DISASTER VICTIM IDENTIFICATION – ARE WE PREPARED?

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INTRODUCTION

Disasters, whether natural or man-inflicted, are unfortunately a fact of life. Mass casualties are encountered in a number of situations like collapse of buildings, crash of passenger airplanes, ship wrecks, train accidents, fires and explosions, war casualties, or even ethnic cleansing practices such as seen recently in Bosnia and Rwanda [1-3]. Acts of sabotage and crime may also produce mass casualties. Besides, the Mother Nature is also no less behind and often huge number of casualties are left behind in earthquakes, floods, tsunami, and volcanic eruptions. Unfortunately no one can predict when such a calamity might strike and the scale of its destruction.

A mass disaster causes injury, death, or property damage on a scale that may affect from as low as a dozen of people to as much as encountered in the earthquake of 8 October 2005 in Pakistan; this catastrophe left behind more than 80,000 dead, thousands injured, and many still missing. A commonly accepted definition of mass disaster is "the death of more than 12 victims in a single event" [4]. In most countries a Mass Casualty Plan is to be implemented in the event of any mass disaster. Besides rescue and relief efforts, identification of the dead victims is one of the most important jobs in disaster management. The recovered human bodies may range from being relatively fresh and intact to highly degraded or decomposed. However, whatever the nature of the disaster, the public authorities have the basic responsibility for identifying the human remains [5, 6]. Generally, these plans cover medical services and other rehabilitation components. Unfortunately provisions for the dead are often completely ignored in these plans in the developing countries. Generally, no thought is given as to how several hundred corpses would be found, accommodated, examined, and identified in a mass disaster. Therefore, in the context of identification, it is essential that every responsible public authority, forensic institute, and individual pathologist should make some forward provision for such an eventuality. In the wake of recent disasters, now the disaster victim identification (DVI) has emerged as a separate discipline. This article intends to review the contemporary methods and strategies for the disaster victim identification and to provide general guideline to develop any disaster victim identification (DVI) plans in Pakistan.

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CONTEMPORARY IDENTIFICATION METHODS

From professional point of view, the accurate identification of dead bodies is achieved by visual recognition, circumstantial evidence, personal effects, matching ante-mortem and postmortem data, and evidence provided by external and internal examination of the body [7-12]. The significance and contribution of each of these components in the identification process varies from case to case.

Visual Recognition:

Traditionally, visual recognition of a dead body by some relative or any other acquaintances of the dead person may be the only criterion for victim identification in majority of cases. However, in many cases, the results of such a non-scientific approach have later proved to be inaccurate. This can lead to serious embarrassment and may also cause legal difficulties. Therefore, it is best to ensure that identification is achieved by evaluating a combination of criteria and not to rely solely on visual recognition.

Personal Effects:

Personal effects such as clothing, jewellery, pocket contents, identification cards, uniform pattern and articles, and various other belongings of the victim have proved to be amongst the most useful aids for identification. Therefore, they should be carefully documented and preserved. It must be borne in mind that loose objects can easily be attributed to the wrong body, whether by mistake or intentionally. Personal effects may constitute valuable circumstantial evidence of identity, but never proof. They are merely the factors which, when combined with others, make a case for positive identification.

Ante-mortem Data:

Ante-mortem data that may reveal any peculiarities likely to be helpful in personal identification must be searched. Ante-mortem data may be available in the form of photographs, X-rays [12], other hospital records, or by interviewing the family members and friends of the deceased to reveal information about pathology, surgical interventions, cardiac pacemakers, prosthetics, amputations, anomalies, and other physical characteristics that may help in the identification of the victims.

External Examination of the Body:

The identification of an unknown body is more reliable if it is based on the physical evidence derived from the body itself as compared to circumstantial evidences. Therefore, the general features of the naked body should be described including sex, estimated age, height, build, color of skin, hair, and eye color. Taken together with other details, they can lead to a positive identification. Specific features, such as scars, moles, tattoos, and abnormalities, are often unique and thus extremely important if they can be matched with ante-mortem data [13]. Photographs of dead bodies highlighting its face and other peculiarities must be taken for a later visual recognition of the body by the relatives.

Internal Autopsy Examination:

In mass causalities usually no internal autopsy is done in most cases as the external examination generally provides sufficient evidence of the cause of death. However, autopsy may be necessary as an essential part of the overall investigation of the disaster. Medical findings, for example, signs of previous fractures or surgery, missing organs like appendix, uterus, or kidney, and implants may assist in identification [4].

