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Mass killing during terror attack at the Israel-Gaza border and the role of the Ministry of Health in identification of human remains and their release

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ABSTRACT

More than 1200 civilians and military were killed in cities and villages by the Hamas attack on October 7th, 2023. The bodies and body-parts had to be identified and released for burial. This report outlines the challenges and mode of operation of the massive disaster victim identification (DVI) efforts.

Bodies were delivered to a central mortuary. Each body was coded and undressed for external inspection and documentation of physical elements. Digital fingerprints were recorded and blood or toenails sampled for DNA. Odontology exams were performed by dentists describing dentition, aided by computerized tomography (CT). Whole-body CT was performed in cases the bodies were disfigured or burned from the second week.

Simultaneously, families of missing civilians provided physical elements to the police to extract the DNA for antemortem documentation. The police took the responsibility over the reconciliation, which was based on comparison of the ante-mortem and post-mortem fingerprints, aided by DNA profile matching, odontology examination, clinical and/or radiological findings performed by forensic practitioners. Secondary identification elements were used assure the families regarding the identification. Precise scientific identification a was a priority, even if it slowed the rate of bodies release. Families were allowed to view their relative either at the mortuary or before burial.

The DVI process required cooperation between several governmental agencies and police. To maximize the effectiveness, a synchronized approach should be adopted, specifying communication channels between the partners and dividing the responsibilities. The DVI should be led by a single, experienced authority to ensure interdisciplinary teamwork. This catastrophe required personal resilience of the teams for rapid and efficient functioning and communication between the partners.

1. Introduction

On the morning of October 7th 2023, Hamas and other terror organizations breached the Israeli-Gaza security fence and simultaneously fired rockets into Israel. The terrorists invaded Israeli territory and took control of over 25 towns and villages. They broke into civilian homes and military bases and murdered more than 1200 civilians and soldiers by different ammunitions means, Including bombs, rockets, gun shots, knives and fire. About 364 of the civilians were partygoers who attended an open music festival in the area.

In the aftermath, the government took the responsibility for identifying the victims and registering their deaths. The process included the collection of dead bodies from the field, transporting them for storage, and later analysis of information to identify the deceased persons. Identification reduced the uncertainties faced by the families and allowed mourning. Disaster victim identification (DVI) is a multidisciplinary effort to identify dead bodies, and parts of bodies, recording the findings and conclusions, and releasing the bodies for burial in accordance with standards set by the International Police Organization (INTERPOL) [1].

The aim of this paper is to describe the multi-organization deployment needed to identify a large number of bodies during an unpredicted mass disaster and the lessons learnt from the Israeli experience.

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2. Main findings

The bodies of the victims were transported to a mortuary in a military base in central Israel, which has a capacity of 17 single-bed examination rooms and 2 built-in refrigerated storage rooms for bodies and body parts. As the storage capacity was exceeded in this event (Fig. 1), additional refrigerated containers were placed nearby the main building to prevent decomposition. As the number increased, cooling trucks were used to store the additional bodies.

Of the total victims from the Israeli side, 1127 were brought to the mortuary, which was divided into two parallel lines- one for soldiers and the second for civilians. The bodies of the 311 soldiers were identified by trained military teams. The line for identifying 816 bodies of civilians was established within a few hours and divided into several stations, deployed by members of the police and other governmental officials, including the Ministry of Health, the Ministry of Interior Affairs, and the Ministry of Religious Services. Additional agencies, such as the Immigration and Population Authority and burial organization of different religions also took part.

Of 816 civilians, 87.4 % were Jews, 1.6 % Arabs, 8.5 % work migrants from other countries and 2.6 % their citizenship of religion could not be determined. The median age of the victims was 31 (25–75 % interquartile range: 24–35 years; age range: 5 months to 91 years, Fig. 2). Due to the mass killing, the age-adjusted mortality rate in Israel has increased in October 2023 by 1.3 compared with the average rate in the months of October in 2017–2019 (0.52 cases:1000 population, and 0.39 cases:1000 population, respectively). Furthermore, the median age in death was reduced in October 2023–71 years for males and 81 years for females, compared with an average of 77 and 84 years of age for the months January to September 2023 [2].

