Factors that make PHC suitable to play an essential role in response to MI

- **Work concept:** Changing to comprehensive health care of the community makes the PHC responsible to prepare people to a disaster if there is time to and help them during its occurrence and in the post-incident stage.

- **Community based:** The responsibility is for the welfare of the whole community and not for medical advice when asked only.
- **Easy accessibility:** The presence of PHC centers in close proximity to people makes them reachable with little efforts. During a major incident, there are many things people are busy with, or some have lost helpers; the presence of a nearby health care facility will decrease patients and people suffering in attending and getting the proper health advice they need.
- **Dealing with all types of diseases:** The PHC centers are run by family medicine physicians (FP) or general practitioners (GP), and they are trained to deal with all types of diseases and possess the ability to deal with all patients or persons asking different types of consultations in many specialties.
- **Filtering ability:** The doctors in primary care are trained to deal with patients in all specialties. This practice gives them the ability to work in the early step of sorting cases. PHC can deal with simple cases that constitute 50 to 60% of cases and keep hospitals and specialized centers for more severe cases.
- **Decrease cost:** FP/GP use less tools and request less investigations for their work, and this cuts the cost the patient should pay for care. This is exaggerated during major incident circumstances, which enable the health system to deal with larger number of patients in the same cost if the patients have been managed by hospitals only.

Stages of major incidents: Most of the researchers divide the major incidents into four stages:

- A. Mitigation and prevention
- B. Preparedness
- C. Response
- D. Recovery

Although this has many positive implications, Quarantelli in 1980 [8] put major incident phases depending on the time factor. He put three phases as follows:

- I. Pre-impact phase
- II. Trans-impact phase
- III. Post-impact phase

In the coming sections, I will discuss the role of the PHC system according to the phase and regarding the staff, space, stuff, and communication roles. The discussion will be divided into two parts as follows:

- A. **Effect of major incident on primary health care.** This will be under the title "Challenges."
- B. **Actions by the primary health care in response.** This will be under the title "Actions."

4. Pre-impact phase

PHC system is the nearest health facility to most people and is easily accessible; therefore, it is, mostly, the first place that the patients will attend to get information and advice for their conditions and worries about any new threat or risk.

4.1 Challenges

The challenges will affect PHC staff and PHC facility. The challenges will depend on the risks more suspected in the geographical area in which the health facility is present.

4.1.1 PHC staff

- a. The PHC staff are holding double personality during major incidents; from one side they are part of families and they have responsibilities for them, and on the other side, they have commitment to work to help people and other community services.
- b. The staff will be under pressure to have answers to the new threat and its relations to the different diseases and medications.
- c. Dealing with major incidents is not part of day-to-day activity of the health sector; therefore, there is lack of knowledge of the major incident response plan (MIRP) to the facility and their specific roles. All staff in the PHC in all levels whether clinical or nonclinical should have specific training on the MIRP and their specific role in it, so everybody will speak the same language during the response and can harmonize work better.
- d. Psychiatric aspect of the major incident will affect both PHC staff and people visiting the health facility. Staff should have basic training to deal with those difficult situations.

4.1.2 PHC facility

- a. There will be an increase in visits to PHC from people for different consultations, which will lead to overcrowding in the PHC.
- b. More medications and stuff are requested by patients to have stocks during the expected incidents. This will impose pressure on the stocks of the medications and consumable stuffs.
- c. How to change the layout of the facility to accommodate more visitors if needed? This is depending on the blue print of the facility and whether it is manageable or not.
- d. Is the facility in danger of the incident or not? This is more applicable in the natural disasters like earthquake, tornados, and hurricanes. What to do if it is affected and cannot provide service?
- e. The infrastructures like electricity, water, or network may be affected by the incident. What are the substitutes or mitigation solutions for this breakdown?

4.2 Actions

The period before expected incidents is a suitable situation to do improvements in planning, training for staff, and stockpiling stuff. PHC administrators need to achieve the following aims:

- a. Orient the local and national health system on the PHC active involvement in protecting community, and strengthen the skills of risk management in the PHC directors.
- b. Concentrate on efforts to support communities, individuals, and health workers to better respond to major incidents. This is done by providing enough information about the disease and protective measures, vaccinations, and actions to do if any family member or oneself is affected.
- c. Financial investment in the infrastructures of the PHC regarding water, electricity, information, communications, and supply network.

The abovementioned aims will be accomplished through the following:

4.3 Planning

PHC should work in close collaboration with local health authority and other emergency services in developing response plans.