Dental Identification:

Dental identifications have always played a key role in natural and manmade disaster situations [14-16] and can often be so accurate that it will positively identify an individual by itself. Typically, postmortem dental remains are compared with ante-mortem dental records, including written notes, study casts, radiographs, etc, to confirm identity. In those cases where ante-mortem records are not available, and no clues to the possible identity exist, a postmortem dental profile is completed by the forensic dentist suggesting characteristics of the individual likely to narrow the search for the ante-mortem materials [17]. The information from this process will enable a more focused search for ante-mortem records. Because of the resistant nature of dental tissues to environmental assaults, teeth represent an excellent source of DNA material. When conventional dental identification methods fail, this biological material can also provide the necessary link to prove identity [18, 19].

Fingerprints:

Fingerprints are unique to every person. If fingers are available with the body, they constitute the safest and fastest identification means available provided ante-mortem prints can be obtained for comparison. Now many countries are maintaining large databases of fingerprints of various categories of people. These databases are searched through Automated Fingerprint Identification System (AFIS) for comparison with the unknown

fingerprints and provide answer in minutes or even seconds. Therefore, the fingerprints of a dead body should always be recorded by an expert. In Pakistan, the National Database and Registration Authority (NADRA) maintains at least the thumb fingerprints of the adult (over 18 years age) population of the country. This may obviously be of immense value in disaster victim identification in Pakistan.

DNA Identification:

Not all human remains will be suitable for the more traditional identification approaches, especially if there is substantial fragmentation of the remains. The DNA profiles from recovered mass disaster remains are compared with the DNA profiles from reference samples such as known personal effects of the victims or family member reference samples. Personal items such as unlaundered clothing, a toothbrush, or even archival pathology tissue can serve as direct reference samples. In some situations, such direct DNA comparisons are not possible, and therefore family members must provide reference samples for indirect identification using kinship analysis [20, 21].

ORGANIZATIONAL ASPECTS

Typically, a mass disaster identification setup comprises of following major sections with designated functions [22].

Body Recovery and Search Teams:

Body recovery and search teams are the first link in the identification process. Each unknown body found is given a number. The bag in which the body is removed should also bear the same number. It must be remembered that personal effects can often be an aid to victim identification and should be kept available for examination. Effects should be labeled and bagged separately and if necessary the location from which they were recovered should be marked with a number. Separate property recovery teams must be formed to operate in a similar way to body recovery teams.

Photography Unit:

The importance of photographs, films and videos cannot be over-emphasized. Photographic and video recording of bodies at the disaster site and within the mortuary is important for evidence and identification purposes. The photographer should always take full-body and full-face pictures as well as close-ups of specific external findings. Body reference numbers must be clearly visible on each exposure and these must be the only numbers used. Photographers should be attached to search and recovery teams and work in conjunction with them. Bodies will also need to be photographed at the mortuary.

Morgue Station:

The Morgue Station is a temporary holding area for bodies and body parts until transport can be arranged and the mortuary is ready to receive them. The Morgue Station will keep its own record of bodies received and stored, listing each body reference number, the date and time of receipt, from whom received and where stored. Subsequently details of the transfer should be recorded.

Mortuary:

A mortuary is established with best possible facilities under the circumstances. Ideally there should be facilities to keep bodies refrigerated and not frozen. The mortuary building should also cater for the needs of various other sections involved in identification like, fingerprint experts, property and personal effects section, medical and dental personnel, documentation facilities, and X-rays, and photography, etc. The benefits of working in a well-equipped mortuary, even a temporary one, have always proved to be most useful for identification.

Missing Persons Record Unit:

The Missing Persons Record Unit must be responsible to collect information regarding missing persons in a disaster. Any ante-mortem data about the missing persons

should be collected and preserved by this unit. This data is then compared with the postmortem data of unidentified bodies for identification purposes.

Post-Mortem Record Unit:

The Post-Mortem Records section is responsible for collating the post-mortem descriptions and findings for each individual body. It will be responsible for recording the physical description and features, particulars of clothing and property, and the autopsy findings. Particular attention must be paid to all possible identifying features, and important findings should be photographed.

Identification Centre:

An Identification Centre or Board is established and is made responsible to compare ante-mortem and postmortem data. It should be established as an extension of the Mortuary Branch. Computerized matching programs may be used to suggest the most likely possible matches quickly. This centre should have availability of experts in fingerprint identification, property comparison, photography, forensic pathologists, dental experts, and radiologist. The final job of the this centre will be to check the results of comparisons made by the various specialized sections, locate and reconcile possible inconsistencies, and combine the results into one final list of identifications. The centre should, therefore, be headed by the most experienced identification expert involved in the operation. An information center must also be established to respond to the questions of family members and friends of the missing or dead. Now even internet based information services are possible to be provided to the concerned ones.