The DVI and body release process was implemented on the evening of the day of the massacre. First, as the identification of each body was unknown, officials from the Ministry of Interior Affairs issued a personal unique running number to each body. The number was attached to the body bags and to a limb (preferably wrist, if was present) of each human part. The dead bodies and body parts were handled with dignity and respect. Transportation of each body within the mortuary throughout the process was done by two orderlies, while the body was wrapped in an opaque solid body bag. Once a separate examination room was cleaned and became vacant, the orderlies laid the body bag on the table. It was opened in most cases in the presence of a religious representative, experienced in caring for the deceased. Second, each body was then inspected by police forensic technicians, who were advised by a forensic medicine specialist from the National Institute of Forensic Medicine, if needed. When the body bag was opened in the room, the body was undressed and personal items, such as documents, jewellery, and mobile phones were collected, registered, and labelled with the same unique code as on the body, and then stored in a separate room, secured by policemen. The personal items were later collected by the families and mainly used to assure the families regarding the identity of the victims. Third, an external examination and photo documentation were performed on bodies or body parts with emphasis on unique physical elements relevant for identification, such as tattoos. This information was recorded in police computers. The fourth step included digital fingerprints and DNA sample collection from blood or a toenail. The final phase included odontology, in which the dentists chartered the dental data and performed dental computerized tomography for definitive documentation of dentition and jaws at the time of death. Whole-body computerized tomography was performed from the second week after the massacre on bodies and body parts which were difficult to identify as a result of decomposition or the effects of fire.

Simultaneously, a family information centre was set up by the police in a nearby location for family members of missing civilians. They were asked to provide physical elements and characteristics of the victim (height and weight, hair colour and style, description of tattoos, scars, garments worn, etc.) and bring documents or pictures of the missing person. Families were also asked to bring personal possessions from which to extract the DNA, such as a toothbrush, comb, personal towel or a garment, and dental records if available. As foreign nationals and migrants were also involved, DNA was also collected from families in other countries in collaboration with the Ministry of Foreign Affairs. In total, 1239 files for missing people were opened. The missing people were either killed or kidnapped into Gaza. Next-of-kin buccal mucosal samples were collected. DNA profiles from antemortem samples were compared with profiles in a designated computerized program.

The reconciliation phase was primarily performed by cross-referencing of fingerprints, DNA analysis or odontology evidence of clinical or radiological findings. Men and women in Israel who were enlisted to the compulsory military services in Israel had their fingerprints, DNA sample and dental X-ray taken upon deployment, which promoted the precise body identification at a timely manner. Secondary identification based on personal description, medical finding and tattoos to support laboratory identification, mainly to assure the families with the identity of the victim. Families were allowed to view the body of their relative either at the mortuary or before burial at the cemetery. Families who came to inspect their relatives at the mortuary were

