Challenges Experienced by Australian Forensic Practitioners in International Disaster Victim Identification Operations

by

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The research associated with this thesis abides by the international and Australian codes on human and animal experimentation, the guidelines by the Australian Government's Office of the Gene Technology Regulator and the rulings of the Safety, Ethics and Institutional Biosafety Committees of the University. The research was approved by the Tasmanian Social Sciences Human Research Ethics Committee (Ethics Reference Number: H0024089).

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Abstract

Disaster Victim Identification (DVI) is an important process in the aftermath of disasters. Australian forensic practitioners contribute to such processes internationally under difficult post-disaster circumstances. The aim of the study was to determine the main challenges experienced by forensic practitioners in overseas DVI operations. Twenty Australian forensic practitioners were interviewed. The participants included DNA analysts, fingerprint examiners, forensic odontologists, forensic pathologists, and mortuary technicians. Participants shared their experiences and perceptions of DVI processes across a broad range of events in which they had participated. Interview data were analysed using thematic analysis. Six main themes were identified: the working environment, project management, interpersonal interactions, personal challenges, social and political factors, and suggestions for improvement. Key findings highlighted the interrelated and overlapping nature of various challenges, and in particular, the importance of the work environment in international contexts. The thesis concludes with implications for practice arising from the findings, such as enhanced pre-disaster preparation and training across forensic disciplines and organisational contexts.

Key words: DVI, disasters, forensic practitioners, operational challenges.

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Doing research and contributing to new discoveries that can make topics such as DVI more approachable and less under the social stigma was always a dream job. For a long time, I have been interested in the topic of DVI, both professionally and privately. Identification of the victims and providing closure to relatives of those who died is such an important issue that from my point of view it has never been discussed enough. I wanted to learn more about it and I wanted to start a wider discussion about this topic. As small and humble a contribution as my research would be, I hoped that my research would help this topic come to be better understood by the public. This motivated me to work hard and to research exactly this topic. I am beyond grateful for the opportunity provided by the University of Tasmania for letting me research this topic.

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Disasters and

Disaster Victim Identification

Chapter 1:

Disasters and Disaster Victim Identification

1.0 Introduction

Disaster victim identification (DVI) refers to the process of restoring identity to individuals who are killed as a result of a natural or human-made disaster. DVI is important for several crucial reasons, such as providing closure to the relatives and families of a deceased person, respecting dignity of the dead and resolving the status of missing persons. This chapter discusses the term 'disaster', analyses the main types of natural and human-made disasters, and considers the differences between incidental and intentional disasters. By presenting examples of disasters, the chapter aims to highlight the significance of these phenomena across the world and thereby the vital role of forensic practitioners in DVI. The number of deaths in various incidents provides an indication of the magnitude of the impact of disasters. The chapter outlines the processes and complexity of DVI. It concludes with the rationale for this research project: the need for more detailed analysis of the DVI process with regard to the challenges experienced by Australian forensic practitioners involved in the aftermath of disasters internationally. This issue has major importance for the work and wellbeing of practitioners, as well as for those affected by their interventions such as family members of victims.

1.1 Disasters: Definitions

A disaster is defined as an event that has catastrophic effect on human lives and living conditions. A disaster or catastrophe usually takes us by surprise, thereby increasing negative effects (Morner, 2010). A disaster can be defined as an emergency that has severe

consequences that include deaths, injuries, illness, and property damage. It can be caused by natural events, equipment malfunction, human error and/or activities, or biological hazards and disease (Furin, 2018). The definition of disaster is a critical issue for social scientists in that it lays the ground for systematic research into the causes, conditions and consequences of disasters (Perry, 2017).

The World Health Organization (WHO) defines a disaster as 'a sudden ecological phenomenon of sufficient magnitude to require external assistance' (quoted in Zibulewsky, 2011; p.144). Landesman (2019) defines a disaster as any event, typically occurring suddenly, that causes damage, ecological disruption, loss of human life, deterioration of health and health services, and which exceeds the capacity of the affected community on a scale that is sufficient to require outside assistance. The United Nations (2015) views a disaster as 'the occurrence of sudden or major misfortune which disrupts the basic fabric and normal functioning of the society or community'.

A comprehensive definition of disaster sees it as 'a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or man-made cause, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of property, or damage to, or degradation of, environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area' (NIDM, 2005, p. 3). Both Landesman (2019) and NIDM (2005) emphasise that disasters change normal patterns of life and it is notable that all definitions above have focused on the consequences of disasters. There is clear agreement among governing bodies that a disaster involves sudden and significant depredation, wreckage, injury, loss and death that renders an ecological system in need of external aid.

1.2 Types of Disasters

Disasters can be classified in several ways; however, there is a consensus that factors contributing to a disaster are often under human control (Khorran-Manesh, 2017). It is therefore important to delineate those aspects of disasters that are accidental, avoidable and intentional. This partly depends on whether a disaster occurred because of forces beyond human control or as a direct consequence of human action (Khorran-Manesh, 2017). There is also an emerging third type of disaster that starts with human action, and then nature plays its role in increasing the magnitude of the disaster; for example, negligence in controlling agricultural pests which leads to damage of agricultural production, resulting in severe negative consequences for the community (Khorran-Manesh, 2017).

The United Nations Office for Disaster Risk Reduction (UNODRR) (Khorran-Manesh, 2017) classifies disasters into three types:

- Major disasters, such as earthquakes, volcanoes, floods and tremors
- Visible disasters, such as famine and epidemics
- Sudden disasters, such as industrial or nuclear disasters, or in general those resulting from technological development.

The spectrum of disasters, their frequencies and consequences can also differ. They can be anticipated or unexpected, and the magnitude and scope of disasters will vary. These distinctions are important because they impact community, government and practitioner responses. Moreover, preparation for disasters differs in different locations, ranging from non-existent to partial preparation, such as preparation for specific types of disasters only (e.g., cyclones) but not others (e.g., tsunami). The socio-political context of disaster management, including historical colonial relationships and current political relations

between countries, can further contribute to how disaster management is carried out on the ground.

1.2.1 Natural disasters

Natural disasters occur as the result of natural forces and tend to be accepted as unfortunate, but inevitable. They can be understood as the consequence of climate and/or geology. They are defined as temporary events triggered by natural hazards that overwhelm local response capacity, and seriously affect the social and economic development of a region (Charvériat, 2000).

Natural disasters consist of two basic elements — the catastrophic event, and the vulnerability of people. For example, while it can be argued that countries such as Bangladesh and the Philippines are in geographically vulnerable situations; there is no doubt that their main susceptibility comes from their weak social and economic structures (Sapir, 1993). Disasters disrupt the living conditions of communities and individuals and the economic activity of countries. As the Economic Commission for Latin America and the Caribbean (ECLAC, 2014) notes, depending on their intensity and duration, natural disasters may eventually affect food supplies or essential services.

1.2.2 Human-made disasters

Human-made, anthropogenic, or human-induced disasters are defined as those 'induced entirely or predominantly by human activities and choices' (Zietkiewicz, 2012:43). When human behaviour causes an unintentional disaster, it is referred to as an incidental or accidental disaster (Zietkiewicz, 2012). A disaster of this type can be due to intentional or unintentional actions, negligence or lack of concentration, as well as variability of interest or feelings of distress (UNISDR, 2012). Examples of human-made disasters are complex; they

include conflict, famine, displaced populations, industrial accidents and transport accidents (UNISDR, 2012). Furthermore, according to UNISDR (2012), technological disasters are normally considered as a subset of human-made disasters. Chemical, nuclear and radiological hazards, as well as transport hazards are defined as those that originate from technological or industrial conditions, dangerous procedures, infrastructure failures or specific human activities (UNISDR, 2012). Examples include industrial pollution, ionising radiation, toxic wastes, dam failures, transport accidents, factory explosions, fires and chemical spills.

Some of the most notable and catastrophic human-made technological disasters include the Great Smog of London (1952), the Bhopal Disaster in India (1984), the Chernobyl disaster in northern Ukraine (1986), the Exxon Valdez Oil Spill Disaster in Alaska, USA (1989), the Deepwater Horizon Oil Spill in Mexico (2010), and the Fukushima Daiichi disaster (2011).

Human-made disasters can also include armed conflicts and other incidents of social instability, and civil unrest. Intentional disasters are those that are caused by an individual or group of humans with the aim to create a disaster. The terrorist attack on the twin towers of the World Trade Centre in New York, on the 11th of September 2001, is an example of this type of disaster, which killed almost 3,000 people, and left more than 6,000 wounded (Zierkiewicz, 2012).

In recent decades, some authors have extended the term human-made disasters to include wars and political violence (Harding, 2007). Changes taking place in the modern world make the use of weapons of mass destruction, such as biological or chemical weapons, an increasingly likely cause of disaster, both in an armed conflict and as a terrorist occurrence. These two events—war and terrorism—are examples of intentional human disasters. By far, the largest proportion of the total victims of disasters in recent decades has

been caused by armed conflict. The 1945 atomic bombs over Hiroshima and Nagasaki are examples of the emergence of large-scale disasters of this kind. The number and magnitude of human-made disasters have risen worldwide since the 1970s and continue to grow in both frequency and impact on human wellbeing and economies, particularly in low and middle-income countries (UNISDR, 2012). Another example of a human-made disaster is the Yugoslavian war in 1991-2001 in which 200,000 people died, 800,000 were displaced and 15,000 were still missing by 2007 (Cianflone et al., 2007). An example of a terrorist intentional disaster was the Bali Bombing in 2002 in which 202 people died (Cianflone et al., 2007).

1.2.3 Differences between natural and human-made disasters

Human-made disasters result in a broader range of consequences than natural disasters. For example, they include mass displacement due to war and armed conflict, and widespread death caused by the global spread of disease (UNAIDS/ WHO, 2004; UNICEF, 2004). Nearly one fifth of disease in developing countries is linked to environmental risks, where unsafe water, poor sanitation and hygiene are the 'leading risk factors, causing 1.7 million premature deaths per year' (World Bank, 2005). Natural disasters are generally unpredictable, whereas human-made disasters are the result of, or made worse by, human planning or activity (Harding, 2007). For example, government corruption can affect and influence the management of disasters. According to Alexandar (2017), government corruption impacts operations related to disasters across the areas of mitigation, relief, and recovery, through to arms supply and humanitarian help. He also suggests that there is a strong relationship between disasters and organized crime regardless of a country's economic status. Mathew (2010) argues that not understanding the nature of disasters including their

mismanagement can potentially lead to higher mortality rates and economic loss. How a DVI team responds to disaster is also intrinsically shaped by such factors.

1.3 Phases of disasters

Disasters are considered dynamic, and because they are always changing, they demand flexibility in response. Disasters can be understood as involving a series of phases on a time continuum. Identifying and understanding these phases is an important part of describing related needs and conceptualising appropriate disaster management activities, with the ultimate goal of disaster relief being to save people.

he main disaster phases are: pre-emergency, impact and flight, acute, post-emergency, reparation, and rehabilitation or reconstruction. The *pre-emergency phase* is based on disaster warning and the available resources. Some activities included in this phase are provision of shelters, planning of evacuation routes, and monitoring of ongoing trends (Interpol, 2018). The second phase – *impact or flight* – is activated when a disaster happens, and the disaster often leads to the displacement of a large number of people from their homes. How long this phase lasts depends on the type of disaster, the number of people affected and the distance they must travel to find sanctuary (Interpol, 2018). The *acute phase* starts immediately after the impact of the disaster, and is marked by intense, often reactive, activities by many humanitarian and government agencies responding to media reports of a very high death rate.

The *post-emergency phase* focuses on providing aid to displaced people. It is difficult to set time limits on the post-disaster time phases or to accurately define the limits of each, even for one specific type of disaster. During the *post-emergency phase,* priority is given to the survivors. All efforts are made to save the lives of the injured first, without unduly endangering rescuers from the various continuing dangers such as fire or explosion (Oloruntoba *et.al*., 2018). It is suggested that the disaster victim identification (DVI)

processes should begin in this phase and include a focus on the deceased. There can be a high probability after a disaster that some of the bodies can be difficult to reach and/or recover. In this case, the DVI process is put on hold, and all resources related to it must be focused on finding bodies and securing evidence. In some cases, after disasters, body parts may be heavily traumatised and it is important to protect and secure the remains so that once the DVI process starts, they are in the best possible condition.

The next phase is the *repatriation phase*. It starts after the emergency is over and displaced people are expected to return to their place of origin, either on their own or with the help of relief agencies. Repatriation may be either forced or voluntary (Interpol, 2018). The *rehabilitation or reconstruction phase* occurs when a permanent solution is obtained that allows the focus to shift from relief to development (Interpol, 2018).

1.4 Impacts of disasters

The main focus of many studies is the consequences and the impact of disasters on human life (ECLAC, 2014). There are fewer studies, however, that investigate the broader psychological impacts on people who have not themselves experienced the disaster first-hand, such as family, friends and the global community (ECLAC, 2014), as well as those working to assist people in the affected areas in the aftermath of the disaster, including those involved in DVI.

Following a disaster, groups can be categorised within a population according to how they may be affected (ECLAC, 2014). The first group is the primary affected population, and it includes people affected directly by the disaster. This group consists of victims of primary trauma such as the dead, the injured, the disabled, those displaced and living in shelters, and those who suffer material losses as a direct and immediate consequence of the disaster. The second population affected by disaster is defined as people who were within the boundaries

of the affected territory, but who suffer less traumatic but direct consequences of the disaster. These include individuals who lost their jobs due to the destruction of their places of work, or tradespeople who lost their income because they worked for businesses that were affected, for example, their agricultural harvests were destroyed. The third group consists of people who were not living in the area defined as disaster affected but who suffer indirect consequences from the disaster (ECLAC, 2014). An example of this population would be those living several kilometres away who are affected by the collapse of water supply systems (ECLAC, 2014).

1.4 .1 Impacts of Natural Disasters

Recent data reveals that in the 10 years to 2018, natural disasters have killed 760,000 people, injured 2 million and affected more than 2 billion people worldwide (Bartholdson & Schreeb, 2018). It is important to emphasise that natural disasters causing mortality and morbidity are likely to increase in coming years due to climate change (Bartholdson & Schreeb, 2018). In 2018, several deadly natural disasters occurred. These included earthquakes in Indonesia, flooding in Japan, and a volcanic eruption in Guatemala, in which thousands of people lost their lives. Hundreds of thousands more people were injured or displaced. In 2017, 335 natural disasters affected over 95.6 million people, killing 9,697 and costing a total of US $335 billion. According to the Centre of Research on the Epidemiology of Disasters (CRED), this burden was not shared equally, as Asia seemed to be the most vulnerable continent for floods and storms, with 44% of all disaster events, 58% of the total deaths, and 70% of the total people affected (CRED, 2018). It is notable that in relation to the African and American continents, the 2017 mortality rate was higher than the 10-year average due to the occurrence of landslides, earthquakes and hurricanes (CRED, 2018).

The deadliest natural disaster in 2018 was the Indonesian earthquake and tsunami. More than 2,000 people lost their lives in this natural disaster. A 7.5 magnitude earthquake and subsequent 20-foot tsunami brought widespread devastation to Sulawesi Island in Indonesia in late September, levelling entire cities and rendering more than 330,000 people homeless, according to World Vision, a global humanitarian non-profit organisation (U.S. News, 2018). Specific types of disasters give rise to particular kinds of impacts, and these influence practitioner capacities, priorities and work tasks over time.

1.5 Disaster Risk

Disaster risk is a widely used concept in disaster literature. It is defined as 'the potential loss of life, injury, destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity' (UNISDR, 2017, p. 1). Understanding the myriad dimensions of disaster risk, such as vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment, is necessary in order for new and effective policies and practices for disaster risk management to be developed and implemented.

Such knowledge can include pre-disaster risk assessments and is used for prevention and mitigation, but also for the development and implementation of appropriate preparedness and effective response to disasters (UNISDR, 2017). This has important implications for practitioner preparedness as well. The Sendai Framework for Disaster Risk Reduction 2015–2030 is a guide on human-made and technological hazards meant for practical use. It provides practical examples of the types of actions that can be taken to prevent or reduce the risk of human-made hazards and minimise their potential impacts on human lives, health, well-being, livelihoods, the economy and the environment (UNISDR, 2015). This document is a 15-year, voluntary, non-binding agreement which recognises that each country has the

primary role to reduce disaster risk, but that responsibility should be shared with other stakeholders including local government, the private sector and other stakeholders. The Sendai Framework outlines four priority actions in order to prevent and reduce existing disaster risk: understanding disaster risk, strengthening disaster risk governance to manage disaster risk, investing in disaster reduction for resilience and enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction. It aims to achieve the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries over the next 15 years (UNISDR, 2015).

1.6 Disaster Victim Identification (DVI)

The need to identify the bodies of deceased persons is imperative in the wake of disasters. Disaster Victim Identification (DVI) is the method used to identify victims of mass casualty incidents, either human-made or natural (Interpol, 2018). It is usually impossible to identify a victim of a major disaster by visual recognition or fingerprints; dental records or DNA samples are often required for a conclusive identification (Interpol, 2018). The Interpol DVI Guide, most recently updated in 2018, provides guidelines for use by Interpol Member States in the identification of disaster victims. In order to establish, maintain and review standards and promote effective international co-operation, Interpol calls upon each Member States to prepare for DVI operations (Interpol, 2018.

According to Winskog et al. (2012), in disaster situations featuring multiple fatalities one of the fundamental requirements is the correct identification of victims. This matter is important in so many ways—scientific, economical, medical and humanitarian. The number of fatalities that are required before DVI processes are initiated varies among jurisdictions.

For example, it may occur with only four bodies after a vehicle crash, or with thousands after a tsunami (Winskog et al., 2012). Importantly, DVI can be undertaken not only in response to natural disasters such as earthquakes, or human-made, such as terrorist actions, human trafficking accidents, but also in response to events that happened some time ago, as with the exhumations of mass graves from previous armed conflict (Winskog et al, 2012).

Being prepared is key for a successful DVI process. The DVI process is multidisciplinary and includes several different scientific areas and level of authority. This is the reason why preparations and coordinated responses by the authorities and other stakeholders such as the police is of crucial importance. Developing preparatory strategies and a higher level of harmonisation in the DVI processes can provide a better answer when disasters occur (Interpol, 2018). Many existing disaster management handbooks do not discuss DVI in detail although some handbooks discuss specific processes such as management of the dead for first responders (e.g., the International Committee of the Red Cross [ICRC] (Winskog et al., 2012). On the other hand, some handbooks are aimed at different practitioner groups such as police and emergency services, including volunteers, but omit others in specialist roles, such as forensic dentists and DNA analysts. Ambiguity exists in regards whether and how such resources have been translated into training and practice that includes the diverse range of forensic and police practitioners who may be called upon in disaster situations. This is especially pertinent to DVI practitioners. For example, over the years, and in different countries and jurisdictions, practices have differed greatly in terms of developing and organising specialist DVI teams ahead of time, and providing training to enable them to act as soon as possible in the event of a disaster.

The DVI process has four main phases: (1) the scene: locating and recovering human remains and property at the disaster site; (2) post-mortem: detailed examination of human

remains at the mortuary; (3) ante-mortem: collection of missing person data from various sources and (4) reconciliation: matching post-mortem and ante-mortem data (Interpol, 2018.

In the DVI process, several different specialist services may be called upon and these include emergency response specialists, such as Police, Fire, and Ambulance, Rescue Units, Investigation units (e.g. Crime and Fire investigators), Forensic Services (e.g. Scene and Post Blast examiners), Disaster Investigation Unit (e.g. Air Safety), Intelligence Unit and the Public Information Unit (e.g. Media) (Interpol, 2018).