Body Release and Burial Section:

The Body Release Section is responsible to hand over the bodies to relatives. Sufficient number of coffins must be available for final disposal. The Release Certificate for each identified body should bear the reference number and the name of the person whose body has been identified. In respect of all unidentified and unclaimed bodies, an identification profile is maintained in the records. Before burial of unidentified and unclaimed bodies, some kind of tags (plastic coated, for example) should be attached to the bodies providing the name (if known), approximate age, sex, and location of the dead body. The body should be buried in some numbered or marked grave as it might be exhumed for a later identification or for a dispatch of the body to some other place. A record of grave identification should be available in the documents of a particular unidentified body.

RECOMMENDATIONS

The ultimate aim of all disaster victim identification operations must invariably be to establish the identity of every victim by comparing and matching accurate ante-mortem and post-mortem data. As a matter of principle, every attempt should be made to identify the bodies at the site where they are found. Disaster victim identification is a difficult and demanding exercise which can only be brought to a successful conclusion if properly planned. Such preparation will undoubtedly contribute to successful operations and thus benefit all involved including victims and the relatives. Following guidelines are to be kept in mind for any pre-planning of disaster victim identification operations.

Institutional Responsibility:

In disaster situations, the task of identification should be assigned by law to an institution (for example, the health ministry, the public attorney's office, the public ministry, judicial branch, forensic medicine institute, etc). If the law does not designate the responsible institution, then any emergency operations committee should delegate this function to the most competent institution. In the majority of countries this responsibility falls to the public prosecutor's office, police, or the justice department. The

responsible agency coordinates with other institutions related to handling the dead. Ideally, the forensic or medico-legal institutes have protocols for identifying and preserving bodies, certifying deaths, and transporting bodies. Good performance in this area requires superior teamwork between the medico-legal, public prosecutor, judiciary and health entities [23].

Preparation of the Plan:

The key to success in mass disaster identification is preparedness [24]. Any pre-planning must include adequate provisions for the collection, accommodation, examination, identification, and disposal of large numbers of dead victims. The plans should take into account the following; the trained human resources available to handle, identify, and dispose of the bodies; financial resources for managing dead bodies; logistical resources and materials; knowledge of types of disasters that are most common in a region, and probable number of associated fatalities; volunteers for the recovery of bodies; refrigerated containers to serve as temporary morgues etc. The basic demographic and epidemiologic data of the country should be used as supporting material in making of a plan. For best outcome, subdivide the plan into independent sub-components. Ensure that everyone involved in handling dead bodies is familiar with this plan, especially with sections relating to his or her role during an emergency; an effective response does not require all specialized personnel to be familiar with all aspects of the plan.

Coordination:

The management of dead bodies involves search for corpses, in situ identification of the body, storage, delivery of the body to family members or final disposal of the body in accordance to the religious and cultural norms of the community. Often a diverse team of people takes part in these functions. They include rescue personnel, forensic medicine experts, prosecutors, police, army, personnel from non-governmental and international organizations, as well as community volunteers [25]. Typically, this coordinating role falls to the agency responsible for a State's internal security. A law or regulation should clearly specify the coordinating institution. Failure to provide this coordination will negatively affect the entire process of managing dead bodies during a disaster.

Training of Personnel:

The availability of experienced investigation and forensic teams, technical infrastructure, and preparation will produce markedly different results. All institutions involved in management of dead bodies should introduce basic training programs. Lack of training can have negative consequences. For example, insufficient documentation about the bodies and the scene, hurried forensic work done without sufficient expert staff can have long-term effects like increased costs owing to the need to repeat the work, and loss of evidence or valuable information. Training may not be limited to the institutions directly involved in managing dead bodies. It may be even more important for professional training institutions (universities, schools, etc.) to include topics about disaster preparedness and response in their regular programs or as part of continuing education programs. The teams should also be sent to help in international disasters. This not only serves humanitarian purposes, but it also adds immensely into the knowledge of dealing such disasters later on in own country.

Rehearsing the Plan:

Failure to carry out exercises can nullify the validity of even the best of abstract plans. Therefore, the simulations should be carried out with the participation of authorities and operative personnel. The exercises may be in the form of table-top paper exercise or field exercise. These exercises are the only way to keep plans up-to-date, especially during the long periods when there are no emergency situations.

CONCLUSIONS

The multidisciplinary approach to the identification process is vital to the successful outcome of a mass fatality incident. Unfortunately, like other developing countries, there is a great paucity of any organized plans for identification of mass disaster causalities in Pakistan. Mostly, identification is relied upon the non-professional approach. Therefore, there is great need for professional kind of approach as it is being currently undertaken in the world. Any mass fatality response plan of Pakistan must incorporate international systems for mass victim identification. If planned properly, the problem of dead body identification would be solved in a much better way and will help the community in the most befitting manner.

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