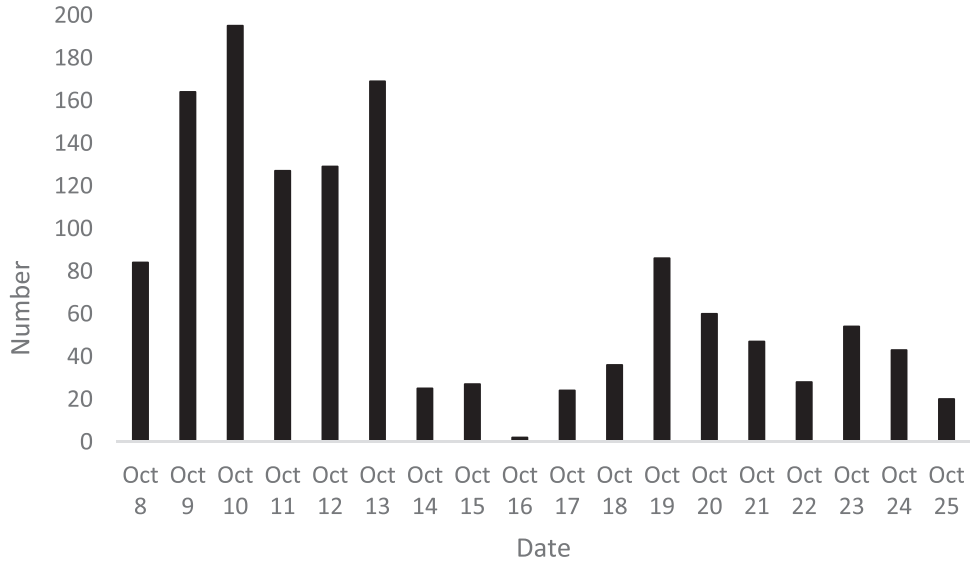

Fig. 1. Number of bodies of massacre victims released from mortuary in October 2023.

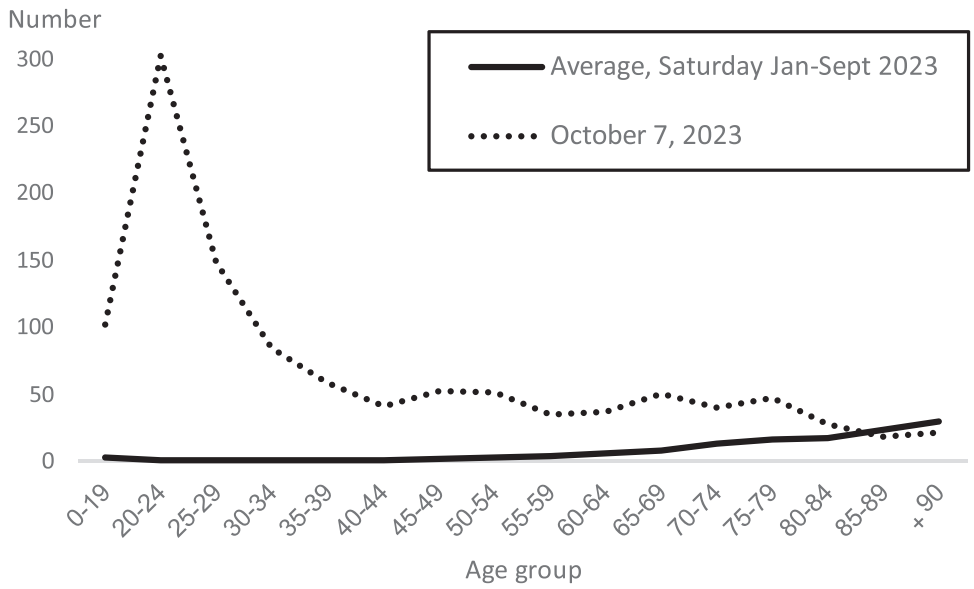

Fig. 2. Number of deaths in Israel on Saturdays in 2023, by age groups.

provided with primary psychological support by a team of social workers from the Ministry of Health who were available 24 hours per day. Disfiguration of the body at the time of killing or rapid decomposition in many cases made the visual identification difficult, unreliable or impossible. Establishing precise identification by laboratory and clinical criteria was a priority and the only criteria used for body discharge, although it occasionally slowed the rate of release of bodies.

Bodies and bodies parts, which could not be identified in the mortuary were transferred to the National Institute of Forensic Medicine of the Ministry of Health. This institute houses an in-house DNA laboratory, DNA experts, medical forensic specialists, and capacity in the fields of anthropology, radiology, and forensic pathology. In total, of the different 1200 bodies and bodies parts, 14,000 molecular tests were performed, generating 3262 unique DNA profiles of 1597 different bodies and body parts. Most of the unidentified bodies or body parts who did not correspond with the ante-mortem objects probably belong to the terrorists.