DVI specialists often find it complicated to operate in an external jurisdiction and face various legal and cultural issues (Byard & Winskog, 2010). For example, the feeling of some local authorities is that they are merely being tolerated by the true 'experts' in the field, those from outside the country. The importance of cultural sensitivities has also been recognised by some experienced practitioners. Byard and Winskog (2010) urge that every effort should be made for an experienced team leader and team members to be fully briefed on local religious beliefs, cultural attitudes and practices and political systems.

The presentation of conclusions in a formal identification report for each victim has been an important development in the field of DVI. The role of the International Criminal Police Commission (later Interpol) in the coordination of the identification procedures where victims from different countries were involved was very significant, especially on an international level (Taylor, 2009). For example, Interpol coordinated the international DVI response following the 2004 Asian tsunami. More than 2,000 specialists from 31 countries were involved in the identification process in Thailand alone, where some 5,000 victims were identified (Interpol, 2018). This highlights the size of the task and the sheer number of practitioners that can be involved. This, in turn, foreshadows some potential difficulties for those involved in the DVI process.

1.7 Complexities of the DVI process

The main forensic disciplines used in the DVI process are forensic anthropology, forensic odontology, forensic pathology, forensic biology and fingerprint examination. In addition to these professions, mortuary managers and missing person officers can be included (Interpol, 2018). The spectrum of tools in the DVI process continues to evolve. Computed Tomography (CT) – which refers to a computerised x-ray imaging procedure that can generate cross-sectional images of the body – is now widely used in forensic practice and its applications are often discussed in the DVI context (Iino & Aoki, 2016). However, it is often difficult to implement the CT "process" because of the scale of disaster and/or the poor resources/infrastructure in the location in which a disaster has occurred.

DVI can be performed in traditional ways, such as using the physical identification of documents, jewellery and other belongings. More reliable methods than physical identification, however, are associated with the collection of fingerprints, hair and/or dental data (Zietkiewicz *et. al*., 2012). Until a few years ago, the traditional methods of DVI were used in the majority of cases. Visual identification is not always helpful in the case of mass disasters, but it has been used even in relatively recent times. For example, when the Japanese tsunami in Tohoku occurred in 2011, the most commonly used method in DVI was 'visual and personal belongings.' This DVI method was used in 89 per cent of the cases after that particular disaster. Only 8% of the victims were identified by dental analysis, 2% using fingerprints, and only 1% by using DNA (Iino & Aoki, 2016). During the same DVI process, at least 17 cases of misidentification occurred. All of these cases were visually identified by families and released by police before receiving the results of DNA testing. It can be concluded that misidentification is usually related to traditional DVI methods that are less

accurate than more contemporary methods of identification (Iino & Aoki, 2016). It is for this reason that other methods are typically recommended.

Currently, DVI is based mainly on molecular methodology such as DNA testing, which is considered the most effective approach in victim identification, both in small-scale disasters and in mass-casualty events (Zietkiewicz et al., 2012). DNA profiling is considered as one of the most reliable and efficient ways to identify bodies or separated body parts. This requires a post-mortem DNA sample and an ante-mortem DNA sample of the victim or their biological relative(s) (Boer et al., 2018). The important characteristic of DNA is that it can be collected from almost any body part, even when the human remains are in an advanced state of decomposition (Boer et al., 2018). Interpol's DVI guide, accepted by all member countries as the international standard for conducting DVI operations, recognises DNA analysis as one of 'the most reliable methods by which identity can be confirmed' (Boer et al., 2018, p. 256).

Another aspect important to identification using DNA is that even if DNA analysis could lead to certain identifications, other identification approaches—for example, initial anthropological screening—may be useful to eliminate the need for expensive and repeated analysis (Caenazzo et al., 2013). Historically, anthropological involvement in the DVI process has been limited to developing biological profiles from skeletal remains to aid in identification. Over the last few decades, the anthropologist's role has expanded into some non-traditional and novel areas (Mundorff, 2012). This expansion includes greater anthropological participation at the disaster scene, with an increased role in the mortuary, particularly during initial triage, for example. Increased anthropological involvement in other areas of DVI operations comes at a time when calls for anthropologists to develop biological profiles as an identification tool in other contexts is decreasing because they do not provide enough individualising data to establish positive identification (Mundorff, 2012).

The need to establish and maintain high standards at all stages of the identification process, from securing reliable ante-mortem data, to repatriating remains to families is self-evident. Interpol has had a great influence on creating some of the standards which are generally accepted in the international community. Decisions and processes must be checked regularly during the DVI process to ensure that identifications have been correctly performed in a timely manner. The need for a stable chain of command, that ensures current scientific techniques and protocols are followed, is paramount to maintaining standard operating procedures (Wineskog et al., 2012).

1.7.1 Ethical considerations in DVI

In relation to disasters and the need for an adequate DVI process, many ethical and legal questions arise. DVI is essential if humanitarian considerations are to be addressed; it satisfies legal aspects, such as notifying next of kin, criminal and/civil litigation, and identifying victims or even perpetrators; but it also satisfies administrative aspects such as estate issues and completing death certificates. The procedure involves practitioners from different disciplines and jurisdictions to assist in the identification of the deceased following a mass disaster (Caenazzo et al., 2013) and this includes harmonising medical matters such as autopsy rules and procedural matters.

DVI is increasingly recognised as a sub-discipline of forensic practice. In order to better understand this process, and the important questions that arise, it is necessary to focus attention on the diversity of disciplines that may be involved, to formulate rigorous international protocols, and to ensure the highest standards of scientific investigation and analysis (Winskog et al., 2012). When a disaster occurs that requires professional intervention, a coordinated and considered approach needs to be adopted, rather than ad hoc and unauthorized mobilisation of variously trained individuals and teams, something that has

occurred in the past (Winskog., et al., 2012). The kind of response adopted after a disaster influences the time taken to identify victims and notify families. Depending on the nature of the event, the safeguarding and the collection of information and biological specimens, useful for identification of the victims, must be considered as part of the response procedure (Caenazzo, 2013).

Although DNA-typing is one of the central and most effective methods in DVI, ethical issues may still arise. Forensic genetics laboratories need to have policies and procedures in place to notify families for long-term sample storage and data archiving. Therefore, according to Caenazzo (2013), DNA sample collection and a strategy for DNA-based victim identification needs to be part of a preparedness plan.

The DVI process generates several dilemmas about priorities and what managers and practitioners should do when a disaster occurs. In a forensic genetics' context during a disaster, the typical questions emerging in the decision-making process relate to resource allocation in managing victims' identification. These questions can include: 'Is it sufficient to identify all victims, or would it be necessary to attempt a complete re-association of all recovered body parts? Does each family need to be informed about their relative's identification as early as possible, or when all samples are completely re-associated? Will all fragments, only fragments meeting a certain size, or only anatomically recognizable fragments require testing?' (Caenazzo et al., 2013, p. 394).

Ethical considerations related to DNA are discussed generally in respect to secondary uses in other fields such as routine medical activities or research. When referring to vulnerable individuals, ethical considerations must also be applied when collecting biological materials from mass disasters. It is widely held that the interests and rights of a person do not expire at death (Caenazzo et al., 2013). In the context of mass disasters, it is common that

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relatives are asked to donate reference samples and they should be informed about the reason for collecting the biological material. The persons should be able to understand how the collection will affect them, because unique to mass disaster victims, is the issue of their relative's privacy and confidentiality. It is possible that victims and relative's names or personal identifiers may be leaked by the media or others (Knoppers et al., 2006).

Parker et al. (2013) suggested that when it comes to DVI and use of DNA profiling, when observed from an ethical point of view, identifying victims is important for a variety of reasons. These range from the necessity for families to have clear information about the loss of their loved one, to the respect of religious burial customs. There is an increasing necessity to address ethical issues surrounding the secondary use of samples following mass disasters, and to provide guidance to researchers and research ethics boards. A combination of humanitarian attention, improvement of identification technologies, harmonisation of preparedness strategies and, above all, ethical reflection is required when faced with the management of victims' identification in mass disasters, both in policy making and in practice (Parker et al.,2013).

1.8 Disasters as a social phenomenon

The identification of victims is essential for humanitarian reasons. An important aspect of that is to return human remains to their families in a culturally appropriate manner. DVI allows family members to acknowledge the fate of their relative and to have the opportunity to accept their loss. Without proper identification, there could be social or administrative difficulties for families, and, above all, it would be impossible to conduct burials or other funeral rites in accordance with traditional religious customs where these apply (Caenazzo et al., 2013).

It is evident that DVI is a complex process and that it includes a great number of activities that require a lot of time to be done properly. The nature of identification techniques can be a key reason for this, but also the lack of harmonisation and preparation affects the carrying out of tasks after disaster. For example, the issue of time and conflicts with family members during the victim identification processes is important, and one that is worthy of further study.

Research on DVI needs to maintain a balance between theoretical and practical considerations. Researchers should seek to link practical problems that emerge in DVI with broader social science theories and other perspectives on DVI and disasters more generally such as those that focus on organisational crisis responses. Understanding DVI requires integration of theories and approaches from the forensic disciplines that contribute to the field, as well as those that scrutinise the forensic field as a whole (Julian, Howes & White, 2022). In many cases, it is necessary to work with researchers from non-forensic science disciplines, including physical scientists and engineers, to ensure that the field as a whole identifies all variables that pertain to hazard management (Lindell & Perry, 2012: 11). Not only do disaster researchers need to develop more comprehensive models of critical activities such as evacuation, they also need to expand their vision of which human behaviours to study in disasters especially in relation to individual grief and collective social rituals. Quarantelli (2005) argues that a disaster must be understood as an inherently social phenomenon and that practitioner work in this area must relate it to the social context.

Furthermore, DVI represents an important step in the rebuilding of societies affected by mass fatalities, helping families and communities return to normal. Thus, every effort must be made to identify as many human remains as possible, but also as effectively and in the timeliest manner as possible, to avoid increasing emotional suffering for families (Caenazzo et al., 2013).

1.9 Aim and purpose of the thesis

The aim of this thesis is to qualitatively explore the challenges for forensic practitioners in the DVI process, and to emphasise that DVI is not just a scientific process that needs to be fulfilled. This process is also about people, about a need for closure, and about their pain and their loss. This human aspect is central when it comes to researching this topic. The intention of this work is to provide insights into problems that professionals involved into DVI process face and to better understand the impact that their challenges have on the overall DVI process. The thesis therefore aims to contribute to improvements of DVI management and facilitate future DVI responses. Its focus is on the ways practitioners' experience can be drawn upon to improve the DVI process in future disaster situations.

1.10 Objective of the thesis

The thesis aims to explore the views of Australian forensic scientists in working with other teams, coordinating activities, and participating in the fulfilment of the final goal of DVI in the context of international DVI operations. This includes aspects such as the communication of cultural issues for stakeholders as well as the influence of interpersonal relationships among practitioners during the conduct of DVI.

1.11 Structure of the thesis

The second chapter summarises existing literature relating to the challenges affecting practitioners in the DVI process. Chapter 3 discusses the methodology, providing an overview of the qualitative method and thematic analysis. Reasons for choosing this method are also discussed. In Chapter 4, the results of the study are presented. The main themes are discussed with illustrative quotes. Specifically, the themes derived from the research are: (1) the DVI work environment; (2) project management; (3) interpersonal interactions; (4)

external factors; (5) personal challenges; and (6) participants' suggestions for improvement. Chapter 5 summarises and discusses the key findings from the study, making contrasts with previous literature and highlighting the implications and conclusions arising.

1.12. Conclusion

This chapter has provided the background to the thesis by discussing the range of disasters and their impacts. The DVI process was introduced and some of the challenges and ethical considerations that arise within it were considered. Finally, the chapter outlined the aims and objectives of this thesis and its chapter structure. The next chapter provides a review of the research literature on DVI processes.

2

Challenges for Practitioners
in the DVI Process

Chapter 2:

Challenges for Practitioners in the DVI Process

2.0 Introduction

Disaster Victim Identification (DVI) is a complex process. It requires the involvement of practitioners with a wide range of professional and technical skills together with cultural and religious awareness of context in regards to their implementation. This review of the literature will examine current practices and their implications for forensic practitioners across various DVI contexts. Equally important is the matter of how DVI processes are viewed by the relatives of victims as well as by practitioners, in particular, when it comes to the handling of the deceased. This chapter reviews articles that examine a range of challenges in DVI operations.

2.1 Interpersonal challenges

The practitioners involved in DVI operations face a great variety of challenges. These include dealing with the families of the deceased, political and religious factors that impact the DVI process in terms of the disaster response or the disaster victims, interpersonal relationships within and between the teams, and communication with stakeholders. Despite the importance of these types of challenges for the DVI process, limited research has examined these factors; they may not seem to be equally as important as the challenges posed by technical aspects of the DVI process. However, the challenges associated with undertaking DVI work overseas and in international teams and contexts are many. These social, political, and religious types of challenges, just like technical challenges, can impact the ability to

identify bodies effectively in the aftermath of a disaster. Political and cultural factors can act as barriers for applying certain techniques of identification. Differences in how DVI processes are viewed by forensic practitioners compared with how they are viewed by family members of victims may be an area of particular tension.

2.1.1 Relationships and communication between international teams

Good communication is important during and after disasters. This is true not only for senior officials, politicians, the media and the relatives of the deceased, but also for the international teams involved in disaster victim identification. Good communication among the team members is essential in working effectively and obtaining the best results.

Based on their own experiences as odontologists affiliated with the Australian Defence Force, Griffiths et al. (2003) and Lain et al. (2003) discussed the role of forensic dental and medical personnel in identifying the victims of the bombings after the Bali disaster in 2002. They emphasised the positive interpersonal relationships among the responders included in disaster operations. For example, the authors highlighted that the relationship between Australian and Indonesian forensic scientists was collegial; with some having met previously, which helped to establish good relations between the teams in the DVI process. Having attended and actively participated in an Interpol meeting for the South-East Asian region, Indonesian regional police chiefs were aware of the International DVI standards before the disaster occurred. These experiences allowed the decision making to proceed logically and rationally. The positive relationships and shared understanding of appropriate practices meant that problems that occurred during the DVI process – such as local and international authorities demanding preferential treatment, and the idea that national teams identify only their own citizens – were able to be resolved efficiently and without harming identification operations (Griffths et al., 2003).

According to Lain et al. (2003), the main disagreement was about the release of bodies. Australia's then-Prime Minister, Mr John Howard, was being pressured by Indonesian authorities to release bodies based on visual identification only, due to the financial costs associated with scientific methods. Once he was made aware of the limits of visual identification by forensic scientists involved in the DVI mission, Mr Howard agreed that the costs of DNA analysis would be met by the Australian government irrespective of the victim's nationality.

Another issue emerged both in the DVI processes in Bali after the bombing (Lain et al., 2003) and Thailand following the tsunami (Scanlon, 2008). Lain et al. (2003) explain that in Bali, the teams from some countries wanted to work independently of the Indonesian–Australian team and only examine non-Caucasian victims. This was problematic because non-Caucasian victims were not necessarily citizens of South-East Asian countries; they could also be citizens and residents of countries from other regions. Furthermore, it was not necessarily always possible to determine ancestry from appearance due to the condition of the bodies (Lain et al., 2003). Similarly, in Thailand, this problem occurred as the foreign teams arrived in Thailand for the DVI mission. They immediately started searching for their own nationals. Thai officials were initially in favour of separating Thai nationals and foreigners based on appearance. By contrast, those from other Asian countries and from European countries supported the idea of aiming to identify all bodies, because it would be difficult to determine nationality based only on visual appearance. Further difficulties in identification based on appearance would occur due to marriages between people of different ethnicities and appearance (Scanlon, 2008). After discussion in Thailand amongst participating countries such as Germany, the Netherlands, Denmark, Norway, France, USA and Australia, it was decided that all countries would share responsibility for the identification of the deceased – not just those from their own countries.

In Thailand, additional problems arose regarding procedures such as moving bodies (Scanlon, 2008). The bodies were reportedly located in four areas. Thailand has a federal structure and some governors objected to the proposal that bodies be relocated to a single site. The reasons for objections were not strictly political; they reflected the Buddhist belief that spirits remain in the body after death and concerns that spirits would be disturbed by relocation of the bodies (Scanlon, 2008). Ultimately, it was agreed that teams of forensic scientists (often with existing close relationships such as Australia and New Zealand; or the Nordic countries; and Austria and Germany) would work at each of the four sites.

Related to forensic disciplines, De Boer et al. (2018) underlined the importance of cooperation and a teams' approach with a multidisciplinary agenda. However, disagreements were evident within specific forensic disciplines. For example, among fingerprint specialists, some wanted palm prints taken of the victims, but others claimed that it was not necessary (Scanlon, 2008). To address this issue, the management team in Thailand established a scientific advisory group to set and enforce standards.

Wright et al. (2015) explain that segregating the identification teams, which is a typical DVI strategy, leads to duplicated efforts between staff rotations and therefore to unnecessary work. Each national DVI team typically had a staff rotation between two and five weeks, where new experts would join a team, replacing those returning home. The problem with staff rotation, was that the newly rotating individuals would begin to search for possible matches among cases previously discounted within their group or discarded by another primary team because there was no mechanism in place to record confirmed exclusions. Together, the studies outlined above show that it is common that the relationships and communication between teams from different countries can positively or negatively influence the outcome of the identification process and contribute to the success or otherwise of a disaster response. These studies highlight the importance of inter-professional

communication and interpersonal relationships, a factor that was acknowledged by odontologists' accounts from the field (e.g., Griffiths et al., 2003; Lain et al., 2003). It is also evident that achieving shared understanding between practitioners in the disaster situation about how to coordinate and execute DVI operations is very important for the success of the the process.

2.1.2 Other Practitioners: Interpreters and Translators

Another aspect related to the work of personnel in the DVI process is the role of interpreters, and their credentials for working in the field. The need to improve communication was stressed at the first conference on implementing the Sendai Framework for Disaster Risk Reduction 2015–2030 (O'Brien, 2018). A problem that has often occurred during DVI processes, is that not everyone involved will understand the dominant language used during the response and recovery operations (Nepal et al., 2012; O'Brien, 2018). Adequate interpreting and translation during DVI processes can reduce risks of miscommunication and can help contribute to overall community resilience.

O'Brien (2018) urged that those affected by a disaster not be discriminated against on the grounds of language and that they be entitled to all available information. For example, the New Zealand Disaster Management Acts includes both translators and interpreters including those for New Zealand Sign Language. However, compared to Japan's DVI system, countries such as New Zealand do not have a satisfactory level of preparedness to provide information in a range of languages. Japan sets down the principle that the State and its organs should proceed from the basis that the behaviour and informational needs of foreign residents and foreign visitors may be different, but that a system for timely and accurate information transmission needs to be put in place to support both groups. O'Brien (2018) emphasised that in the 2016 White Paper, reference is made to a ¥1.26 billion (approx.

US$11 million) budget commitment by Japan's Ministry of Internal Affairs and Communications to commission research into the development of automated translation applications that could be applied to disaster contexts.

One of the main tasks for governments is to guarantee the acceptability of translated information. This might include the use of professional translators and interpreters as a first port of call; training of translators and interpreters for emergencies; and ongoing ratification and training for all (O'Brien, 2018). However, many communities will rely on the voluntary, non-profit sector to provide assistance. Therefore, volunteer management strategies in this domain are critical.