They should look to the following issues:

1. Define hazards and risk factors to the area, in collaboration with other emergency services. This will help in predicting expected incidents and their effects on the health of the community they are serving. Also, it will help in preparing the type of medications and consumables.
2. Make lists with addresses of the vulnerable population and those using regular medications in their area. This will allow the health and other authorities to prepare shelter, medications, and other care plans during MI.
3. The effect of the expected MI on different diseases should be prepared with the help of the specialized sections in local, state, or federal (or ministerial) health authorities. Information should be relayed to the concerned patients along with best mitigation actions.
4. Setting agreements with ambulance services to transfer patients (who need hospital transfer) received in PHC during MI.
5. Information regarding any MI expected, its nature, the expected size, and the need to activate the MI response plan. That critical information should be verified, i.e., the source of information should be trusted and accurate.
6. Allocate area to be an alternative place, and make pre-arrangement for rapid conversion into PHC facility if the original building became unsuitable for work.

4.4 Training staff

Staff should have training on several aspects of MI response including the needed information to help the community and individuals.

This includes the following:

1. Training the staff on the MI response plan set for the area. The response plan should be flexible to meet the different types and effects of different incidents. The plan should rhyme with the local and state health response plan.
2. Training the staff on communication with people including agitated and aggressive people. Communication training should include breaking bad news. They may have to visit families and inform them about their relatives, good or bad news.
3. Training on working in austere conditions in case there is damage to the infrastructure of the PHC facility and a need to work in small or large teams depending on the incident circumstances and decision of the local authority or state's incident response leaders.
4. Training on more than one method of communication including radio communication protocols. Radio communication will be used if other methods are lost by the effect of the incident.

4.5 Prepare for infrastructure failure

- a. Electricity failure is one of the major failures during MI. It has serious negative effects on patients' care. Electricity generator working on petrol should be prepared and maintained regularly to be ready anytime electricity cut occurs.
- b. Water loss. Large water reservoir should be ready, and the water should be replaced on a daily basis. In addition, drinking water bottles should be part of stockpiling in preparation to a major incident. Potable drinking water in addition to clean water suitable for different uses in the facility and patients' care is crucial for work in any place and especially in PHC.
- c. Communications: It is important to have at least two ways to contact the staff. If one method failed, the other will be the backup. A third wireless radio communication should be prepared for extreme loss of any sort of communication.
- d. Network: Failure of network can occur alone or accompanying electricity failure. Server backup should be applied to keep the important information regarding patient, administrative, pharmacy, and store documents.

4.6 Stockpile stuff

During daily work, the PHC centers are stocking their expected needs of drugs and consumables for a certain period depending on the chain of supply. If there is a risk or threat of any type that needs special medications or protective equipment, the PHC centers should bring these stocks according to the population supported with the coordination of the local or national health authority.

5. Trans-impact phase

As mentioned above, the PHC will be the first point people will reach to seek help and advice regarding injuries or information regarding an epidemic infection. This includes many challenges.

5.1 Challenges

The WHO in their briefing about PHC and emergencies [9] mentioned some of the challenges as follows:

1. Without earlier warning system, case identification and escalation are a challenge that PHC staff face. Most epidemics usually start as patients come to seek medical advice, which is a day-to-day work in PHC. Case definition and raising the suspicion of a disease that may be an early epidemic or even pandemic (like the COVID-19) need to be reported to more central and higher authority with experts in epidemiology and infectious diseases.
2. Geographical accessibility:
 - a. Several types of natural disasters like earthquake, floods, etc. may affect the PHC and its surrounding area, preventing health workers, people, or supply chain from reaching it. This will render the PHC useless, and alternative methods should be placed to mitigate this challenge.
 - b. In the same context, geographical accessibility to patients and survivals will be sometimes difficult if not impossible and need special help.
 - c. People with special need will face more difficulty in major incidents in accessing the PHC. The rescuers will face more difficulty in moving people with special needs in case there is need for it.
 - d. Transferring patients and staff to an alternative place or transferring patients to hospital may be a challenge in certain circumstances.
3. Skillful health workers are part of the community and may be affected by the incidents either themselves or their families, and in both situations, they cannot be available to treat and help people. PHC may replace them by less skilled staff which will affect the care in this difficult situation.
4. Health facility infrastructure may be affected by the incident, and loss of water, electricity, and network supply, for example, will also affect the ability of PHC to offer help and services.
5. The incidents may affect the chain of supply, leading to a decrease in resources and limitations in the numbers and types of medications and services available.
6. If there is an incident that is big enough to affect large cities and states, the government will distribute the funds and resources to all areas. This mostly will make the amount given to a certain PHC center below its actual needs. This has effects on the availability of staff and supplements and decreases in the PHC center's effective services.
7. Ensuring quality of care to be in acceptable level. In day-to-day work, the quality should be in the optimum; this is not applicable in most MI, but there should be an agreed acceptable level of quality during major incident, so the PHC centers do not go below it. This is extremely important to decrease the spread of infectious diseases that follow major incidents and decrease mortality and morbidity for all patients.