After forensic specialists identified the remains and identification was confirmed by the police, the Ministry of Health issued burial permits without the normally required death certificate. Death was then recorded electronically in the population registry. Finally, the Ministry of Religious Services transferred the body to a civil facility for storing bodies in a nearby city, and from there the bodies were transferred to cemeteries in accordance with families' requests. Families were provided with documents which would enable them to file life insurance claims, request social benefits, and in some cases, re-marry.

3. Discussion

The mission of identifying the bodies of the massacre victims was conducted under considerable time pressure, to accommodate Jewish or Muslim religious norms of burying the deceased as quickly as possible, which is held to provide comfort for the departed soul and to expedite its journey to the next world. The identification teams were sensitive to the distress of the families: in the chaos of ongoing fighting at the site of the massacre, some families did not know if a loved one was killed, in coma and unidentified in hospital, still missing, or kidnapped and taken hostage to Gaza. The definitive notification of death to the families made them certain that no hope remained, and they could prepare for the mourning rituals. Timely notification of death also lowers the risk from the so-called "Zeigarnik effect", a failure for family members to "find closure", begin the mourning process, and move on with their lives [3]. In addition, as the numbers and names of those missing or kidnapped were unknown, the identification of each body further assisted government officials in updating counts of persons missing who were probably taken as hostages, persons dead, and unidentified unconscious persons in hospitals.

This exceptional mass catastrophe required teamwork cooperation between several civilian agencies and varied professional disciplines under significant logistic challenges. To maximize the effectiveness of professionals from different fields of expertise in preparedness for future events, a synchronized approach should be adopted, specifying how each partner interacts with others so all activities are aligned and focused. In addition, local protocols should be developed to improve communication between teams consisting of staff members from several agencies, including a shared computerized infrastructure. The entire DVI process should be led by a single, experienced authority to ensure smooth interdisciplinary teamwork in the event's unique context.

In many of the cases, the bodies and body parts were collected under weapon-fire or in areas which there were still active military operation, and the bodies were not registered or photographed upon collection and no documentations were added. A considerable number of the body bags contained commingled remains, which added an additional challenge to the professional teams, especially when the remains were burnt. This increased the difficulties in identification, especially in cases where multiple bodies (including whole families) were burned together or when the bodies were maybe taken apart and possibly mutilated by the terrorists.

The deadly Hamas attack was shocking on the national level. On the personal level, the traumatic emotional stress on the practitioners participating in the DVI should be addressed. They had to identify, handle, and release a seemingly unending stream of dead bodies of young persons, many bearing the marks of torture, mutilation, burned or disfigurement (before or after death) in complex social and political circumstances. The bodies of the members of entire families who were killed together were sequentially identified by the staff. Members of these teams had the opportunity to receive emotional support to express their feelings and be cherished for the importance and value of their work. Adequate support arrangements should be made available post deployment, as some symptoms of psychological trauma may not present until well into the future. Future studies should explore the psychological well-being of individuals involved in the DVI process and recommend comprehensive support measures to maintain psychological and physical health, identify protective factors, or improve treatment

opportunities for practitioners involved.

Safe working conditions were a priority. Practitioners involved in the DVI process were concerned about possible exposure to infectious agents. However, the casualties were killed in a terror attack rather than an epidemic, and there have been no reports of infection arising from contact with a dead body following natural disasters [4]. To provide safe working conditions, universal precautions were employed, including disposable coveralls and overshoes, gloves and masks, along with recommendations to ensure vaccination against hepatitis B and tetanus.

In summary, the DVI process after mass killing highlighted the complexities of the process and the overlapping challenges which were faced by the practitioners who were involved. On the national level, future preparedness and better communication between the different agencies involved can improve cooperation in complex and chaotic aftermath environments. Bodies collected at the scene should be documented and photographed to assist the identification teams in understanding the consequences of the killing. On the personal level, the emotional wellbeing of the practitioners and safe working conditions should be a priority in effective management of the process.

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CRediT authorship contribution statement

Hagar Mizrahi: Writing – review & editing. **Zohar Mor:** Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Chen Kugel:** Writing – review & editing, Resources, Methodology, Data curation. **Ehud Kaliner:** Writing – review & editing, Methodology.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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