Rogl (2016) addresses this topic by focusing on the Haiti earthquake in 2010. Following the earthquake, translators and interpreters were urgently needed to help establish communication within the disaster relief community both to assist in coordinating crisis intervention and to provide urgent language services for those affected. The problems with translation depend on the scale of the disaster as well as existing infrastructure and available resources (Rogl, 2016). In the case of mass disasters which result in the death of people from multiple countries, translators and interpreters become essential agents in the process of facilitating effective coordination, but due to insufficient planning or a lack of pre-existing pools of relief interpreters, the needs often exceed the resources available for a rapid response. This indicates that the matter of translation should be organised as part of disaster preparedness strategies. Rogl (2016) underlines the role of technology in how people approach and resolve these problems, emphasising how online networking (assuming that the Internet is working) and technology can contribute substantially to a faster mobilisation of people and resources in the case of a natural or humanitarian disaster. However, while more people can potentially be reached in this way, it does not mean that those involved would be better prepared for the tasks. Thus, good communication in the right languages is essential.

2.3 Psychological impacts

One of the challenges that practitioners face is dealing with the psychological aspect of disasters and events they witness.

Adequate responses to disasters and emergency situations rely on, among other factors, the coping abilities of disaster workers and emergency personnel (Thoresen et al., 2009). Dobashi et al. (2014) conducted research to clarify the psychological effects of disaster relief activities on Japan Ground Self-Defense Force (JGSDF) personnel after the 2011 Great East Japan Earthquake. They discussed how personnel who participated in the DVI response managed the post-traumatic stress after the earthquake. Participants in the study included 606 DVI personnel one month after completing the disaster relief mission. The results of a self-report questionnaire indicated that exposure to dead bodies and age were significant factors for psychological effects in personnel included in DVI relief operations. Despite the challenges faced by practitioners, Dobashi et al. (2014) highlighted the strong stigma experienced by Japanese practitioners about seeking help for psychological problems.

Additionally, personal identification with the dead is a serious issue for those involved in the disaster management process (Cetin et al., 2005). After the Marmara Turkey Earthquake in 1999, African American soldiers experienced great emotional distress because most of the victims were also of African American background, and thus they were more likely to identify with them personally. Nagamine et al. (2018) examined the tendency for Japan Defence Force personnel to identify with the feelings and experiences of others in the context of the DVI operations of Typhoon Yolanda, which struck the Philippines on November 8, 2013. The issue of identifying with the dead was also analysed in the study by Alexander and Klein (2009), who presented a review of a stress reactions and vulnerability in the case of first responders after disasters.

The handling of dead bodies as part of disaster operations can negatively impact the psychological states of disaster workers. A study conducted by Tucker et al. (2002) analysed the issue of the handling of dead bodies. However, unlike other studies, it did not conclude that doing so had significant psychological impacts on those involved. The study also found that younger workers are more likely to suffer from psychological distress than older workers. Similar findings were reported by Shigemura et al. (2018). Many authors suggest that it is important to take the possibility of post-traumatic stress disorder (PTSD) into account when protocols and strategies for the practitioners in DVI are created (Brooks et al., 2015; Glaysher et al., 2016; Garbern et al., 2016; Jones, 1985). Some practitioners' stress reactions can be generated, in part, by lack of social support and culture shock due to being away from home and in the midst of chaotic destruction (Quevillon et al., 2016). As a result, Quevillon et al. (2016) introduce the idea of self-care during the disaster response as one of the important tasks of the DVI management. Besides PTSD, depression is a common problem reported among practitioners who were part of DVI teams. It is important to mention that non-practitioners such as volunteer workers were more exposed to PTSD and depression than professional experienced workers (Garbern et al., 2016).

The issue of ambiguous loss has been discussed extensively. Wayland, Maple, McKay and Glassock (2015) explain the complexity of disappearance and not knowing what happened to loved ones. Robins (2012) explains this term as the loss which occurs when a family member is psychologically present – as they have not been found – but physically absent. Robins underlines that ambiguous loss is the most stressful type of loss precisely because it is unresolved. Boss (2002) provides examples of situations when a person suddenly disappears, as happened in the terrorist attack of September 11, 2001. Ambiguous loss is further associated with psychological conditions such as depression and anxiety.

Robins (2010) considers victims who are often marginalised in both theoretical and practical ways because they receive less attention than victims from other categories. Testing the extent to which the ambiguous loss model, largely developed from data taken in Western countries, has relevance in the Nepalese context, with radically different family and social structures, the researcher collected data from interviews and focus groups for four years after violent conflicts in Nepal in 2006. The participants in the study were 86 families of people who had disappeared. The findings emphasized the importance of a different approach for a fair and equal assessment of DVI operations. Similarly, Danvers et al. (2006) focused on the psychological consequences after a disaster for family members of the deceased. Some authors, including Cordner and Ellingham (2017) emphasise the need to take care of the affected families with attention to the appropriate cultural context.

The topic of ambiguous loss highlights the need for closure for families. Persaud and Fuham (2017) examine how prolonging the time until families gain answers about what happened to their loved ones impacts negatively on their psychological conditions. The need to work quickly for a rapid resolution of the 'missing' status places DVI personnel under significant pressure. This pressure can be increased by publicity and the media, especially in terms of media criticism and demands for information. Furthermore, over-exposure to the media can possibly worsen feelings of being emotionally involved (Brooks et al., 2015). For these kinds of reasons, Thompson and Solomon (1991) concluded that the selection of stable and extroverted individuals, who are given training in carrying out their tasks, can potentially reduce the chance of traumatic experiences in handling disaster victims.

2.4 Practical considerations during the DVI process

The practical aspects and day-to-day realities of undertaking the DVI process include many unanticipated considerations. For example, the level of preparedness among personnel and the available resources and equipment can impact how processes are undertaken.

2.4.1 Preparedness

Although disaster preparedness cannot pre-empt every problem that may arise during the DVI process, it is one way to raise awareness of the many problems that may occur. Previous DVI operations provide information for experts about common problems that can be resolved by engaging in general training and better organisation before a disaster strikes. Scanlon (2008) reports that although the process for identifying the dead had improved after the Bali bombing, in Thailand after the tsunami, many issues were still evident. For example, Morgan et al. (2006) argue that a lack of national or local mass disaster plans further limited the quality and timeliness of response, as did the absence of practical field guidelines or an international agency providing technical support. Merli and Buck (2015) discuss several legal and evidential regimes as an important aspect of the DVI process and its efficiency in the wider context of the DVI management of Thailand tsunami. The involvement of many DVI teams and great number of personnel further complicated the process. Some states implemented special legal requirements for the identification of their victims. For instance, the German team implemented their own additional dental check outside the Interpol guidelines before they would release an identity of German victims.

A significant challenge during the DVI process is the set of problems related to visual identification of the victims. Indeed, the lack of reliability of visual identification is one of the major issues addressed in the DVI literature (Winskog et al., 2012). By analysing the

disaster response after the terrorist attack in Nice in 2016 when all victims were positively identified within five days, Quatrehomme et al. (2019) illustrate how organisational features can influence the efficiency of the process. Good communication among actors involved in the DVI response was one of the key elements. Any information that could assist with identity such as an identity card, was delivered to the ante-mortem (AM) team as soon as possible. In this way, quicker reconciliation of the AM and post-mortem (PM) data was possible. Additionally, an effective DVI process is associated with establishing an order of victims' identification. This is manifested in first identifying child victims, as their identification is regarded as especially sensitive. Additionally, the role of each actor was defined, and their actions were coordinated.

According to Byard and Winskog (2010), an adequate disaster response can be dependent on the training and preparedness of included practitioners. Sakuma et al. (2015) underline that the level of preparedness can contribute to better psychological conditions for the rescue workers. After adequate training, it is anticipated that practitioners would be more confident in their capabilities and therefore the disaster operation would be less stressful for them. The importance of preparedness was also mentioned in the study by Schou and Knudsen (2011) when they discussed Danish efforts in DVI operations in Thailand after the tsunami. Having a permanent unit which deals with missing persons and unidentified bodies was identified as important. Practitioners who engage in such work routinely would be habituated to the work of identifying bodies and would have experience that could apply to disaster response work. Of course, this does not mean that they are immune to psychological distress or trauma.

The involvement of unprepared personnel is not uncommon in disaster responses. In fact, a broad range of people beyond specialists are included in disaster responses (Watts, 2002). In some instances, untrained volunteers are involved and can unintentionally hinder

the successful and rapid identification of victims. Some authors, including Watts (2002) list ways in which their lack of training can create significant difficulties for the rest of the personnel and negatively impact the identification process. For example, after the Bali bombing in 2002, without understanding the importance of keeping each located body part separate, some of the volunteers filled some bags with a collection of partial remains (Watts, 2002). Well-intentioned volunteers in that case were amongst the first to begin work at the site, however the lack of guidance available on the ground at that time led to this outcome (Watts, 2002). One way that this problem can be alleviated is by good leadership and specific and precise guidelines for volunteers. Dyregrov et al. (1996) underline that it is much more difficult to optimise volunteers' reactions during the DVI process.

2.4.2 Resources and equipment

Prominent issues in the DVI process include the need for suitable resources and equipment. For practitioners, responding to issues such as a lack of access to suitable equipment presents a substantial challenge. Concerns about poor living conditions, inadequate equipment and a sense of being in personal danger led to feelings of vulnerability that impacted on the practitioners (Brooks et al., 2015). These have potential impacts on the whole DVI process. Some of the first logistic problems include electricity and water supply, air-conditioning, and a protected space for the autopsy room (Beauthier et al., 2009). Telecommunications infrastructure may also be impacted adding to complexity. For example, Yamamura et al. (2014) show that after the Japan Earthquake in 2011, during the first four days after the disaster hit, the use of mobile phones, laptop computers, and landline phones was rated as poor to moderate, while satellite phones had better service. These factors also greatly impact the practitioners' working conditions.

Transportation problems are not rare when it comes to DVI operations. Lau et al. (2005) underline that after the tsunami in Thailand, a lot of time during the DVI process was spent on the transport to and from the DVI sites. This adversely influenced the time frame of the DVI process. As one potential technical solution to make the DVI process easier, Royds et al. (2005) suggested the use of a mobile laboratory. They explain that temporary mortuaries or mobile laboratories help by reducing the number and volume of samples to be sent to the main laboratory for more exhaustive confirmatory analyses.

Transport of equipment to sites can also present issues. After the Japanese tsunami in 2011, it was impractical to transport mobile CT scanners to every mortuary. In addition, even though mobile CT scanners have their own generators and fuel, blocked roads made the use of CT scanners even more difficult. If we assume that it takes 10 minutes to prepare and scan one body, it would take four months to scan 16,000 bodies with one scanner running 24 per day, seven days a week (Iino & Aoki, 2016). Another reason CT was not used after the tsunami in Japan was that visual identification was thought to be strong enough evidence. Iino and Aoki (2016) explain that this attitude led to many cases of misidentification, which were revealed after the DNA method was applied.

The significance of the CT scanners for an efficient DVI process was also explained in the study by Blau et al. (2008). After a plane crash, caused by pilot error, in Australia in 2017, it was estimated that approximately 250–300 separate human remains were scattered over an area of around 600 m from the site of impact. Those remains consisted of various heavily disrupted unidentifiable tissue types, making identification complicated. Remains were highly disrupted and partially burnt. The benefit of using the CT scanner in this case was that the remains did not have to be mechanically cleaned (and therefore disrupted any further) to identify body parts. As a result of the technique and two days of examination and analysis, it was possible to reconcile a total of 34⁄41 (83%) of the bags collected at the scene.

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Blau et al. (2008) conclude that the implementation of CT imaging at DVI incidents significantly impacts the ability to identify and reconcile highly disrupted body parts quickly and efficiently.

Where an on-site radiology reporting team is not available, it is demonstrated that an efficient DVI radiology reporting system can be established by utilising a remote reporting team with supporting clerical staff without jeopardising the DVI, medico-legal investigations, or local autopsy services. The early establishment of a secure data transfer system is critical to this process (Rutty et al., 2020).

Without the expected resources, practitioners need to improvise. For example, Khoo et al. (2018) discuss how a cling film plastic wrap was introduced as an alternative for a cadaver body bag in large scale disasters. It was quick and easy for first responders to use to wrap a complete body, with an average time of less than 10 minutes – and it required minimal training. The researchers found that wrapping 25 adult bodies or 80 children's bodies could be accomplished with cling film at the same cost as one body bag. This system according to Khoo et al. (2018) is more productive and effective during the first 48 h after a disaster occurs.

This idea of improvisation has been reflected in other practical considerations in DVI. Based on the disaster response in Bali in 2002, Watts (2002) discussed the lack of refrigerators in the morgue needed for dealing with the victims who died in the disaster. The main task was to secure the remains. In order to do so, personnel had to shift several hundred 10 kg, metre-long blocks of ice from a truck to a long row of black body bags laid out in the crematory garden. The lack of refrigerators for corpses was also identified as a problem in the 2004 Boxing Day tsunami (Morgan et al., 2006). The use of ice in place of refrigeration, created many additional problems. Morgan et al. (2006) explain that the large quantities of

melted water that were produced contained products of decomposition, which were likely to create additional management problems. Both Watts (2002) and Morgan et al. (2006) reported problems with inadequate cooling tools that would secure the remains of the deceased. This issue has been a commonly reported problems faced by practitioners in existing studies about DVI (see e.g., Tsokos et al., 2005).

In Thailand after the 2004 Boxing Day tsunami in 2004, temporary burial was used as a solution to the problem of a lack of refrigeration. In that way bodies were in storage in a type of natural refrigerator. However, that method led to different challenges for DVI personnel. It resulted in a complicated approach that necessitated careful recording of the location of each body and good communications with the public and media, who may otherwise have mistakenly interpreted this as disposal of victims without identification (Morgan et al., 2006).

Aside from this less than optimal solution, some DVI teams tried to resolve this problem in a different way, using dry ice. According to Tsokos et al. (2005), the preservation of bodies by cooling them with dry ice, was not a sufficiently effective means. Morgan et al. (2006) explained challenges based on experiences in Thailand, Indonesia and Sri Lanka. The problem with dry ice use is that when it was placed on top of the bodies it damaged them because of its low temperature, while not providing sufficient overall cooling to stop decomposition. Another problem was handling large quantities of dry ice caused skin burns among the individuals handling it (Morgan et al., 2006).

The DVI process in Thailand highlighted the issues of aiming to identify individuals without sufficient AM dental records (Wright et al. 2015). The impact of the AM data quality issues was recognised in the INTERPOL Tsunami Evaluation Working Group report, which specifically highlighted that speedy and successful identification can only be achieved with

quality AM data relating to the missing. They also recommended 'that INTERPOL oversee the development of standard operating procedures and minimum data standards for the submission of quality data by foreign countries' (Wright et al., 2015, p.3).

Medical implants, including pacemakers, orthopaedic implants, and artificial teeth may help to identify people, particularly among older individuals. However, this approach is subject to several limitations. Following the tsunami in Japan in 2011, identifying implants was difficult, in some cases impossible, as the deceased had been stored in dry ice which prevented the scanner from registering the presence of an implant (Makinae et al., 2013). An additional obstacle is that the serial numbers of pacemakers are often destroyed during the disaster or by subsequent cremation (Makinae et al., 2013).

Natural factors can impact the process of identification by using skeletal remains which often are the only samples available in historical and archaeological cases (Ambers et al., 2018). Skeletal remains are among the most challenging sample types for DNA testing due to prolonged exposure to a variety of environmental insults, including the effects of soil acidity (Ambers et al., 2018).

The inability to preserve some remains led to great difficulties in the detection of surgical scars or implantable devices, whether by direct (i.e., visual or tactile) or ultrasonic examination. Iino and Aoki (2016) stated that blood samples from the bodies were not taken in the early phase after the Japanese tsunami and that one of the reasons for this was the belief that extraction of human tissue from intact bodies might be considered a violation of the current Penal Code, Article 190 "Abandonment of a Corpse". This action was approved by the NPA two weeks later (Makinae et al., 2013).

2.5 Religion and Customs

One problem that can impact the DVI process is premature cremation or mass-burials of dead bodies. This is often associated with religious and cultural customs. Premature burials and cremations have been explained as consequences of a common disaster myth that dead bodies represent an imminent risk of epidemics and must be disposed of immediately. This occurred in Thailand in the aftermath of the tsunami (Tsokos et al., 2005). During the first two days after the tsunami had struck, the hurried disposal of corpses occurred through cremation or mass burials in Phuket and Khao Lak at some places under the surveillance of local authorities (Tsokos et al., 2005).

As to whether corpses can cause epidemics and jeopardise public health, Morgan et al. (2006) explain that even in Banda Aceh, Indonesia, after the Indian ocean earthquake and tsunami in 2004, where it took around two months to bury the thousands of dead bodies, no epidemic occurred. This serves as one example of a mass disaster where despite the prolonged presence of dead bodies, there was no major public health consequence. Perera and Briggs (2008) list several recommendations for facing the challenge of mass burials more successfully, with the aim of avoiding negative effects on survivors. They underline the need to identify and map out potential mass burial sites in various regions throughout a country, the use of specific reference codes with which to tag the deceased and avoiding stacking bodies on top of one another (Perrera and Briggs, 2008: 3-5). The International Committee of the Red Cross (ICRC) (2006) provides significant insights into the way that DVI processes can be facilitated. The significance of the coordination and storage of dead bodies is especially emphasised. For each aspect of DVI, this document provides clarification of the aims, the relevant workforce that is involved, and the methods and procedures that are adopted.

It is important to note that religion and customs can have different interests to defend compared to professional interests in the DVI process. This clash between these interests often can lead to a negative impact on the effectiveness and success of the DVI response. Levinson and Domb (2014) argue that this matter is not acknowledged enough. They also make a presumption that time pressure, and the numbers of disaster victims may contribute to potential reasons for lack of cooperation between people with different interests. Therefore, DVI practitioners need to be conversant with religious customs concerning the dead.

The range of religious implications is shown in a study by Stadler (2006), which explored how specific ethnic groups perceive role of religion in relation to the DVI process. It is important to consider how religion and culture can impact on understanding of appropriate care for the dead and can require different identification approaches. Stadler (2006) underlines how different customs can impact and challenge the DVI process. He explains that volunteers from the 'ZAKA' (Hebrew abbreviation for "identification of disaster victims"), a volunteer organisation work with dead bodies following terrorist attacks. ZAKA has been part of the Israeli rescue forces since the mid-1990s. During the current Intifada, ZAKA has played a prominent role in carrying out tasks of body removal and providing first aid in the aftermath of terrorist attacks (Solomon & Berger, 2005). The study showed that ZAKA volunteers cope very well with managing victims after disasters probably due to the connection of their work to religion.

Reviewing research on religion and coping, Agorastos et al. (2014) found that individuals' religious customs may enhance the ability to cope with negative life events. Religious implications can be noted in the practitioners' response to disaster management tasks, particularly in handling the dead. Solomon and Berger (2005) present the case of the Orthodox Jewish ZAKA. A very small number of DVI personnel reported psychological problems. Religion can be a significant provider of a sense of control and is therefore

important for more complete understanding of the DVI process. Based on this study, it can be claimed that religion has a significant role to play when it comes to professional challenges and copying with stress during DVI operations. Findings in the study by Zerach and Levin (2015) show that ZAKA body handlers reported significantly lower levels of psychological problems compared with charity workers. They explain that by the fact that bringing the dead for burial is of particular importance among the Orthodox Jewish (ZAKA workers) and that evokes positive emotions in them.