5.2 Actions

There are many actions needed during the response phase. Those actions are classified according to the condition of the facility.

A. Health facility is intact, accessible, and functioning:

1. Activate the major incident response plan. This is the decision taken by PHC facility leader in liaison with the local and state health authority.
2. Change the layout of the facility and the patients' flow to permit faster management of patients with acceptable standards.
3. Call the staff who are in their off or vacation to join work in the facility to deal with the increased numbers of patients and visitors.
4. Stop elective visits of patients, and replace it by telephone or online consultations. If there is a need to see the patient and examine him physically, then go to him/her or call the patient to the center; examine the patient in area away from the incident management venue. This will decrease the number of patients attending to the health center and create surge capacity to examine patients related to the major incidents.
5. Contact local health authority and nearby hospitals to liaise about the situation and work distribution. The PHC can have an important role in dealing with the well and worried people and patients with mild symptoms to decrease the load on hospitals and minimize people's need for transportation. The movement restriction is an important factor in controlling epidemics and makes movement of emergency services easy and fast.
6. Make special documentation for the incident patients and other related issues like questionnaires, asking about relatives, etc. This will help in better preparedness for future incidents.
7. PHC director and supervisors should observe staff for signs of PTSD. Daily debriefing session should be done by the end of the shift. The management of PTSD staff will depend on the severity of symptoms.
 - a. Mild PTSD usually is solved by the support of colleagues and the daily debriefing session.
 - b. They may change the type or place of work of the staff if they noticed moderate symptoms of PTSD.
 - c. Staff with severe symptoms of PTSD should be stopped from dealing with patients, and psychologist or psychiatrist consultation is requested.

B. If the primary health facility is not accessible or not functioning:

1. The alternative site should be activated, and directional signs to the new site, people, and authorities should be informed about the new site.
2. Medical teams [10, 11].

The concept of emergency medical teams applied in disaster management is well known worldwide and applied by the WHO and other bodies interested in disaster response. We can apply this concept to distribute the primary health staff into small teams and direct them (as forward teams) to different residential areas in conjunction with other emergency services. Their duty is to:

- a. Define the special needs and vulnerable population.
 - b. Supply chronic medications to the needed.
 - c. Defining affected people and do baseline life support interventions.
 - d. Contact health authority or hospitals for patients who need to transfer to higher level of health care.
 - e. This concept, going to patients in their residency, can be used even if the facility is accessible and functioning. It is an extra service for people in catchment area aiming to bring health care very near to people and help in stopping the spread of epidemic infections.
- C. Start thinking of recovery for the health centers during a long-lasting major incident, for example, the COVID-19 pandemic, which is affecting the whole world now. There should be regular thinking of how to resume work in the PHC to serve the patients who need regular follow-up. This can be done by telephone or network meeting (as mentioned above), and medications can be delivered to the patient at their homes through the post. Fees can be paid by electronic payment methods.
- D. Live experience on the role of PHC in epidemic.

During the writing of this chapter, there is a COVID-19 epidemic. In the beginning of the epidemic, many people came to the emergency department asking for checkup and PCR test for COVID-19. This issue created overcrowding in emergency departments all over the country, and many people present are requesting the test. This was dangerous for spreading the infection if someone is really infected. Two days later, the PHC sets up centers for dealing with well and worried persons and provided COVID-19 PCR test. This action by the PHC did a huge decompression to emergency departments, decreased mix between well and feverish persons, and gave us opportunity to concentrate on symptomatic patients.

6. Post-impact phase

Recovery from the effects of the MI occurs in this phase. Sometimes, when the MI takes long time, the PHC should resume receiving patients other than MI. There is merging between trans-impact and post-impact phases. Recovery of the PHC will be better if it was part of the pre-incident plan [12].

6.1 Challenges

1. Many times, there are epidemics after major incidents especially if the incident affected the infrastructures of basic services like potable water and electricity. This effect is aggravated if people need to migrate from their area for any reason and

assemble in a new area, which is usually less suitable and overcrowded. This permits for disease transmission creating an epidemic between the migrants. Acute respiratory infections and cholera are among the most epidemics that occur in immigrants [13]. Some of these diseases are not present in the PHC area previously.

2. New patients may be added to the PHC from two sources:

- a. In the first source, there is an epidemic in the area covered by the PHC after the major incident. More patients are presented to PHC for consultations.
- b. The second source is the new people who moved to their area from other places, which rendered unsuitable for living (temporarily or permanently) by the major incident.