Care for the dead was studied by Al-Dawoody (2017), who focused on the specific requirements related to Islamic law and religion. Islamic regulations often led to the collective burials and premature burials or burials in the sea (Al-Dawoody, 2017). For example, the burial of the deceased is a collective obligation on the Muslim community. This means that the entire Muslim community will be guilty if a Muslim body is not buried unless this was beyond their knowledge or capacity. Islamic law has developed detailed regulations regarding the disposal of the dead bodies of Muslims. An important Islamic regulation is that every dead body should be buried in an individual grave. Further, male and female bodies should be buried in separate graves and if necessity dictates otherwise, classical Muslim jurists add that a barrier of dust should be placed between the bodies (Al-Dawoody, 2017). This further leads to additional problems that can make identification of the dead impossible. Most common amongst them are misidentifications followed by the destruction of remains or mixing of body parts. This can make the DVI process difficult, and in some cases even impossible. Burials before the DVI process has been completed are often motivated by religious considerations.

One of the significant religious implications within Islam, that can complicate and extend the DVI process, are the specific rules about handling bodies of the opposite sex. This presents a barrier for practitioners who are not used to working in this manner and can

contribute to clashes between practitioners from non-Islamic states. Al-Dawoody (2017), emphasises that it may be hard for those who are not members of the Muslim community to understand the importance of applying rules about the burial of the dead. Certain prohibitions on cremation or collective graves must be understood by DVI specialists. Overall, researchers have highlighted how the complexity of Muslim customs can pose challenges for the DVI practitioners, especially in relation to burial customs (Gatrad, 1994).

Regarding the Jewish religion, Goodman et al. (2011) underline that the fundamental principle of the inviolability of the human body is one of the problems that arises during the DVI process. First and foremost is the inherent sanctity of the body according to Jewish law and second is the requirement of a burial within 24 hours of death. According to traditional interpretation of Jewish law, there is a general prohibition against autopsies because they disfigure the body and disgrace the corpse (Goodman et al, 2011). This kind of norm can have a significant impact and dictate community responses and willingness to cooperate with DVI personnel, whose procedures were developed without taking such customs into account. Alqahtani and Adserias-Garriga (2019) analysed ethical considerations of the management of the dead in the Middle East. They concluded that many aspects of such management are heavily influenced by religion and culture. At the same time, it is a process surrounded by myths. People of various faiths in the Middle East believe that the body must be buried immediately after death to comfort the deceased, which means that delays can cause anguish to families. Dissecting a body is forbidden in the Middle East, regardless of religious beliefs, in order to preserve the dignity of the dead. However, with the advancement of medical knowledge and law in recent years, the practice of autopsy has become a legal requirement (AlQahtani & Adserias-Garriga, 2019). With a few exceptions, human identification methods in the Middle East are primarily based on non-scientific methods such as visual recognition,

circumstantial evidence, or testimony; when scientific methods are used, fingerprint and DNA analyses are typically used (AlQahtani & Adserias-Garriga, 2019).

Considering the many studies that show how religious norms can impact and shape how people see the risk of disaster and disaster management, it is important for DVI practitioners to take them into account. Understanding religious customs and norms presents a challenge for practitioners (Holmgaard, 2019). Holmgaard (2019) focused on the role of religion in local perceptions of disasters focusing on the post-tsunami religious and social change in Samoa. Similarly, a study by Ha (2015) explained how religious customs can impact the course of the DVI process. This study examines the role of religion and the incorporation of religious beliefs and institutions in the field of disaster management, focusing mainly on disasters in Korea.

It can be noted that religious considerations arise not only with mass burials and cremations but also with expectations of how deceased persons will be handled, and how people cope with the DVI process, and with the loss itself. It is important to consider who has the vote when it comes to giving primacy of religious customs even if that is against the best interests of the DVI process. Sometimes religious customs have a lot to do with political actors and the multinational character of disasters. Usually, respecting customs represents the ways of respecting the other states, so DVI management is forced to take certain decisions, even if it will negatively affect DVI outcomes.

2.6 Political Influences

Awareness of the potential for political impacts on DVI processes is fundamental for preparing good and effective disaster management operations. Certain actors in the DVI process can dictate the course of the process itself. In the Philippines, Walch (2014) analysed how disaster relief efforts were affected by the involvement of participants in the conflict,

specifically the Moro Islamic Liberation Front (MILF) and the New People's Army (NPA). The typhoons in Bopha in 2012 and Haiyan in 2013 affected regions that were partially controlled by the Communist rebel group. Walch (2014) explains that disasters weaken state capacity and legitimacy. Natural disasters can be an incentive for drastic change in a conflict-affected country and became tipping points for political and social changes. Both government and rebel groups may be aware of the potential for change and try to take full advantage of it. In interviews, some of the rebels claimed that collaborating with the government was far too dangerous for them. Instead of helping the government, as the MILF organisation did several times including in the disaster relief response, some rebel groups obstructed relief operations with the aim of further weakening the government. The case represented in Walch's study shows the complexity of political factors that may impact DVI processes.

As noted in the section above, following the tsunami, the international relationships in the DVI response in Thailand were impacted by international teams' focus on the identification of their own nationals. Cohen (2009) claims that Thai authorities were under pressure by foreign governments to identify the bodies of their nationals. These governments had supported the identification operation financially and sent forensic teams to the region, often with the explicit purpose to retrieve and identify their own citizens; they wanted results as quickly as possible. The prioritisation of deceased foreign nationals provoked tensions between the local and foreign teams in the first days after the disaster.

Another study indicates that in some disasters, the status of the victims as citizens or otherwise can play a significant role in identifications. In the United States of America, following the World Trade Centre terrorist attack on September 11, 2001, Latino immigrants were not included in the official list of the dead (Aguirre & Quarantelli, 2008). Some of the reasons for their exclusion were that they were unregistered and that many of them did not have security numbers. The issue of undocumented migration to the United States is a

politically sensitive matter. In the post-disaster context, it represented a great problem for the personnel responsible for creating a final list of the dead. The issue of being unable to include undocumented migrants can become a barrier and delay the identification of the remains. It not only inhibits identification but also the notification of families of missing or deceased persons.

Political implications are also evident when the governments of the implicated states do not take responsibility for a disaster (e.g., in human-made disasters) or accept its jurisdiction for the DVI process (in both human-made and natural disasters). An example that illustrates this problem is related to the MH17 plane disaster in 2014, which occurred in the Ukraine, and had victims of many nationalities. At the time the disaster occurred, an armed civil conflict was ongoing in the Ukraine, between armed groups and Ukrainian armed forces. As a result, the army and security forces were called to participate in the DVI mission to ensure the security of the personnel involved. DVI operations were conducted in Hilversum, a military camp situated about 25 km from Amsterdam, chosen to provide security and ensure confidentiality for the victims and the records database (Khoo et al., 2016). The DVI operations were headed by and conducted in the Netherlands, which meant that victims had to be transported by air and land over 2000 km (Khoo et al., 2016). Specifically, all recovered bodies and personal belongings were transported by train from Donetsk to Kharkiv and flown by military aircraft C130 and C17 to Eindhoven, in the Netherlands. On arrival, a Coffin Ceremony for the dead was performed before the DVI operations (Khoo et al. 2016:2).

The need to transport bodies to the Netherlands for the DVI process after the MH17 crash complicated the issue of appropriate lines of authority. To establish clear role distinctions for the main agencies, there was a need to establish a Memorandum of Understanding/ Memorandum of Agreement (MOU/MOA) between the various stakeholders in a DVI activity.

The case of the Malaysian DVI team after the MH17 tragedy is an example of the results that can be reached with consensus among agencies and better coordination among DVI actors, leading to better resources and financial management. The DVI MH17 operation was regarded as a success. The professionalism of the Malaysian team was recognised by the Interpol team for DVI.

One of the major things that the Malaysian team did well was pre-deployment preparation. The Prime Minister of Malaysia held a coordination meeting for the Special Malaysia Disaster Assistance Rescue Team (MNSC) and the involvement of other agencies and actors were planned. Also, the protocol they used was internationally recognised. Further, the software used in this operation was created for Interpol, with the ability to compare AM and PM data to expedite the process of matching and identity verification. The roles of the medical personnel and the DVI teams were divided in five lines and each line into five stations: fingerprint; personal items; DNA and autopsy station; odontology; and quality control. The success of the MH17 DVI mission was due to the nature of the DVI system applied in this case. It was significant for the DVI process that organisational structure, identification as well as the communication plan were all satisfactorily executed in a short time and with international collaboration. As the result of high professionalism and significant level of cooperation all 43 Malaysian victims were identified and the remains were passed to their relatives (Khoo et al., 2016).

To a large extent, political decisions can determine the course of recovery events and facilitate or make identification process harder for practitioners.

Poor leadership can slow and misdirect the whole DVI process. Brooks et al. (2015) in their study present poor leadership as one of the common stressors for professional rescue workers. Limited research addresses decision making during DVI processes. It is unclear why

this is the case. However, understanding the decision-making processes within DVI would provide answers not only to why some DVI processes ended poorly, but also how unsuitable decisions during DVI can change the course of the process and drastically diminish its efficiency.

The decision-making process can be addressed to some extent using example of the Thailand tsunami in 2004. Its magnitude, together with the place and time it would strike land could not be predicted. Although no one person is to blame for a natural disaster, responsibility for outcomes can be subject to critique. The Swedish Committee argued that Prime Minister Goran Persson had some responsibility for the shortcomings in the ability of the government to manage and analyse information that the Committee provided and to act in accordance with that information.

Accusations against the Prime Minister were based on the fact that during his long mandate the issue of disaster management had been raised several times and never resolved. Criticism about his decision making were not uncommon, and the basis for that was the responsibility that comes with the decision-making position (Brunsson & Brunsson, 2017). In this particular case, the tsunami struck on December 26, at 07:59 (local time) which was 01:59 by Swedish time. It is estimated that 20,000-30,000 Swedes were in Thailand when the disaster occurred. During the next few hours' discussions were ongoing between various units of the government office. The Swedish Embassy in Bangkok sent a query about evacuation flights. It was unclear who would make such a decision, and consequently no decision was made.

Such was the delay, that an emergency response from the Rescue Service Agency was unable to depart for Thailand until the evening of December 28 (Brunsson & Brunsson, 2017). It was already mentioned in the overview of the current literature, that the first days

and hours are fundamental for successful identification of the dead not to mention crucial for rescue work and helping those affected. The response of the Swedish government had a negative influence on the disaster response operations. Brunsson and Brunsson (2017) refer to the case of Italy and its response in order to show how a different approach can impact the quality of the response and the contribution of the government. In Italy, the Central Disaster Management Unit of the Ministry of Foreign Affairs immediately decided to send help for urgent evacuations.

Decisions by members of Government can have serious consequences for the success of DVI processes. For example, when Japan was hit by an earthquake and tsunami in 2011, the administration decided to bury dead bodies there on the disaster site. The motivation was mainly the fear that bodies were contaminated and that infections would be spread (Arora & Arora, 2013). Another example is the lack of a clear governmental body that has the mandate and the obligation to make decisions can also be a problem that influences the DVI process. For example, in Indonesia the body recovery phase lasted several months and was under the coordination of the military. In the process 42 different organisations were involved (Morgan et al., 2006). Similarly, Othman et al. (2013) presented a disaster management "model" adapted for Christchurch, New Zealand. It was clear that interaction between all included actors is very complex. This kind of management does not provide information about where power lay or how key decisions were made. It can be concluded that identifying the source of decision-making power is of the greatest importance for successful DVI management.

Decisions taken following Hurricane Katrina were assessed to identify any shortcomings (Withanaarachchi & Setunge, 2014). The case study highlighted the fact that from the highest-ranking officer to the lowest ranking officer, they failed to carry out the most important aspect of decision-making during disasters, that of saving lives. There were

breakdowns in the chain of command in all areas from evacuation planning to communication and sheltering to transport (Withanaarachchi & Setunge, 2014).

From these examples, it can be concluded that the decision-making process is very complicated and that many factors can lead to making unsuitable or poor decisions that could negatively impact the DVI process.

2.7 Climate and weather

A significant technical challenge that emerged after the 2004 Boxing Day tsunami was that the hot climate increased the rate of decomposition (Morgan et al., 2006). The tsunami had destroyed much of the infrastructure including roads and rail lines making shipping bodies or anything else difficult (Scanlon, 2008). This is an important post-disaster circumstance that can impact on the DVI process and make identification harder. Challenges related to the natural consequences of disasters were noted in the literature during the analysis of the New Zealand earthquake in 2011. For example, the mortuary located within the city hospital was damaged by the earthquake (Trengrove, 2011).

Scanlon (2008) states, in relation to the 2004 Indian Ocean tsunami, in both Thailand and Sri Lanka, that due to the conditions of extremely high temperature and humidity, practitioners were sweating so much their rubber gloves and boots were full of water. This was a technical problem that definitely impacted the quality of the DVI operation. Additionally, many of the bodies had been immersed in salt water, causing a layer of skin to slough off the hands; hence, prints taken from the second layer of skin were less detailed than prints taken from the epidermis. As a result, the identification by fingerprints was significantly less effective (Scanlon, 2008).

In contrast, after the Japan tsunami in 2011, natural factors actually enabled visual recognition. The tsunami occurred in the coldest season of the year, so most bodies were not

destroyed and were kept cold under water or debris, until they were recovered. Consequently, the lack of storage refrigerators at the mortuaries did not impact the DVI process as was expected. The average temperature of three degrees Celsius in Tohoku in March prevented bodies from de-composing and therefore enabled the families to visually identify the bodies in the early phases (Iino & Aoki, 2016).

All of the factors discussed above can impact the ability of practitioners to effectively complete their tasks. It is important, therefore, to include climate and weather conditions as aspects that can impact DVI process, especially in cases of natural disasters.

2.8 Conclusion

This chapter has discussed challenges that practitioners faced in DVI processes and provided an account of the context and range of factors that can influence outcomes of the processes of identification. The challenges discussed are related to the interpersonal relationships among teams and the members within the teams that participate in the DVI process. Special attention was dedicated to international DVI responses where teams from different states work together. Preparedness is recognised as one of the important aspects that can be initiated before the disaster strikes. The preparedness of teams affects the timely and accurate completion of the identification process. During the DVI process, especially when international teams are included, interpreters and translators are of the great importance. Their expertise and accurate translation skills can impact the DVI process path. This issue is especially important when it comes to the communication with next to kin and communication between different DVI units. Besides these issues, practitioners also face a great number of practical challenges during the DVI process.

By summarising some of the challenges discussed in the current literature, this chapter makes it possible to identify several areas for further research. As demonstrated,

various factors make it difficult to undertake DVI processes in the most efficient ways and this may delay subsequent closure for family and friends involved. For instance, while technological aids including portable CT scanners and mobile forensic laboratories can be used to reduce the time taken to gather post-mortem data, establishing the necessary equipment and resources in areas of need can pose a significant challenge. Furthermore, these devices alone cannot bridge the cultural and religious aspects of DVI. These issues require clear channels of communication between all stakeholders. The use of agreed formalised procedures has a role to play in this regard; however, there must also be sensitivity to different customs and traditions in different parts of the world to ensure the most appropriate outcomes.

The magnitude of DVI including technical, organisational, cultural and religious factors further emphasises that disasters cannot be addressed the same way each time given the local nuances and contours. Much of the existing literature focuses on examples from the Bali bombing and the tsunami response in Thailand. Some studies were based on specific forensic disciplines and aspects of the responses. By contrast, the current study aims to better understand the challenges for Australian forensic practitioners, from a range of disciplines, in overseas DVI operations. With this literature review as background, the study aims to provide information that will be helpful for the development of strategies for future DVI operations. The next chapter outlines the methodology for the research.

3

Approach and Methodology

Chapter 3:

Research Methodology

3.0 Introduction

The literature review provided an overview of previous research on the challenges faced by forensic practitioners during the DVI process. Many different types of challenges were identified, and it is evident that they were relevant across a range of disasters. This research project aims to build upon existing research by exploring in greater detail the challenges faced by Australian forensic practitioners in their work as part of an international DVI response. This chapter outlines the qualitative research methodology and offers an explanation of why this method is the best for the topic of this research.

From the beginning of this project, my research supervisors were very supportive and they considered the possibility that researching this topic could be stressful and difficult for me. This was especially pertinent, considering that I was born and raised in Yugoslavia and it was possible that some of the participants would have been members of the DVI teams deployed from Australia after the Yugoslavian war and Kosovo crisis. My supervisory team offered me the opportunity to have a general debrief with them after the interviews if I desired and/or to arrange for counselling if needed. During the meetings, the supervisory team was concerned not only with the progress of my thesis but the personal impacts of working on the project. Fortunately, I have been completely fine and there was no need for counselling.

3.1 Research question

The literature review presented in the previous chapter underlined the importance of cooperation and good working relationships between DVI personnel. For example, Thorensen (2009) emphasises that the outcomes of DVI operations rely on the efficiency of DVI workers. Schou and Knudsen (2011) also found that good organisation and cooperation helped Danish teams to achieve better results in their response after the tsunami in Thailand. The same point also was made by Beauthier et al. (2005), who discussed challenges that can arise from the complexity of cooperation. Following on from those studies, the question of challenges faced by Australian forensic scientists during their DVI operations overseas arose as a natural direction for the present study. Therefore, the following research question was developed:

> **What are the challenges for Australian forensic scientists in working with others in the context of international DVI missions?**

3.2 Previous qualitative research on DVI

Qualitative research involving interviews and observations has been prominent in studies of disasters. In 1920, Prince used qualitative methods to research an explosion disaster in Halifax, Canada (as cited by Philips, 2014). Disaster researchers nowadays similarly rely on qualitative research methods to analyse these unpredictable and specific events and people's reactions to them (Phillips, 2014). The literature reviewed in the previous chapter suggested that many of the researchers used qualitative methods when investigating the field of DVI. In order to explain why a qualitative method was selected for the present study about DVI, it is important to refer to the nature of DVI. Each case of DVI is unique.

Many different types and causes of disasters lead to the need to use a flexible approach to research this phenomenon.

3.3 Qualitative research

The main purpose of this thesis is to better understand the challenges faced by Australian forensic practitioners in DVI operations. Qualitative research is commonly used to understand people's beliefs, experiences, attitudes and interactions, with the aim of exploring social phenomena and events (Ormstone et al., 2007). It can be said that a qualitative study is credible when its results are recognisable to the people who shared the same experience (Hammarerg et al., 2016). The sharing of personal experiences can occur in an environment of trust and respect, when the participant feels comfortable to share with the researcher. Further, it is important that qualitative researchers follow the dynamic of the participants as the main aim is to find the answers about the event, rather than to support a hypothesis (Rossman & Rallis, 2012). One of the greatest benefits of qualitative research is that participants can answer the questions using their own words and express their attitudes, experiences and thoughts about the topic (Pattion, 2002). The opportunity to express ideas freely is of great importance considering that participants can explain the same challenge, event or problem differently. This aspect of qualitative research stands in contrast to quantitative research, which often requires participants to choose among given answers. Unlike quantitative research, qualitative research therefore generates non-numerical data as well as numerical forms.

The qualitative approach enables the researcher to identify issues related to the study from participants' perspectives and incorporate participants' subjective experiences on specific phenomena (Denzin & Lincoln, 2003). Moreover, qualitative research tries to answer questions in the real world. Qualitative research does not try to find proof and facts, but rather

to explain human behaviour and to determine what a certain group of people thinks about certain phenomena. Denzin and Lincoln (2002) suggest that qualitative research aims to achieve a holistic understanding of the human experience in specific settings. Compared with quantitative research, qualitative methods are less structured, may take longer and have a more flexible relationship with the respondents so the resulting data have more depth and greater richness of context. This makes them suitable for the research about the challenges faced in DVI operations, due to the potential for a broad range of personal challenges and attitudes that are the subject of research in this thesis. The potential for qualitative data to provide new insights and perspectives may also be greater than those associated with quantitative data (Zawawi, 2001).

Qualitative research starts with the formulation of research questions and objectives of the study (Agee, 2009). During the process of qualitative research, the researcher has an active role and constantly reshapes the research question. The process of qualitative research has been described as a learning process in which the researcher has the role of transforming information into knowledge. For the present research, initially, it was thought that a narrower research question would be used. However, the literature review highlighted a lack of research on challenges faced in DVI across disasters and forensic disciplines, and the research question was broadened to address this gap.

Qualitative methods can be defined as 'an array of interpretive techniques, which seek to describe, decode, translate and otherwise come to terms with the meaning, not the frequency, of certain more or less naturally occurring phenomena in the social world' (Van Mannen, 1983: 272; Ormstone et al., 2007). However, there is no single accepted way to explain how qualitative research should be conducted. A broad range of techniques and philosophies is associated with qualitative research. To examine people's experiences in detail, the primary techniques of qualitative methods include in-depth interviews and

observations (Zawawi, 2001). However, focus group discussions, document analysis, and visual methods can also be used.

The specific data collection techniques chosen are determined by many factors. Some of those factors are the audience, participants, and the goal of the research (Ormstone et al., 2007). Differences that arise in these factors lead to variations in approaches when conducting qualitative research. Questions that are typically associated with qualitative research are: how, why, and what as opposed to those associated with quantitative research, for which the main question is usually how many (Agee, 2009). With this distinction, it is clear why qualitative research is chosen for this topic

Several methodological techniques could be used to gather data for this study and therefore, it is important to present the advantages and disadvantages of various possible methods. In-depth interviews (unstructured, structured and semi- structured), as a fundamental type of qualitative research are a good choice when the aim is to collect personal perceptions and experiences (Gill et al., 2008). By contrast, focus groups bring several participants to discuss a topic of mutual interest. Using focus groups is especially useful when existing knowledge of a subject is inadequate and elaboration of pertinent issues or the generation of new hypotheses is necessary, for example before a relevant questionnaire can be constructed or an existing one enhanced. They are also useful when the subject under investigation is complex and concurrent use of additional data collection methods is required to ensure validity (Powell & Single, 1996; Morgan & Spanish, 2020). The use of focus groups is helpful when the exchange of opinions and experiences among participants is required or beneficial. Unlike interviews, the focus is then not on the individual but the group (Gill et al., 2008). On the other hand, observations are used when the goal of study is to observe interactions between people in social situations.

To collect data from experts who have experience in working as part of international DVI teams, interviews were identified as the most appropriate method. This is because interviews can be used to collect data about personal experiences of participants and are a suitable method for researching sensitive topics. Even though the focus group method enables collection of data that is rapid and provides a wide range of opinions, interviews offer a more suitable method for this research because participants would have participated in different DVI operations and interviews would offer a better opportunity to express their personal experience and the personal significance or subjective meaning of that experience. Collecting individual participant data is important in order to allow participants the opportunity to share their experiences as fully as possible. Interviews offer greater confidentiality and do not have the issue of dominant members influencing the course of discussion. Further, their key benefits are that they are suitable for sensitive topics and may reduce the pressure to produce socially desirable answers (Barriball, 1994). Additionally, while observations would provide a lot of contextual information in specific DVI settings, it would not be feasible to conduct a proper observation of the DVI process. The main reason for that is that DVI process is initiated in response to unexpected events and any participation of the researcher can hardly be organised in advance. Non-professionals need to be excluded from the disaster-affected area. Besides that, it is very hard to manage to include a researcher in the DVI process due to security and safety measures. Also, it would be very hard to determine what challenges specific people face from the observer position. However, observations from the interview context can be included as relevant.

3.4 Interviews

Interviews are one of the most common instruments used in qualitative research. Researchers who use qualitative interviewing as a method are aware of the nature of the

human interaction and how this interaction can help the researcher to understand the participants' experiences (King, Horrock & Brooks, 2019). The interviewer can probe or ask follow-up research questions of the interview participant (Taylor, 2016). Probing is a specific research technique used by interviewers in individual and group interviews and focus groups to generate further explanation from research participants (Given, 2008). Probing may be achieved nonverbally with pauses or gestures, or verbally with follow-up questions (Given, 2008). Collecting data could be envisioned as a progression of exercises the researcher takes part in during this period of their research examination. Therefore, during the conversation with the participant, not only their words and formulations would be noted, but also the body language.

Three major types of interviews in qualitative research are: unstandardised (unstructured), semi-standardised (semi-structured) and standardised (structured) interviews (Jamshed, 2014). Structured interviews may make use of a questionnaire, which connotes a fixed instrument to be read verbatim (Adam, 2015). By contrast, semi-structured interviews use a more flexible and interactive approach and are based on an interview guide, which is a schematic presentation of questions (Jamshed, 2014) or a general outline of planned topics or key questions (Adam, 2015) that need to be explored by the interviewer during the interview.

Semi-structured interviews were selected for the present study as they provide a more flexible approach than do structured interviews. This flexible approach is important for creating bonds between the participant and the researcher (Barriball, 1994). For successful interviews, it is important to get a personal perspective and to be able to see things from the perspective of the other person. To do so, it is necessary to abandon the structured approach and to conduct an open, in-depth conversation.

In order to capture interview data effectively, recording of the interviews is considered appropriate. However, it is sometimes a matter of controversy and therefore the purpose of recordings must be part of ethical considerations, which are explained to the participants, and their consent obtained. While hand-written notes made during the interview can be used, they are considered relatively unreliable due to the possibility that the researcher might miss some key points (Jamshed, 2014).

3.5 Participants and Sampling Procedure

One of the fundamental steps in qualitative research is choosing participants. Considering that participants have an active role in the research process, and that the findings of the research depend upon their answers, choosing the right participants is of paramount importance for qualitative research. It is typical in qualitative research to identify and select information-rich cases for the best use of available resources. For this research, participants needed to fulfil important selection criteria, including that they are Australian forensic practitioners with experience in international DVI responses. There was no criterion regarding the amount of experience in DVI responses, as many factors other than their engagement can influence this such as age, expertise, personal obligations, and job position.

Twenty practitioners participated in the present study. Of these, eight were male practitioners and twelve were female partitioners. Of the 20 participants, nine had been involved in more than five DVI responses, with one having been involved in eleven such responses. Eleven participants had taken part in fewer than five DVI responses, with two having experienced just the one DVI response. The most frequently attended DVI operations were the Victoria bushfires (2009), Thailand tsunami (2004) and Bali bombing (2002). For example, 15 of the 20 practitioners had participated in the DVI response in Thailand.

Ethical approval for the study was provided by the Social Sciences Human Research Ethics Committee [ID: H0024089]. Once approval was received, several Australian police organisations were contacted for permission to undertake research in their jurisdictions. Specifically, Western Australia, Tasmania, and the Australian Federal Police (AFP) were invited to participate. The rationale for including these three jurisdictions is that they reflect one large and one small Australian jurisdiction, and the AFP has a role in coordination of Australia's DVI response. All three jurisdictions have professionals who have been involved in international DVI operations in the past. In Western Australia, permission from Western Australia Police would apply to fingerprint examiners. Permission was also sought from Path West (Department of Health) for DNA analysts to participate. In Tasmania, permission from the Department of Police, Fire and Emergency Management was required for fingerprint examiners based in Tasmania Police and DNA analysts based at Forensic Science Service Tasmania.

Forensic practitioners in forensic anthropology, forensic pathology, odontology and mortuary technicians were contacted via the Australian and New Zealand Policing Advisory Agency (ANZPPA) Disaster Victim Identification Committee, which is a permanent committee within the Australian and New Zealand Policing Advisory Agency (ANZPAA) and National Institute of Forensic Science (NIFS) (ANZAPAA NIFS, 2019). ADVIC facilitated the research by agreeing to contact discipline chairs and forward information about the study to members.

Once potential participants were nominated by their organisations, or had responded to the researcher directly, they were contacted via email, and provided with information and consent forms if they had not already received them. When participants returned the signed consent forms, the researcher contacted them to arrange mutually suitable times for interviews. The resulting list of participants and forensic disciplines is presented in Table 3.1.

The table of participants provides limited information about the participants so as to maintain their anonymity. Interviews were mainly conducted using Zoom (due in part to the Covid-19 pandemic as well as travel considerations). Western Australian participants, where possible, had the option of participating in face-to-face interviews because the student researcher resides in that state. In this case, all recommended measures for protection during pandemic of COVID–19 were implemented and the safety of both researcher and participant remained the highest priority. Interviews were recorded using an iPhone. They were transcribed verbatim and transcripts were provided to participants (if they wished to receive them) with the possibility of making some corrections or further comments as appropriate.

Table 3.1**: Participants and forensic disciplines**

Forensic Discipline	**Number**
Fingerprint examiners	6
DNA analysts	4
Forensic odontologists	4
Forensic pathologists	4
Mortuary technician	2
Total	**20**

3.6 Interview Guide

At the beginning of the interviews, participants were introduced to the main aim of the research. They were asked to confirm that they had read the Participant Information sheet. They were thanked for having provided a consent form. Finally, they were asked whether they had any questions about the process before the interview commences.

The following questions were asked of the participants:

1. Could you tell me about your background and your professional work expertise and your current role?

2. How did you get involved in DVI operations?

3. Can you tell me about your experience in DVI operations? Where did you go? What was your role in that operation?

4. What were the main challenges during the operation? What were the other challenges that you can think of?

5. How did you overcome these challenges?

6. What recommendations would you suggest to improve the DVI process?

7. Is there anything else that you would like to add before we conclude the interview?

The participants were encouraged to say what went wrong, what helped, and how their role changed during the process. The participants were asked sub-questions, or probes, based upon their answers, if necessary to elicit further information. They were encouraged to participate actively in the conversation and further to take the conversation in directions they considered relevant. At the end of the interview, participants were thanked for their time and sharing their experiences. They were told that they would be contacted by email when a transcript of the interview was ready for their review.

3.7 Thematic Analysis

Braun and Clarke (2006) contend that thematic analysis ought to be a primary method or strategy for the analysis of qualitative data. Thematic analysis is the most widely used qualitative approach to analysing interviews. The conceptual framework of the thematic analysis for these interviews was based upon the theoretical positions of Braun and Clarke (2006). According to them, thematic analysis is a method used for 'identifying, analysing, and reporting patterns (themes) within the data' (Braun & Clarke, 2006, p.79).

Thematic analysis allows the researcher to identify and explain patterns of meaning. Analysis produces the answer to a question, even if, as in some qualitative research, the specific question that is being answered only becomes apparent through the analysis (Alhojailan, 2012). There are numerous patterns that can be identified across any dataset – the purpose of analysis is to identify those relevant to answering a particular research question. Thematic analysis is considered appropriate for any study that aims to create conclusions based upon the interpretations. It provides a systematic element to data analysis. It allows the researcher to connect specific themes to the topic of the research (Alhojailan, 2012). The advantages of thematic analysis are discussed below.

3.7.1 Some advantages of using Thematic Analysis

Thematic analysis is a profoundly adaptable methodology that can be applied to various topics of research. It can be used to provide a rich and complex record of the findings (Braun and Clarke, 2006; King, 2004). King (2004) contends that thematic analysis is a valuable strategy for inspecting the points of view of various participants, featuring what is similar/different, highlighting the contrasts, and producing unforeseen bits of knowledge. This kind of analysis is likewise valuable for summing up key highlights of an enormous data collection, as it directs the researcher to adopt an organised strategy to handle all the data (King, 2004). A large amount of information can be summarised to address the aim of the research by using thematic analysis. This approach provided a strategy for the researcher to use the data effectively to answer the research question.

3.7.2 Steps of thematic analysis

The first stage of thematic analysis represents the process of getting familiar with the data. Common to all forms of qualitative analysis, this phase involves reading and re-reading

textual data (e.g., transcripts of interviews in this case) and listening to audio-recordings collected during interviews.

The second stage involves the researcher generating codes. According to Savage (2000), during this stage the researcher concentrates on explicit attributes of the information. Throughout coding, significant segments of text can be recognised and recorded. Codes identify and provide a label for a feature of the data that is potentially relevant to the research question.

During the third stage, the researcher is searching for themes. This stage includes arranging and gathering all the conceivably important coded data which are then separated into themes. DeSantis and Ugarriza (2000) suggest that these themes capture and unify the nature or basis of the experience into a meaning. As per Braun and Clarke (2006), a theme is not reliant on quantifiable measures, rather on whether it catches something significant in relation to the general research question. Furthermore, once distinguished, themes give the impression of being major ideas that connect generous parts of the data together (DeSantis & Ugarriza, 2000).

In the fourth stage, the researcher reviews the themes that have been formulated. In this phase, themes can be "refined" (Braun & Clarke, 2006). Toward the end of this stage, the researcher has a general idea of the various themes, how they connect with another, and the general story of the entire dataset in relation to the research question.

During the fifth stage, the process of naming and defining the themes is developed. Throughout the fifth stage, the researcher has determined what part of the data each theme caught and recognised what is of interest about each of the themes and why.

The sixth stage is the final stage, in which the report is produced. It is suggested that if a researcher keeps good notes throughout the research process, this will facilitate the reporting procedure and therefore produce a good final study. Each step mentioned above was utilised by the researcher in this research study.

3.8 Conclusion

This chapter has outlined the methodology for the study. It has highlighted that qualitative methods have often been used in research about DVI. Semi-structured interviews offer a flexible and appropriate methodology to explore participants' experiences and perceptions. Thematic analysis provides a suitable method of data analysis. The next chapter presents the findings from interviews with the forensic practitioners in this study.

4

Practitioners' Experiences

Chapter 4:

Practitioners' Experiences

4.0 Introduction

As has been discussed in earlier chapters, DVI is a complex process requiring a wide range of professional and technical skills and cultural and religious awareness in their implementation. This chapter presents the results of interviews with 20 Australian forensic practitioners with experience in overseas disaster victim identification (DVI) operations. The chapter first shows the range of disasters in which participants reported experience and presents a summary of key themes before discussing each theme and associated sub-themes, with quotes that best reflect the sentiments expressed by participants. The chapter highlights the key findings across practitioner groups about the challenges experienced in the context of DVI operations.

4.1 Participant DVI experience

Participants reported experience in DVI in many different locations and types of disasters. Table 4.1 shows the disasters, years in which practitioners assisted and the nature of the disasters. As the table highlights, collectively, the participants in the study had many years and types of experience with DVI.

Table 4.1: **Disasters Attended by Participants**

Year/s of event	Location	Nature of disaster
1991-2001	Yugoslavia	War
1993	Texas	Siege
1996	Port Arthur	Mass shooting
1999	Kosovo	War
2002	Bali	Bombing
2003-2011	Iraq	War
2004	Thailand	Tsunami
2005	Bagdad	Plane crash
2005	Egypt	Bombings
2005	Comoros Islands	Plane crash
2005	Libya	Plane crash
2007	Myanmar	Cyclone
2007	Indonesia	Plane crash
2008	Philippines	Typhon
2009	Victoria	Bushfires
2009	Samoa	Tsunami
2009	Papua New Guinea	Plane crash
2010	Congo	Plane crash
2010	Christmas Island	Identification of the deceased refugees
2011	New Zealand	Earthquake
2012	New Zealand	Balloon crash
2014	Ukraine	Plane crash
2014-2016	West Africa	Ebola crisis
2015	Nepal	Earthquake
2019	New Zealand	Volcano eruption
2019	Egypt	Bombings

Six key themes were identified. Table 4.2 shows the themes and associated sub-themes, and the numbers of participants who discussed each theme.

Table 4.2: **Themes and subthemes identified in analysis of interview transcripts**

Themes	Subthemes	Number of participants
1. The DVI working environment	Logistical Challenges	18
	Lack of preparation	15
	Resources and equipment	15
2. Project management	DVI management and decisions about protocols	11
	Complexity of Interpol forms	16
3. Interpersonal interactions	Cultural and religious beliefs	16
	Language	8
	Relationship between teams	12
4. Personal challenges of professionals	Dealing with relatives of the deceased	16
	Dealing with reality of DVI	13
	Psychological and Physical impacts	15
5. Social and political challenges	Political factors	12
	Finance	5
6. Participants' suggestions	Recommendations for improvements	18

4.2 Theme 1: The DVI work environment

The majority of the participants spoke about what the DVI work environment is like and the challenges that can arise in specific working environments. They covered several different topics that can be incorporated into this theme: (i) Logistical challenges, (ii) Lack of preparation, and (iii) Resources and Equipment. These three subthemes represent the major aspects that were identified by the participants as important when it comes to the DVI working environment.

4.2.1 Logistical challenges

Logistical challenges are among the most frequently mentioned types of challenges and were discussed by the majority of the participants in this research. According to participants, these challenges caused major problems during DVI processes. The majority of participants recognised logistics as a fundamental aspect of a successful DVI operation. Some of the participants returned several times in their interviews to the issues related to logistics, emphasising their impact on the DVI process.

The logistical challenges most frequently identified by participants included transport and accommodation for participants, ensuring they are in a safe and satisfactory domestic environment. In the immediate aftermath of the disaster, overcoming these logistical challenges is important for DVI work to commence as soon as possible and for professionals to work effectively. As one forensic odontologist stated:

> The logistics of travel can be a problem. It wasn't exactly easy getting to Addis
>
> Ababa, so the site can be tricky so you've got to be prepared to travel. You've got to
>
> be prepared to travel instantly. Often, we might get 24 hours' notice and you fly out
>
> tomorrow . . . I mean, if you can't, that's okay, they'll skip onto the next team

member because they need to get the team together very quickly. They then need to organize your transport, your accommodation when you get there; you need to be looked after . . . So quite often, they'll send someone to the airport to grab you and take you to base, get you settled in your hotel and then get you to work. The logistics of getting all our equipment where we need it, we have teams that deal with that. And sourcing local equipment or local things we might need when we get there because we run out of things, and so we have to get that sent in or source out. (Forensic odontologist, #16)

A forensic pathologist highlighted that these challenges are not limited to the DVI teams, but may affect the whole community where the disaster has taken place:

There'll be logistical challenges you know that people haven't got food, the power has gone down, the roads are flooded, the people haven't got anywhere to live so they're not focused on identifying the dead. It is very difficult to encompass the complexity of this when the numbers get large and the disaster has affected the functioning of the society and the community. (Forensic pathologist, #1)

Organising shifts so that participants could have necessary rest was another of the challenges. Some participants' comments suggested that exhaustion was a significant problem:

I guess the main challenge was just dealing with the... it was just nonstop work. There was not really any time off... And when you're doing that week after week, and not really having any time off, that was pretty tough. We did have time off, but it was like six days on one day off. (Forensic odontologist, #4)

The issue of long shifts was recognised by participants from different disciplines. Related to the logistical challenges, one of the participants also added that changes in professionals' teams during DVI process can be very hard:

> . . . And occasionally, somebody had to go home from a deployment because they're not coping well, and that's fine. As long as they have the sense to talk to someone and say, I'm not coping very well. We then can fly them home and bring somebody else in. It might upset the dynamics for a day or two, or often people can multitask and someone will stand in and multitask until we get somebody else there . . . So, it's no hanging offense, you know, if you feel you're not coping, but it's a sensible thing to do is to say, rather than suffer, so you know, the team look out for each other. (Forensic odontologist, #16)

Referring to the handover for the next team, one of the participants commented:

> When I got there, the handover was relatively short. Very short really, it was just like, "Here's the office, this is your team. This is the roster. These are the current files, do your best. We'll see you later." And then they went, so it wasn't a lot, it didn't take a whole day to handover or meet and greet people; you had to find your own ways. It was very rushed. It was like when I first walked into the IMC, it was like what I would imagine Wall Street would be like on a trading day. There are papers everywhere, noise, just chaos, really, in there. (Fingerprint examiner, #17)

The participants who addressed this topic referred to different logistical challenges. Their comments show that the DVI working environment consists of numerous logistical problems that need to be overcome in order to conduct the DVI.