3. New diseases may occur due to loss of infrastructure and sanitation or due to earth changes, leading to bacterial, fungal, and other infectious organisms that are not common in the area. It is found in one study that there was an increase in visits for patients complaining of respiratory symptoms (mostly asthma) and diabetes [14].

4. In the last 40 years, all the studies showed that there is a significant increase in stress levels of both health care staffs and patients in post-major incident phase [15]. This will decrease the working staff on the one hand and increase the patients visiting the PHC on the other hand.

5. Delayed appointments for patients already registered in the PHC due to MI response actions. After the end of the incident, work need to be back to normal, and the patients whom appointments were postponed in the response period need to be rescheduled in addition to the regular appointments and providing appointments to the new patients.

6. Gathering information and statistics about the MI and its effects on the PHC in all aspects. Information regarding response to the major incidents, patients' flow, number of patients, types of complaints, areas of crowding and delay, etc. all need to be collected, summarized, studied, and used in this phase to prepare the PHC for improved response in the next major incident.

7. Funding. During the trans-impact phase, the media concentrate on every activity done by all emergency services. This media coverage is a good motivation for providing funds by governments, nongovernmental organizations, and personnel. In the post-impact phase, this media coverage will decrease a lot especially if there is another major incident in other parts of the world.

6.2 Actions

This stage is an opportunity to improve the PHC and rebuild it better than before, by applying risk reduction and optimizing work protocols [16]. The actions in the post-impact phase can be divided into three stages [17]:

a. Early recovery stage

In this stage there is emphasis on clinical services; the PHC is trying to go back actively again. It is trying to open its services to people if the facility was closed

during the incident's response phase or increase work if it was working in limited scope during the previous phase. The following are the steps to do this objective:

1. Maintain the PHC building, especially if it is affected by the incident. If there was an epidemic, then there is a need to deep cleaning and sterilization before allowing entrance and providing service to usual patients.
2. Debriefing to staff after the trans-impact phase. This may need psychologist or psychiatrist sometimes. The PHC director should evaluate the staff during all the phases. In this phase there is time to deal with the staff who shows mild-to-moderate PTSD.
3. Rearrange duty rosters for staff in a way that they can work and have time to look after their families.
4. Education to staff regarding new diseases that occurs in the post-impact phase. This should be arranged with local health authority and hospitals. There will be many questions regarding the new disease and relations to the chronic diseases they have.

b. Rehabilitation stage

The aim of this stage is to reach the pre-impact stage level of work and go back to normal activity or put a new norm to help in better response in the future. Activities in this stage are the following:

1. Maintain used equipment and fix the damaged ones. Electricity generators, water tanks, and ultrasound machines all should be checked by specialized teams.
2. Refill stores with medicines and consumables. When there is MI, there is large number of patients which is more than the present resources. After the end of the trans-impact phase, stores should be rearranged to have enough supply of the previous drugs and stuff for the new emerging diseases.
3. Rearrange patients' visits to decrease delay, and catch the condition before the incident.
4. Make appointments for the new patients added to the PHC facility after the impact. This may need recruitment of new staff to accommodate those patients in addition to the delayed patients mentioned in the previous point.
5. If an alternative place has been used and proven to be better than the original one, try using it permanently. All actions, official documentations, and addresses should be changed to the new place.

c. Development stage

This is a long-term stage, and its aim is to prepare the PHC for the next major incident. It will be mixed with the mitigation and preparedness stages in the pre-impact phase. To achieve this stage properly, there is a need to:

1. Collect data through statistics regarding different aspects of the incident, for example, numbers, diagnosis, age, etc.
2. Make plans for better facility; this may need change or an increase in facility building. Make plans to divide the facility into sectors if needed to maintain isolation for containing infections and easy sterilization of the parts of the facility. This should include the ventilation system of different areas.
3. Improve communication plan to the staff. All staff should have their contact addresses including the social media addresses and landlines if present.
4. Arrange with the local health authority to have any specific PHC plan to be part of a master plan and any PHC capabilities to add to the total state or national health abilities, and there is no need for doubling the work.
5. Fund raising should be started and requested from the local and state health authority to do all these changes in the facility and train the staff on different aspects of the MI response.

7. Conclusion

The primary health care system has big and important roles that can be played in response to major incidents. They are the most nearby health care facility and well known to people in each area, making it the nearest health facility that is ready to provide help when people are exposed to a sudden incident.

Their role is not limited to any stage in the incident, but it is in all phases. In some aspects of response, the primary health care staff will guide the state or national efforts to find and help vulnerable population in their catchment area.

More concentration on the primary health care system in terms of staff training, facility floor plans, and stuff stockpiling will yield a remarkable improvement in response to any major incidents.

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