4.2.2 Lack of preparation

Lack of preparation, another important subtheme of the DVI working environment, was also recognized by many participants. Professionals from different disciplines agreed that a lack of preparation can have a severe impact on the DVI working environment and process. This related to the planning and preparation at the country and community level:

It's easy for me to be critical but there was no effective preparation or planning and that's a very hard thing for communities and societies to do, good preparation and planning. But without it there isn't going to be an effective response to a disaster, a mass fatality on any sort of scale. So I would think even now there were virtually no identifications following Typhoon Haiyan and that's very sad. (Forensic pathologist, #1)

However, another participant underlined how previous experience in the field of DVI contributed to better preparation in subsequent DVI operations because learning from one incident could be implemented into another:

The Bali bombing . . . we were prepared, but we weren't. There were so many things we could have and should have done better, and we learned. And then by the time we got to the bush fires, Victorian Bushfires, we used what we learnt in Bali bombing with the Victorian bush fires. (Mortuary technician, #10)

The importance of effective preparation was emphasised by several participants across forensic disciplines. The lack of preparation presents as a huge problem for all professionals involved.

4.2.3 Resources and Equipment

The third subtheme of the DVI work environment is resources and equipment. Resources and equipment are important aspects of working conditions that participants reported as a factor that influences the overall working environment in DVI processes. In the aftereffect of a disaster, relief includes proper handling of the survivors, including procurement of necessities like food, disseminating information, and using available resources, when feasible, for the identification of loved ones, and ascertaining international standards and necessary resources for the treatment of the dead. A prominent issue in the DVI process is that of resources (including safety and equipment). Some of the first logistic problems involve electricity and water supply, air-conditioning, and protected space for the autopsy room. These factors also significantly impact the professionals' capacity to handle corpses and identify bodies in the best possible ways. A lack of proper equipment not only impacts the quality of their work but also prolongs the process and adds to difficulties:

> In the Solomon Islands, we had to transport everything out to the remote sites by helicopter. Most of the places – there was no power at any of the places. There was no sort of buildings, no running water. We had like creeks and the ocean and stuff, but no running water. And so, we had no decontamination facilities. I guess they were just all really remote and everything pretty much had to be carried a fair distance by us; tables, bodies, bodies in bags, equipment, everything happened to be carried to the site from the helicopter on our backs. So, we sort of were quite limited in what we could take. And then we had to all be sort of clean before we could get back on the helicopter, so it sort of involved a swim in the ocean. With a lot of those sites, we didn't bring the body itself back. It was to re-bury by the family, so that was easier. (Fingerprint examiner, #8)

Participants from a range of disciplines echoed these comments:

> So, the morgue wasn't secure at all. It was attached to the hospital, but people sort of lived outside in little tents. They just lived at the morgue, so we couldn't leave anything there, not even gloves or wipes or anything. We had to take everything back to the hotel each night with us. And it was pretty stinky and disgusting, so we didn't want to store it in our rooms, but yeah, so that we ended up getting like a storage room at the hotel to store stinky scrubs and equipment and all of that. (Fingerprint examiner, #8)

The logistical subtheme relating to equipment was also highlighted in the following statement:

> Always equipment – a massive challenge for us, is sourcing it very, very quickly. And obtaining that equipment, particularly working overseas, we often don't have access to good equipment, so it's about working with what resources you have. (Mortuary technician, #10)

A fingerprint examiner with experience as a scenes of crime officer commented on how a lack of resources and equipment may impact the overall DVI processes:

> Just trying to set up processes of how you're going to record – well for us fingerprints, and when collecting DNA, everything. The PPE, the moving of the bodies, the recording, like I said, how are we going to collect the fingerprints. And even the DNA stuff, how are we going to – the samples that we're taking - how are we collecting that, how are we're trying to keep it cold, because a lot of it was decomposing - just actually having equipment, anything, because there was nothing there. Indonesia didn't have very much. After a while, AFP really spent some money there and poured

a lot of stuff into it, but initially we didn't have anything. So, it's just sort of to start. Just start collecting fingerprints. So initially, we were inking the fingerprints. But then we moved away from that – oh no, we did ink. We inked all of them actually, we didn't do it digitally at that stage. It was sort of we were inking, and then we were using adhesive stickers, powdering, and then putting the stickers onto clear sheeting. You're doing a lot of that and that's how we processed. I think we did about 150, I think – when I was there, about 150, 160 bodies . . . So, it was really just – we had food, water. Yeah Bali, especially that hospital, is a pretty basic hospital. If you've ever been there, it's pretty basic. Back then it was very basic. They still had leprosy wards there, you know, leprosy and all sorts of things. So, the challenges were, well, everything really. (Fingerprint examiner, #18)

The lack of a seemingly simple resources could result in larger issues, as explained by a forensic biologist:

So, when you're working on a bench and you're trying not to contaminate things, you're using a squeezed bottle full of ethanol to wipe things down to clean the surface. So, we had all of these resources and lots of money being thrown at us from the federal government, but we didn't have enough of these ethanol bottles to clean down all the benches. So that meant stopping too, because you can't proceed until you've cleaned down this space and you've cleaned your instruments. And we kept saying, please, please, can we have some more ethanol bottles? So eventually people kind of worked out what was needed, but little things like that were, you know, things could run better and it would be a really simple fix. It seems like it would be easy – but by the time you've sent it up the chain of command, it's come back down, it can be stressful too, to know that you could be doing things better and it would be very

simple to solve, but sometimes it's like turning around a big ship, you know, you have to wait for them to turn it around very slowly and it goes in the other direction. So sometimes it can be stressful in those sorts of circumstances because you know this is not the best way to do it, can we do it this way? But by the time people realize that you're right, you've spent a long time doing it the wrong way. (DNA analyst #13)

A lack of equipment and resources can be connected to the problem of a lack of existing infrastructure. In many cases, there was a need to set up temporary mortuaries. These kinds of temporary solutions only partially satisfied the needs of such a complex process. Related to this issue, one forensic pathologist said:

…but then you've got to put plumbing in and drainage and, you know, electricity supplies and so that becomes more problematic. And in those temporary mortuaries running IT systems for data collection can be more problematic depending on how it's done – same with uploading photographs and things like that. (Forensic pathologist, #2)

The responses discussed in the subthemes above highlight numerous challenges related to the DVI working environment, all of which affect the capacity of practitioners to carry out their professional tasks.

4.3 Theme 2: Project management

Project management is the second theme identified based upon the data collected within this research. This theme has two subthemes (i) DVI management and decisions about protocols and (ii) complexity of Interpol forms. According to participants' accounts, both factors can dramatically impact the DVI process. Participants spoke especially about Interpol

forms that they identified as one of the most challenging aspects of DVI process in management context.

4.3.1 DVI management and decisions about protocols

Some participants identified challenges associated with managing people in the DVI process. They emphasised that the DVI working environment can be impacted by bad management. The decision-making process can be problematic because problems can arise between local and international practitioners. The problem highlighted by participants was that local practitioners were sometimes unaware of the best practices that characterise the DVI process. Each disaster is different, and the ultimate decision on the scope and method of each DVI operation is the right of the local legal authorities. However, some decisions made by the local forces can make the DVI process significantly more difficult. As one forensic pathologist noted:

> … No body bag is identified or has a number on it – so immediately, eight bodies
> from eight different locations where the location might have said something crucial
> about who that dead body was, that's immediately lost. A truck comes and the eight
> bodies get put on a truck. They go and pick up another eight bodies from another
> street, none of these are labelled and the bodies are taken off and put into a huge mass
> grave where lots of other bodies brought by lots of other trunks from lots of other
> locations all mixed up in one big mass grave. And you have no idea at that point
> where any of these bodies have come from and at that point nobody has made a
> decision about… In the Philippines, the government would have been quite happy to
> let them stay in a mass grave and there would be no effort to identify them. Then later
> on the government changes their mind, about a month or so down the line they decide
> "oh, let's examine these bodies." So the bodies have got to come out of the mass grave

and be taken to some other place so we're talking hundreds and hundreds and hundreds of bodies. Each of them very superficially examined by forensic doctors and it's a completely useless exercise because in the Philippines, the families have a low opinion of police so they don't go to police to report that somebody is missing. (Forensic pathologist, #1)

Participants revealed that many procedural decisions can drastically impact the identification process in the DVI process. It was recognised by participants that local forces can undertake actions that would lead to the additional complications in completing identification actions in an effective and efficient way. Moreover, the lack of a clear governmental body in charge to make decisions can also be a problem that influences the DVI process. The decision-making process is very complicated, and many factors can lead to making wrong or poor decisions that negatively impact the DVI process. As a forensic pathologist stated:

I mean the decision-making process as to who is the person identity, fundamental questions of the individual. Is completely based on jurisdiction, so if it is on police to determine it or Judicial legal officer, Coroner, or prosecutor. Then they determine it and even where medical examiners are doing the work, usually, a prosecutor or legal official is a person that does the final decision making. Over the years, I've learned that there's no point telling a judicial officer or a police officer that they shouldn't do this, or they shouldn't do that. (Forensic pathologist, #2)

4.3.2 Complexity of Interpol forms

The second subtheme under Project Management is that of Interpol forms, which were frequently referred to as a potential area for improvement by professionals included in

this research. During the interviews, the respondents pointed out that the forms are very complicated, arduous, complex, and very long. As a forensic biologist pointed out:

> Yeah, I do feel like in some spaces, it is not really – I can't really see how the information is really that necessary. So, therefore, the form is overly arduous to complete. Yeah. So that's probably my comment. But I feel like it's probably a little too much sometimes. And also, yeah, the whole idea that everyone needs to… it's difficult, the consistency is difficult to maintain. You know making sure people use the same words to explain a colour or just the words need to be consistent so that you can search. (DNA analyst, #9)

A forensic pathologist said:

> I think the forms are very complex. To a certain extent, I think it's a challenge too. And they have over the years, tried to simplify them and tried to improve them. I think there's still a long way to go. (Forensic pathologist, #14)

As another forensic pathologist commented:

> So, the forms themselves need to be tailored, even the Interpol form needs to be tailored to the incident and if you got an instance when people are massively burnt for example, everywhere is burnt, there's no point in collecting certain information that the Interpol form would ask you, because that information isn't going to be there. (Forensic pathologist, #2)

Likewise, a Forensic odontologist made the point that:

> On the Interpol forms - I don't really have a strong opinion. They're a great guide. They can be sometimes frustrating until you've learned how to use them. They're a

wonderful way to standardise. And again, from a dental point of view, if you run out

of space, you know, there's always another section that you can use at the back.

They've got the 'odontogram' on there for us, and there's a written description of the

tooth too, so you've got pictorial and you got the written, and then there are sanctions

for other bits. You know, I think you don't need to have them overcomplicated, and

with the dental team, we've realized that simplification is the way to go. And so,

we've been working in arguing out what terms should be used to what for years and it

will probably be ongoing. (Forensic odontologist #16)

Interpol forms were a very important aspect of the DVI process for participants. They

agreed with the idea that simpler forms would make the whole DVI experience less

complicated for the professionals involved in it. They also emphasised that omissions in

decision making can impact badly on DVI process and that they usually occurred as

consequence of the overlapping between different actors who participate in DVI process.

4.4 Theme 3: Interpersonal interactions

Interpersonal interactions represent the third theme. Many factors can impact the

communications and collaborations among team members, but in DVI contexts, the

misunderstandings and misinterpretations can lead to severe consequences that can drastically

impact on how DVI process will end and whether the bodies would be identified at all or

effectively. Subthemes included as a part of this theme are (i) cultural and religious beliefs,

(ii) language, and (iii) relationship between teams.

4.4.1 Cultural and religious beliefs

Religious norms and cultural contexts can impact and shape how people see the risk of disaster and disaster management. Understanding the differences in norms can be a challenge in itself for practitioners. Local authorities and investigating agencies must navigate cultural and religious considerations and adhere to relevant legislation. The participants discussed a range of cultural and religious implications related to how specific ethnic groups perceive the DVI process and the role of culture and religion in understandings of appropriate care for the dead.

The respondents said that they realise that they have to be mindful of the culture and the appropriateness of what they are doing. So, one can plan a set of steps, but also have to be culturally sensitive. For instance, participants talked about speed—speed is the essence of an investigation into death because of cultural context. As a forensic odontologist said:

> . . . And certainly, with Muslim people, you know the way bodies are handled is very important to them. Yeah, look, it's one of those things; the bodies are not respected in that way; in terms of when a Muslim person died, they're usually buried in 24 hours. We didn't know which bodies were of what religion, and they were kept on ice until they were identified. So yeah, it's not deliberately ignoring cultural sensitivities, it's just that those things are things that you can't always plan for. (Forensic odontologist, #4)

Research literature emphasises the need to take care of the affected families with attention to the appropriate cultural context. The magnitude of DVI, including cultural and religious factors, further emphasises that a one size fits all approach cannot benefit the process of identifying victims, providing closure to families, and drawing on experience

gained in dealing with a given disaster. While talking about cultural nuances, a forensic biologist said:

> It was an interesting cultural difference between the local people where we said, especially from the bombing, where you had multiple body parts. The locals – if you'd said, we've identified a part of the body of your relative – that was closure for them. But for some of the Westerners, particularly America, they wanted every piece identified. (DNA analyst, #12)

Similarly, a forensic pathologist, said:

> . . . So, for them, the body had no intrinsic value because it was a shell, so there was nothing unethical by treating the body any way they like because it wasn't the person. So again, culture and ethical things have to be looked at together. (Forensic pathologist, #2)

The same forensic pathologist, also commented:

> So, there's this cultural sort of engagement and the teams that come from first world, countries can have a lot of problems when they fail to pick up on those cultural norms and cultural values. And that includes professional relationships… (Forensic pathologist, #2)

This participant also included in his response how cultural differences and religious believes impact the length of DVI:

> If you're in New Zealand speed is the essence of an investigation into a death because of the Maori sort of cultural context. And of course, that's true for a number of religions as well – Judaism and Islam, and so on, both have issues around speed. And

many of these are historical. If you actually think about it, they are more historical because of the issue around the body being preserved and so on. Whereas, for example, in Victoria and in elsewhere in Australia, a lot of the issues have been because they've transformed their death legislation; they've moved it to being more about consultation with the family. (Forensic pathologist, #2)

A fingerprint examiner added how beliefs about spirits can also be a distraction to professionals because they have to pay attention to this type of cultural aspect:

. . . And if you're female, you've also got to be aware of the respect culture. I didn't tell you, the funny thing about culture was when we were Madang in this little mortuary, it was part of the hospital, but the local pathologist was coming and his worker they would knock on the freezer door. And I said to them all, what are you doing? And they said, oh, we just letting the spirits know that we're coming in. I was like, oh, okay, they also believed one of them was telling me that, oh, they don't like having photographs of people because it's taking part of their soul. Every time you take a photo of them, I'm like, okay and that was just part of like their belief (DNA analyst, #5)

Another fingerprint examiner stated:

We had some local Solomon Islands police with us and they were very upset about the idea of digging up graves, it's taboo. So, we encountered some issues with that, with the locals in the surrounding villages coming to have a look and with the local police that didn't like us digging up the bodies. So, we had to organise a local priest to come and bless the site before we dug it up for the spiritual welfare of the people around us. So, I guess that was a hurdle we didn't know that we were actually going

to face until we got there. It was something we basically hadn't prepared for. (DNA analyst, #8)

One of the most interesting stories relating to cultural aspects is also provided by a fingerprint examiner:

They think a reincarnation has come to an animal, so you can't kick a chicken or a dog out of the way. And these chickens over there pecking out body bits oozing out of the containers. Because it's hot they would get into the container in the tropics with no refrigeration full of bodies. And we said, look, we told them, if these containers aren't working - so whoever opened those containers later, it just would have been a flow of soup. It would have been terrible. But I'm just saying that was an issue with - we were told sort of how to deal with it because a lot of the monks, you have to be very careful. You're not supposed to touch people on the head - there are a lot of religious – because they're Hindu or whatever. We were just told to just keep to ourselves. But you can't kick a chicken away. They had the locals there cooking for us and then they're eating chickens. Yeah, we got chicken for dinner and we are like: we don't eat chickens! Where did these chickens come from? (Fingerprint examiner, #18)

It can be summed up that cultural considerations significantly impact the DVI process and direct what actions can be done and in which way. All the listed subthemes impact on the DVI working environment and can be analysed in this context.

4.4.2 Language

In addition to cultural differences, language can be added as significant subtheme. Transparent, timely, and reliable information has been identified as being critical to the

efficacy of disaster response efforts. Growing social and linguistic heterogeneity across the world creates a demand for information in a variety of languages, indicating the importance of language translation as a crucial component of disaster preparedness and response efforts.

During the interviews, some respondents pointed out that an essential aspect of DVI is interpreters and their role and credentials for working in the field. They stated that one of the issues is that the needs of individuals who have poor comprehension of the dominant language used during response and recovery operations are frequently ignored by those in authority. The potential for negative impacts on the accuracy of DVI underline the importance of adequate interpreting and translation during DVI. This can be a risk reduction tool and contribute to overall community resilience. As a forensic pathologist noted:

> The next thing that goes with that I suppose is also the issues around language. So what language are you going to use to record? And it is typical that English is used apart from France, of course they would never use English, but it is usually English. And that has consequences because it depends on how good the English speakers are from their native speakers. They have German, whatever, how good is their English? Now, there are some nationalities with very good English, and there are others that don't. And where this goes into problems is even if a person has very good English you can still get, I feel like inefficient communication and recording. (Forensic pathologist, #2)

In another instance, a forensic pathologist stated:

> Because it was 20 or 30 nationalities, so the communication involved is intensive multiple languages, communication channels, involving embassies and international

police forces and different procedures and tracking people down. (Forensic

pathologist, #1)

It was also stated that one of the most important responsibilities of governments is to

ensure that translated information is acceptable. This might include the employment of

professional translators and interpreters as a first point of contact, the training of translators

and interpreters for use in emergencies, and the continuing certification and training of all

parties involved in the process. Many regions, on the other hand, rely on the volunteer and

non-profit sectors to give help. As a result, effective volunteer management methods are also

essential in this field.

4.4.3 Relationships between teams

One of the most challenging problems is cooperation among teams. First responders,

support systems, and family members are better able to communicate with the communities

and individuals who are affected by the calamity when communication is effective. Reliable

communication is also critical to a community's ability to survive and thrive. It is evident that

achieving shared understanding between professionals in disaster situations about how to

coordinate and execute DVI operations is very important for the success of the DVI process.

During the interviews, participants talked about relationships and communication

between different teams, especially between international teams. The participants emphasised

the positive interpersonal relationships among the responders included in disaster operations.

They said that sometimes when DVI professionals go on international operations, there is

high energy and that for the people who go and work in a disaster, they have an adrenaline

rush for the time they are there. Moreover, they work long hours; they work near each other,

and frequently there are strong personalities; and collectively they work in difficult and

challenging conditions. On top of that, the professionals deal with the deceased, loved ones, dismemberment, fragmentation, and difficult weather conditions, such as when it is hot and muggy. As a result, DIV work takes a physical, emotional, and mental toll.

Several respondents said that it is not so much the professional tasks they perform on-site that is the problem; rather, it is negotiating with people and personalities, and this is probably hardest under these conditions and on a day in, day out basis. The participants said that working on disasters on foreign soil is like any other workplace, sometimes co-workers get on with others, and sometimes they do not because a lot of the time it is close quarters as the nature of the job is demanding work, and it does not take much to push someone over the edge if someone on the team is not a team-player. Like a DNA analyst said:

> Like anything, any workplace, you know, some people you get on with, and some people you don't, and I'm working in those really close... because a lot of the time it's really close quarters and like I said before, it's pretty full-on work that you're doing it. It doesn't take much to kick you over the edge to just, that person being really annoying or whatever. But you figure that out as you go because you can't have those sorts of divisiveness entertain when you got a job to do and you have to do it. So, it gets there, sometimes you snap at one another, but you've got to work through it. (DNA analyst, #7)

A fingerprint examiner discussed the sensitive issue of different ways of working that may be used by teams from different places:

> They didn't do their identifications like we do them. We're a lot stricter on ourselves if you know what I mean, but they were very keen to learn and very keen to take any advice that we could give. (Fingerprint examiner, #17)

Participants talked about the collegial relationship between international teams. They observed that there are different ways of working. For instance, some countries that contribute significantly tend to be up to speed using the most modern technology and approaches. However, modern technology and approaches may not work especially in countries that are less developed. So, for example, one of the really interesting tensions occurs where people outsource logistics management to a private company. A fingerprint examiner said:

Oh, look, you're always going to have individuals who are different, you know? That's just like how you deal with people. But most people there in that sort of environment, I find that doesn't happen that much because everyone's there for the same reason. You know, and yeah, you deal with some people, but I didn't find any issues with anyone. No, not at all. Everyone was pretty good. Because like I said, we're all there trying to help, trying to get it done. And when it's on, it's pretty tense, it's all happening and you get all focused on that sort of thing. I didn't have any issues with anyone. It was all really good. (Fingerprint examiner, #18)

A forensic odontologist said that in her experience:

Well, it's definitely teamwork. So, you really need to have a good team and they need to have the appropriate expertise underneath to be the type of personality that you can work with. We need to have clear guidance on what's going on. Because if you imagine going to a different country, it's a different culture, might be different religions, different approaches to things, so we need parts of the teams going in who are going to be liaising with them and smoothing the way. I'm not going to be doing that, I'm just going to be doing my odontology. I'm just part of the identification process. So, we need a huge team, you know, the team on the ground that goes out

and does the assessment as to what we're going to need and who we're going to need. And then, you have the often-delicate political sensitivities. You don't want to be team marching in there and trampling other people just because they don't have the facilities to do it. So, you have to be sensitive and communicative with their needs to make sure that they're at least assisted. (Forensic odontologist, #16)

This theme covers a wide range of situations that can occur as part of DVI process. A lack of awareness of cultural and religious beliefs or having problems with finding adequate language professionals can cause interpersonal problems and create difficulties in the interactions.

4.5 Theme 4: Personal challenges of professionals

The fourth theme includes the several subthemes that can be related to the numerous personal challenges that arise during the DVI process. The whole DVI process is characterized as stressful and challenging for professionals involved in it. Participants spoke about this theme in different ways. The following subthemes are incorporated in the fourth theme: (i) dealing with the relatives, (ii) dealing with identification tasks, and (iii) psychological and physical impacts.

4.5.1 Dealing with the relatives

Dealing with the families of the disaster victims is often treated as one of the major tasks and challenges for professionals and volunteers. It often the most stressful and demanding part of the job. One of the reasons for this is that most professionals are not trained for that kind of emotional exposure. One of the most discussed consequences of DVI is PTSD and emotional distress among the professionals. Taking care of professionals before,

during, and after disasters is very important to protect them from the negative impacts that exposure to dead bodies and remains can have on their psychological conditions. Like a forensic pathologist said:

> And I often say this to people, you can't help the dead, they're gone, they're beyond help. But they all have their relatives, family, friends, and they're the people you're helping. That's why we do what we do. And I think the majority of people are enthusiastic about DVI. (Forensic pathologist, #14)

About this topic also, the DNA analyst spoke, and said the following:

> So, you need to be able to tell the family that, you know, do you want to know every time we identify a part? Or do you just want to know when we've got the first one and then when we got the last one, we'll just put it all together and send it all home at the same time? And so, they do very much now, I believe for the ones that I've been involved with, they do inform the families a lot more about that. (DNA analyst #7)

Another forensic pathologist said:

> There were a lot of relatives there, quite a lot of people that were there looking for their loved ones, you know, they're trying to find people, so it was quite daunting. You know, there's a lot of people upset. (Forensic pathologist, #18)

4.5.2 Dealing with identification tasks

Participants underlined that dealing with the realities of DVI was a huge personal challenge for them. Like a forensic odontologist said:

> And then you've also got the content, which is of course deceased people, loved ones, dismemberment, fragmentation. (Forensic odontologist, #4)

On another instance, the forensic odontologist stated:

> And then where is the content that you're dealing with going to in terms of vicarious trauma. So, each day we have a debriefing with each other as well. (Forensic odontologist, #3)

The same forensic odontologist also stated:

> Probably most people will tell you that the best support is probably the people that are around you, who are experiencing it, firsthand. On any given day, there'll be someone that is struggling and someone that's being able to support them and then that balance can change, that's a team community. When you come back, you have the opportunity to see a psychologist who can specialize, I guess, in regards to their various trauma, so that's offered to you. (Forensic odontologist, #3)

A forensic biologist also addresses this topic:

> For me, one of the personal challenges is, I don't like to see pictures and stories about the people while they were alive. Do you know what I mean? So, for the Bali bombings, I never read newspapers. Often in the reconciliation room, they'll have pictures of the people up on the walls and things so that, you know, they're the people you're working for to a certain extent. I find that quite confronting myself. And if I had my choice, I wouldn't have that, but to deal with that, you just find yourself your desk so that you're not always having to look at those or to always interact with that sort of thing. And that's a personal thing. Other people love that. They love seeing the people up on the walls and things, but that's a personal challenge for me. (DNA analyst, #9)

A fingerprint examiner emphasised how was faced daily with the DVI content by stating:

> There is time away from home challenges. And time away from home compounded
> by seeing a never-ending stream of dead people or dead and decaying people and
> seeing bodies being opened up and jaws removed, then trying to fingerprint really
> rotten flesh and that constant stench of death. (Fingerprint examiner, #19)

Despite their professional roles, these comments highlight that being exposed to death and destruction nevertheless take a huge personal toll on forensic practitioners.

4.5.3 Psychological and physical impacts

As noted in the previous subtheme, working with mortal remains and dismembered bodies is something that almost everyone sees as exceptionally stressful, and conceivably the experience could be said to represent a worst nightmare. Disaster workers' encounter of the disaster is usually more long-term than that of other victims as they have to be on the disaster site for a long while under severe conditions. In addition, the feeling of helplessness and lack of control is a usual occurrence. Due to a wide range of possible impacts that handling dead bodies and working on disaster operations can have on the psychological states of disaster workers, numerous studies suggest that it is essential to take the possibility of PTSD into account when protocols and strategies for the professionals in DVI are created (Glaysher et al., 2016; Garbern et al., 2016; Jones, 1985; Brooks et al., 2015). Regarding the psychological impact, one of the forensic odontologists said:

> Yes, it's a stressful environment, so what does that mean? Well, it brings out the best
> and worst in people, that's just human nature. I think people that try and control
> everything they're the ones that will be the hardest to work with. (Forensic
> odontologist, #3)

One of the most powerful statements in this research related to this topic was made by a DNA specialist who said:

> . . . And I had a reaction years later when I first went to Kathmandu to go trekking. And our hotel wasn't that far from the airport. And we had a tour guide, a friend I was going with, that I knew and had worked with before, so everything was all nice and safe, hunky dory, but by the time we got to the hotel, I was a nervous wreck. Stomach was churning and I was edge. I couldn't work it out. What is this all about? And I was around with my friend and she said, what about Bali? And a light just came on as soon as she said that. So, it sets me off to it. I thought bang, that just puts me back into Bali with the motorbikes and the noise and the smell and all that was just like being in Bali and I just snapped straight back, and I had a reaction that I didn't know was sitting there except I had known when I came back, I couldn't really talk about it. I got emotional like I still am a bit now, but it was really something. And that was probably close to 10 years later. So various stuff affects you and you don't realize. (DNA analyst, #7)

Also, another forensic odontologist commented that:

> A few of the guys did say, you know, little things that would be happening to them like they felt mood changes or weren't sleeping well, or felt very short tempered, and they thought it was just trying to assimilate this, but it was the first time they'd done one. (Forensic odontologist, #16)

A fingerprints examiner said that about this topic that:

> You worry much quicker because you know what can happen. I've seen it many times. You always think the worst. So that's part of that. But certainly, I think with

large-scale deaths, I think it does compound. At the time you just deal with it, but it's later on I think, you know. (Fingerprint examiner, #18)

Many professionals included in this research noticed that psychological aspects impact significantly on the DVI process as a whole and can have major bearing on their mental well-being.

It is important to mention the possibility that DVI professionals face not only psychological but also physical consequences after participating in the DVI process. One of the participants shared his experience and introduced this topic by saying:

I had a physical issue because after Bali - because of where we're working in the mortuary and it's so hot and humid and because you've got mucky hands all the time, I didn't drink enough water. And I didn't go back and then drink 20 beers after, because I'm not a drinker, so over that timeframe I was there, I developed kidney stones. (Fingerprint examiner, #18)

Even though only one of the participants referred to this topic it is important to mention it due to great exposure that people face when they are part of DVI process.

4.6 Theme 5: Social and political factors

As much as internal factors are imperative for discussion because they related to the DVI process itself, external factors can make significant impact. This theme contains two subthemes (i) political influence and (ii) finance.

4.6.1 Political influence

The first subtheme here is the political influences. The quality of government response to a disaster is an instrumental variable influenced by the political environment in

which the post-disaster response is rooted. Awareness of the potential for political impacts on DVI processes is fundamental for preparing effective disaster management operations.

During the interviews, the participants discussed political pressure. The participants said that politicians tell the public what they think the public wants to hear. As a Forensic Pathologist said:

> Yes. Political pressure is a real thing. In particular, in terms of time pressure, there is a, and not unreasonably, pressure to do identifications quickly. We all want to do identifications quickly. I mean the Thai tsunami took many months before all the autopsies were finished. In fact, the actual identification process went on nearly a year because it took that long to go through that much work. But you can't explain that to a lot of people. And I can understand that. I appreciate that everybody, you know if God forbid, I have a family member or a friend who is in an airplane crash, I want to know that person, you know, sadly, but I want to know that that person's body has been identified. I don't want to have to wait three or four or five, six, seven days. I'd like to know tomorrow, so that tends to be the pressure that goes through. (Forensic pathologist, #14)

One would think that disasters and natural catastrophes would be relatively free from politics. However, certain actors in the DVI process can commandeer the course of the process itself. Human remains are innately political, and handling of them unveils societal doctrines and ethical standards. The ever-increasing global landscape of both disasters and disaster responses signifies that post-disaster identification now often occurs under circumstances where practitioners may be unfamiliar with the beliefs, politics, and moral norms of victims, communities, and families. Like a Forensic pathologist said:

The politics depend on the jurisdictional power and the linkage between government

and that particularly lead agency. And then you got what are call powerful figures...So

you have these very interesting, different political structures, which can completely

change the way in which the DVI process is run by which one of them has sufficient

political power to be in charge of the response. (Forensic pathologist, #2)

Political influences were very strongly related to the disaster MH17, for example, as noted by

one of the participants:

was also the fact that there was likely criminal investigation that went along with it.

So, it's different to normal, DVIs where you have phase one scene. (Forensic

odontologist, #3)

Political pressures often overlap with media and social pressures. One participant referred to

this:

. . . if there's a lot of political pressure or media pressure because you can imagine

something like the Ukrainian plane crash, everyone wanted answers now; everyone

wanted their loved ones back, all of these things. And so, we do try and get through as

much as we can as quickly as we can, but making sure we're doing it all right because

people are relying on us to get that information back to them. (Forensic odontologist,

#16)

4.6.2 Finance

The second subtheme here is finance. A forensic odontologist, based upon experience

in Sri Lanka said:

In Sri Lanka, just buried in mass graves. Yeah, because they couldn't afford anything.

(Forensic odontologist, #6)

Related to same topic, a DNA analyst said that:

> …one DNA result for probably about a hundred dollars.... Well, that's what I'm saying. Like, if you've got a deceased person, you'll have at least one sample from the deceased body and you'll need at least something to compare it to. Then maybe a minimum of five samples per deceased. So depending on how many deceased you've got, depending how many, if they're related then we usually have to increase the number of samples because related people, their DNA is more similar. (DNA analyst, #9)

Thus, financial aspects could not be ignored. A fingerprint examiner said that:

> We also have got scales of economy. So for example, in the UK, they could afford to spend several million pounds on the death of 53 people, 54 people in the underground bombings, the train bombings. And that was a fantastic result. And it is an excellent display of how DVI should be done on the part of the British. They did such a fantastic job. The family should be very proud of that. However, it was very expensive. That could not be replicated here in Australia, just like that. We would use resources that we have already established and maintained, but that sort of expenditure would not be possible here. And in other third world countries, they certainly don't have that sort of money to apply to DVI response. Therefore, we've got what we call scales of economy that are going to change the face of the DVI response, depending on which country you're dealing with and their management style, the management culture, how much money is available, how much money or how much resources are provided to them by those that are assisting. (Fingerprint examiner, #19)

This theme shows how political and financial factors can complicate the DVI processes and impact on the effectiveness and length of it. It is important to have them in mind as part of discussion for improving DVI process considering that participants made some serious remarks related to this topic.

4.7 Theme 6: Participant's suggestions for improvement

During their interviews, participants made suggestions for improvements to the DVI process. One of them was to improve access to data. Here the participants made several suggestions that would essentially help access people's personal data in case of emergencies.

For example, one of the participants suggested that "what could be introduced is a reference sample card, use it, give it to your loved ones, write your name on it and your date of birth" (DNA specialist, #13). She also gave an example of identity cards used in Thailand, which have people's fingerprints. Another participant suggested the following:

> CT scanner which we can scan really quickly and have people looking at the computer (…) and we can take DNA and get that tested really quickly on the mission. (Forensic pathologist, #14)

A forensic biologist also discussed ideas for having "a common set of DNA markers" to be used, as a result of which "we can share information across Australia". A related idea is to make use of the Guthrie test [a diagnostic tool for newborn babies to test for phenylketonuria – it involves the collection and storage of a sample of blood from the baby's heel], which could essentially contribute to a nation-wide DNA database, and this idea was suggested by three participants. Another suggestion was to standardize systems, procedures and paperwork. As previously noted, the discrepancy between the different forms and procedures can be a problem, and one participant suggested:

…we should be trying to have a more unified system, so that when an operation does occur, especially if it involves workers from more than one country, that you're going to have a unified system, everybody knows how it's going to work (Forensic pathologist, #10).

As forensic pathologist further explained:

…we really need to try and uniform the approach. It's not just a question of form filling, it's a question of how we do our examinations, how we communicate with each other, how we select people as well.

Several other participants also called for "a more universal approach to DVI" (Forensic odontologist, #6), and suggested:

… a digital platform and coordination of that, standardisation of techniques, inputting information and communication and leadership (Forensic odontologist, #6).

To better plan for emergencies was also suggested, and this relates to the previously discussed challenges that had to do with the lack of preparation and training. Here the participants discussed several aspects of such planning, which would ultimately contribute to being better equipped and prepared. It was suggested, for example, that mortuaries be set up quicker. Related to this is the suggestion to provide more training on all fronts, which includes training in filling in forms, using the necessary software and general training in skills relevant to the job. Also, a DNA expert (#9) suggested that training related to "that cultural stuff" is needed, which would include "the dos and don'ts and what's appropriate, what's not appropriate, what dress you should wear, those kinds of things".

Additionally, two people suggested appointing leaders and quality control people, and one person discussed more mental health support, which supports the previously discussed findings. Finally, a forensic pathologist (#10) suggested raising awareness among the public,

explaining that it would be useful to educate the public on the nature of the whole process and what to expect, in order to address the previously discussed challenges related to the public having a wrong view and unrealistic expectations as to DVI procedures.

Overall, forensic practitioners' suggestions can be summed up as follows:

1. Depending on the extent of the catastrophe, the corpses should either be transferred to a central location designated as the morgue, or temporary mortuaries should be established in various locations/towns. Temporary mortuaries should be recognised, and they should be able to hold a significant number of corpses. It is necessary to have examined in advance where a large number of refrigerated containers can be acquired for the storage of the remains, where generators and gasoline can be obtained, and where the remains will go after they have been identified.

2. People who participated in a leadership capacity in a previous operation and have first-hand knowledge of their team's issues and successes are essential resources for continuous improvement in DVI. Records made and evaluations conducted by such personnel may hold invaluable insights, which can be drawn upon to better prepare for future instances.

3. DVI communication strategies should include initial liaisons with specialists on DNA to aid with expectation management, identify which samples are best to collect (ideally on the morgue site), and advise on any potential obstacles and impacts on resources throughout the process.

4. Practitioners proposed ways to reduce the risks of inadequate enforcement. For example, at the government level, disaster management authorities believed there should be a working group including important stakeholders such as national and international NGOs, community leaders, and dedicated individuals to establishing norms for various players in disaster relief situations. More formal coordination

meetings between governments, international non-governmental organizations, and UN agencies need to be held to establish norms and promote the participation of international players in shortening administrative tasks and procedural schedules so the DVI process could be more effective.

5. Post-disaster planning is a necessity. To be successful in a DVI operation, it is essential to learn from previous disasters, to have appropriate response plans in place and to have adequate resources available. Recognising the advantages and disadvantages of different identification methods, implementing successful identification strategies specific to victim demography and the disaster, and being prepared to respond to unexpected issues are all essential to the success of a DVI operation.

6. Development of a digital platform and its coordination, further standardisation of methods with the emphasis on practice, input of information, communication, and leadership are all examples of what is required. Standardisation is preferable as it would potentially make the whole process much simpler.

7. Satellite phones may be advantageous, particularly when travelling to other countries and attempting to avoid communication difficulties. Power sources may vary offshore in a post-disaster environment. Internet access may also be limited. Having a small vehicle case bundle for hardware and phones would be useful.

   For every DVI, there needs to be adequate amounts of disposable clothing or scrubs that can be checked every day.

4.8 Conclusion

This study aimed to examine the current practices and challenges for DVI professionals involved in international disaster work. A total of twenty DVI professionals across Australia were interviewed. Findings were summarised in six themes and associated

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subthemes. This research highlights various challenges identified by forensic practitioners in the context of international DVI across a range of DVI operations. Participants discussed different topics that traversed the process of DVI from its beginning to its end. The most frequently discussed aspect of DVI by professionals was working conditions, with the emphasis on logistical challenges and lack of preparation. The next chapter provides further discussion of the implications of these findings.

5

Looking to the Future

Chapter 5:

Looking to the Future

5.0 Introduction

The purpose of the research discussed in this thesis was to explore the challenges faced by Australian forensic practitioners in overseas disaster victim identification (DVI) operations. The emphasis was on practitioners' experiences and perceptions.

While previous studies were from different forensic disciplines and often focused on a specific disaster event, the present study was from a uniquely Australian perspective and included a range of forensic disciplines and experiences of DVI in various countries and contexts. A total of twenty DVI professionals from different forensic disciplines from around Australia participated in interviews for this study. The professionals included in this study were drawn from different forensic disciplines, which provided opportunities to see not only discipline-specific challenges, but also those across a range of disciplines.

One of the important things about this study is that is has confirmed many findings from previous studies. For example, DVI is a multidimensional procedure that necessitates the use of a wide variety of professional and technical abilities, as well as cultural and religious understanding, in order to be successfully completed in a disaster situation. The findings of this qualitative study illustrate specific vulnerabilities, planning deficiencies and operational problems (e.g., lack of equipment) as they pertain to practitioners across the board and specific disciplines (e.g., lack of preparatory training in some discipline areas). For instance, it cannot be assumed that training is rolled out equally to all forensic specialists, and

private practitioners in particular (e.g., dentists), may be at risk of missing out due to financial impacts.

Using thematic analysis, six themes were distinguished: (i) The DVI working environment; (ii) project management; (iii) interpersonal interactions; (iv) personal challenges of professionals; (v) external factors; and (vi) other important aspects. The themes were discussed in the previous chapter, along with related subthemes. The purpose of this chapter is to describe the significance of the findings in the light of what was already known about the research problem. The emphasis will be on explaining what new insights emerged as a result of this research and what the findings suggest for practice and future research.

5.1 Contrast of current research with previous research

The topic of challenges faced by forensic practitioners within the DVI process was addressed in the existing literature – but often only as a secondary aim of the study or as a specific type of challenge. Many studies addressed issues of the psychological impacts of being involved in disaster management; however, the focus was mainly on how professionals coped with those pressures. Besides that, Glaysher et al. (2016), Garbern et al. (2016), Jones (1985) and Brooks et al., (2015) discussed the possibility of post-traumatic stress disorder (PTSD) resulting from DVI work. Also, it is significant that Quevillon et al. (2016) introduce the idea of self-care during the disaster response as one of the important tasks of DVI management.

However, one thing that was not addressed in the previous literature was the direct impacts of psychological challenges on the effectiveness of the DVI. In short, the results that were presented in the studies addressing the issue of psychological challenges provided general insight into this matter. By contrast, the present study was focused on providing the personal experiences of how individual forensic practitioners faced the whole DVI experience. The difference lies in the approach and how narrowed the results are. This

research shows how on the personal level, professionals included in the DVI process perceive the challenges arising from their participation in such a work environment. Moreover, in this research, concrete personal challenges were emphasised. The focus was on the elements of the DVI process that led to the psychological challenges for professionals. Insights from this study can be useful for DVI management and thinking about ways of introducing additional measures that can help prevent or minimise these negative impacts.

Some further issues that were addressed in the literature were language barriers, religious and cultural beliefs, climate conditions and cooperation among co-workers. These questions were, in most cases, part of the wider studies about disasters and DVI processes. For example, Tsokos et al. (2005) explained that religion impacted the tsunami disaster response in Thailand because of the belief that bodies must be buried in a certain timeframe. This is one of the examples of how cultural issues were incorporated into previous DVI studies. When it comes to the cultural issues, it is also important to focus on the concrete situations that represented the challenge for the professionals during the DVI processes. This study focuses on the experiences and concrete manifestation of different cultural norms that were challenging for the professionals. It provided different insight compared to other studies that referred to this issue because in this research it was not about culture as an element of DVI in general; rather, the focus was on the specific events that occurred due to cultural differences and the way professionals from different cultural contexts dealt with that.

One of the limitations of many previous studies was that they often discussed the challenges associated with one disaster. While these kinds of case studies are extremely valuable, they can have limited generalisability. To observe whether patterns can be observed in challenges in DVI processes across disasters, it is necessary to consider multiple cases or incidents. Additionally, while many studies focused on improving technical aspects of the process, few focused on problems that arise for DVI practitioners.

Thus, the existing literature left a gap in knowledge about professionals' perspectives. This study aimed to overcome that gap and provide information about challenges faced across disasters for a broad range of forensic practitioners involved. This study offers personal perspectives and concrete examples how some challenges impacted professionals.

5.2 New findings from the current research

The research conducted provides results relevant for responding to the research question. Results showed many challenges that professionals face within the DVI process. The findings of this study provide new and important practitioner perspectives that show what aspects of the DVI process represent the major problems for those who participate in it.

5.2.1 Working environment

Most of the challenges raised by the forensic professionals were related to the work environment. Most of the existing studies incorporated little detail about this aspect of the DVI process. Professionals claimed that working conditions not only made their work harder but could also delay the identification process. In particular, logistical challenges represented a large problem for practitioners. Logistical challenges were a crucial component identified in this study as being problematic in the disaster victim identification (DVI) procedure that forensic experts encountered, particularly in overseas operations. Logistics continue to inhibit work in the early aftermath of disasters – addressing logistical issues and allowing experts to operate successfully is one of the most difficult obstacles to overcome.

Organisational problems represented another challenge for professionals. From the moment they are informed about the need for DVI until all bodies are identified, the process is marked by such challenges. One of the examples is the long shifts that represent an extremely challenging aspect of the DVI process for professionals. Lack of preparation was another major problem and while this issue was already mentioned as part of some studies,

the professionals provided further insights about how a lack of preparation influenced their work and how they felt about it. Resources and equipment also represented major problems in the DVI process. Some problems were already addressed to a certain extent in previous literature. For instance, Brooks et al. (2015) emphasised the issue of poor equipment in their study. The same is true for Beauthier et al. (2009) who addressed the issue of electricity and water supply, air-conditioning, and a protected space for the autopsy room as part of the disaster response in Thailand. This included the lack of mortuaries or scanners. However, the present study added to information about these topics, including specific examples such as how a lack of ethanol can impact the DVI process.

Further, it was interesting to note that most of the participants reportedly found working conditions among the most challenging parts of the DVI process. Their responses indicate that at the daily level, most challenges that they faced where related to the working conditions. Working conditions as a challenge were very frequent and occurred in a wide range of forms. Its significance has been understated in comparison to the number of challenges that it presents to professionals in the field.

5.2.2 Project management

As part of forensic practitioners' discussions on project management, the many flaws of Interpol forms came to light. Existing literature usually suggests that these forms are a useful tool that provide extensive guidelines to all who are involved in the process. Wright et al. (2015) recommended that Interpol create minimum standards for the submission of quality ante mortem data by foreign countries. Nevertheless, Interpol forms have not previously been examined from the perspective of professionals, and there is a gap in understanding how these forms can affect their work. The professionals in this study had different opinions about the forms, most usually explaining how Interpol forms represent a barrier to effective and fast DVI due to their complexity. Some of them even underlined that Interpol forms are the

reason why many misunderstandings happen during the identification process. Some suggested the need to create simpler and easier to use forms that would be harmonised with the needs of professionals. It was emphasised that in theory, the idea of Interpol forms is very good, but that in practice they can complicate things.

Interpersonal relationships were an important influence on DVI processes. While cultural and religious aspects were addressed in the existing literature, professionals provided additional details and experiences from practice that provide more realistic insights into how these differences can impact the DVI process in their experience. Differences between cultures can make it harder for professionals to do their jobs and to progress with identifications. Unfamiliar beliefs about the spirits of the dead sometimes created a barrier for professionals. Interestingly, participants raised the issue of differences in gender-related expectations. In some cultures, men dominate scientific fields and therefore, women could become marginalised on the basis of their gender. This is one of the issues in DVI that has received little research attention despite its potential to impact negatively on processes.

What was discussed in respect of gender in the interviews and in the reviewed literature was that there may be instances when only professionals of the same sex as the deceased can take care of the corpse. Beside the organisational aspect that can be seriously complicated by this approach, the cultural shock can be very strong and many of the professionals may face troubles in understanding how they should behave in the specific situation. Putting efforts into resolving situations like that and adapting to different cultural norms takes energy from the professionals and can make the whole process more difficult. Finding ways to prepare practitioners for differing cultural norms may be a valuable part of training.

5.2.3 Interpersonal interactions

Relations among team members also represent an important influence on the DVI process. Good collaboration is imperative for success when it comes to DVI. More specifically, the relationships between teams are of high importance for the whole process. Griffiths et al. (2003) and Lain et al. (2003), for example, recognised that interpersonal interaction can be problematic in the DVI process. These authors wrote based on their personal and shared experience as part of DVI teams. Their articles most closely reflect the findings of the current study in this regard; however, in the present study, the findings draw from a broader range of forensic disciplines and disasters. Scanlon (2008) observed that problems can arise such as many DVI teams working primarily to identify the victims of their nationality. According to participants in the present project, DVI operations have become more collaborative from the outset, but challenges between and within teams are nevertheless prominent.

In this study, interpersonal interactions and the level of cooperation among professionals were approached with the idea of analysing how conflicts and disagreements can impact one's perception of the whole process. The lack of good communication and different work habits often caused problems related to the effectiveness of the DVI. Professionals faced troubles finding their place in the DVI process, as it differed considerably from the way they were trained or educated to approach the necessary tasks. The lack of international regulations about roles and the allocations of tasks in the international DVI processes can cause significant overlapping among teams and further affect the quality of communication and cooperation among teams. This study showed situations that occurred due to a lack of regulation of roles and limitations of the teams. Negative interpersonal interactions, on the other hand, can contribute to the ineffectiveness of the DVI process,

whereas positive interactions among DVI operations co-workers contributed to better psychological coping with the entire DVI process.

5.2.4 Personal challenges

Personal challenges were also an important topic in the present study and in previous research. Besides confirming some aspects already acknowledged in previous research on this topic, the present study emphasised that psychological consequences can happen even a long time after the DVI process ends. This finding is important in better understanding psychological impacts, which may be far from immediate, instead emerging many years after the event. This perspective completely changes the way professionals' exposure should be analysed and is more in line with current thinking about traumatic stress. Dealing with the death and destruction that was witnessed in the specific work environment is an important issue that professionals in this study reported as a personal challenge. However, the findings of this study suggest that dealing with on-site material may not be the most difficult aspect of DVI professionals' jobs. Rather, negotiating with people and personalities can be the most difficult aspect of their jobs under those conditions on a daily basis. The study unveils that working in the aftermath of disasters on foreign soil is similar to working in any other workplace; sometimes co-workers get along with others, and sometimes they do not. This appears to be because most of the time, co-workers are in close quarters and because the nature of the job is demanding, and therefore interpersonal issues can readily rise to the surface.

Also, this study shows different forms and manifestations of personal challenges. A wide range of challenges exists and this presents difficulties in making an effective system of prevention. Each professional may react differently to the same aspects of the DVI process. This study demonstrated that the wide variations in time when one would experience the effects of DVI exposure can pose a problem for detailed planning for responding to this

challenge. For example, practitioners who participate in the DVI process may have access to psychological support through their workplaces. However, if they do not experience psychological trauma until years later, when they have left that employment, such supports may be more difficult to access. Some additional aspects were addressed by the participants, such as potential physical consequences of disaster involvement. This was mentioned by only one participant in this research, but along with psychological injury, it raises an important issue that may go unrecognised and undocumented by organisations.

5.2.5 Social and political challenges

Other factors that can impact on DVI processes indirectly include political factors and financial constraints. These issues have received some attention in previous research. For example, Lain et al. (2003) addressed the issue of finance and shared that the costs associated with DNA analysis initially represented a barrier. James (2005) also supported idea that finance is an important element of the DVI process. It can impact the whole process including the length of time taken for identifications. Regarding political factors, Walch (2014) addressed this issue by challenging the state's capacity to deal with disasters. Aguirre and Quarantelli (2008) also included political aspects as important by underlining the way Latino victims' corpses were treated after September 11. Cohen (2009) claimed that Thai authorities were under pressure by foreign governments to identify the bodies of their nationals. In the current study, attention to these political and financial aspects was present, but was not one of the main topics of discussion by participants. Nevertheless, these issues were flagged as important aspects to consider.

This type of challenge is very important because professionals have limited input in influencing the outcomes of these types of issues. These issues are more situational and depend on where disaster occurs and in which moment. This makes it very hard to change and adapt policies in a way to improve this aspect of DVI. One potential solution for

overcoming these challenges is developing strategic plans that outline the most important

expenses to be made and detail resources and equipment that can be provided. By defining

priorities, some level of the working conditions can be assured. However, when it comes to

the political factors, is very hard to find a way to improve these aspects. Professionals have

identified the issue and are finding it difficult to work in a politically unstable environment.

Especially challenging is the pressure applied by politicians to provide identifications as soon

as possible.

5.3   Implications

This research has provided a range of empirical insights into the dynamics of DVI

practices and the lived experiences of DVI practitioners. From a policy and application point

of view, it has identified persistent problems and difficulties associated with the social

contexts, logistics and interpersonal processes pertaining to DVI, and suggested several ways

in which these might be addressed. The research highlights the importance of viewing DVI as

a social process within which expertise and knowledge is mobilised in a manner that is

intrinsically shaped by local circumstance as well as the adequacy of preparation and the

provision of appropriate post-event support.

Prior to the occurrence of any disaster event, each state must examine a number of

logistical issues and have various contingency plans in place. Issues to consider include how

corpses will be gathered, where they will be transported, where the analysis will be

performed, how the remains will be kept, and what equipment will be required. Furthermore,

it is important to consider where call centres and family support centres will be situated,

whether existing call centres can be used, the source of supplies (computers, phones, etc.) for

these facilities, and who will be carrying out the various tasks.

One possible limitation of this study is that some of these disasters occurred a long

time ago so impressions of the event by practitioners may have changed over time. As a

result, after the disaster, it would be helpful to have a process for participants to share their thoughts. To best contribute to potential improvements for practice, recent experiences are best suited; some of these more recent experiences were also included in the present research. The aim of this study was to explore Australian forensic practitioners' experiences and so only practitioners from Australia were included. Furthermore, the original intention was to include forensic anthropologists working as a part of international operations; however, participants with overseas DVI experience were not available prior to the conclusion of the study. Further studies that explore the experiences of anthropologists as well as others who were not included in the present study would help to fill the existing gaps in research and further professional and societal understanding of DVI.

Further studies should focus more on the mechanisms that can be used to reduce the challenges identified. As part of that, it is very important to address the issues related to the working environment and to further research how Interpol forms could be simplified. Regarding personal challenges, research should focus on determining what practices may help reduce stress and prevent PSTD after the disaster is over. Research on challenges should also be undertaken from the perspectives of forensic practitioners internationally, allowing for comparisons of challenges and the success of practices that assisted in overcoming these challenges. Different management systems and organisation within different international teams should be compared and the results would help in distinguishing more effective practices.

5.4 Conclusion

This thesis aimed to address questions about the challenges faced by Australian forensic practitioners in overseas DVI operations. Using data from interviews, it confirmed the challenges reported in previous literature and identified some further issues that have not previously been explored in depth. The findings of the thesis suggest that the main types of

challenges that are prominent to forensic practitioners are associated with their working

conditions. The thesis contributes to a better understanding of these issues that were

experienced by a range of forensic practitioners across a range of disasters. It adds important

insights that can be used to further develop preparation of practitioners before their

participation in DVI and will provide insights valuable in supporting practitioners after their

deployment.

References

Agee, J. (2008). Developing qualitative research questions: A reflective process. *Journal International Journal of Qualitative Studies in Education*, 4 (22), 431-447.

Agency For International Development. Office Of U.S. Foreign Disaster Assistance. (2004). Thirty years of natural disasters 1974-2003: The numbers. University Of Louvain Presses.

Adam, W. (2015). Conducting semi-structured interviews, In K.E. Newcomer, H.P. Hatry, & J. S. Wholey (eds), *Handbook of practical program evaluation* (4th ed.) Hoboken, New Jersey. Jossey-Bass, A Wiley Imprint, 492-505.

Alhojailan, M.I. (2012). Thematic analysis: A critical review of its process and evaluation, *West East Journal of Social Science*, 1 (1), 39-47.

AlQahtani S., Adserias-Garriga J. (2019) Ethical Considerations of the Management of the Dead in the Middle East. In: Squires K., Errickson D., Márquez-Grant N. (eds) *Ethical Approaches to Human Remains*. Springer, Cham.

Aguirre, B.E. & Quarantelli, E.L. (2008). Phenomenology of dead counts in disasters: The invisible dead in the 9/11 WTC Attack. *International Journal of Mass Emergences and Disasters*, 26 (1), 19-39.

Agorastos, A., Demiralay, C., Huber, G.C. (2014). Influence of religious aspects and personal beliefs on psychological behavior: Focus on anxiety disorders. *Psychology Research and Behavior Management*, 7, 93-101.

Alexander, D. A., & Klein, S. (2009). First responders after disasters: A review of stress

      reactions, at-risk, vulnerability, and resilience factors. *Prehospital and Disaster*

      Medicine, 24 (2), 87–94.

Al- Dawoody, A. (2017). Management of dead from the Islamic law and international

      humanitarian law perspectives: Considerations for humanitarian forensic.

      International Review of Red Cross, 99 (2), 759–784.

Arora, R. & Arora, P. (eds). (2013). *Disaster management: Medical preparedness and*

      homeland security. CAB International. Cabi.

Ambers, A. et al. (2018). Improved y-str typing for disaster victim identification, missing

      persons investigations, and historical human skeletal remains. *International*

      Journal of Legal Medicine, 132 (6), 1545-1553.

Bartholdson, S., & von Schreeb, J. (2018). Natural Disasters and Injuries: What Does a

      Surgeon Need to Know? *Current Trauma Reports*, 4 (2), 103–108.

Barriball, L.K. (1994). Collecting data using a semi-structured interview: a discussion paper,

      Journal of advanced nursing, 19, 28-335. Bennett, C. (2014). Who knows who we

      are? Questioning DVI analysis in disaster victim identification, *New Genetics and*

      Society, 33 (3), 239–256.

Beauthier, J – P., et al. (2009). Mass disaster victim identification: The tsunami experience.

      The Open Forensic Science Journal, 2, 54–62.

Blau, S. et al. (2008). Disaster victim identification: New applications for post-mortem

      Computed Tomography. *Journal of Forensic Science*, 53 (4), 956-961.

Boer, H. H., George, J. R., Maat, D., Putut, A. K., Widodo, A., Kloosterman, D., & Kal, A. J.

    (2018). DNA identification of human remains in disaster victim identification

    (DVI): An efficient sampling method for muscle, bone, bone marrow and teeth.

    Forensic Science International, 289, 253-259.

Boss, P. (2002), Ambiguous loss in families of missing. *The Lancet – Supplement.* 360, 39–

    40.

Caenazzo, L., Tozzo, P., & Rodriguez, D. (2013). Ethical issues in DNA identification of

    human biological material from mass disasters, *Pre-hospital and Disaster*

    Medicine, 4, 393–396.

Carr, L. J. (1932). Disaster and the sequence-pattern concept of social change. American

    Journal of Sociology, 38, 207-218.

Cetin, M., Kose, S. Ebrinc, S., Yigrit, S., Sethai, J.D. & Basoglu, C. (2005). Identification

    and posttraumatic stress disorder symptoms in rescue workers in the Marmara,

    Turkey, earthquake. *Journal of Traumatic Stress*, 18 (5), 485–489.

Cianflone, M., Cull, J., Fisher, J., Holt, D., Krause, A., Moore, J., ... & Yancey, J. (2007).

    Anatomy of a Terrorist Attack: An In-Depth Investigation into the 2002 Bali,

    Indonesia, Bombings. *Ridgway Center Student Papers*. 14. Matthew B Ridgway

    Center for International Security Studies.

Cordner, S. & Binz – Tidball, M. (2017). Humanitarian forensic action – its origins and

    future. *Forensic Science International*, 279, 65-71.

Cordner, S. & Ellingham S.T.D. (2017). Two halves make whole: Both first responders and

    experts are needed for the management and identification of the dead in large

    disasters. *Forensic Science International*, 279, 60–64.

Cohen, E. (2009). Death in paradise: tourist fatalities in the tsunami disaster in Thailand. *Current Issues in Tourism*, 12 (2), 183–199.

Cosmo, S. & Barbera, A.J. (2012). Rapid disaster victim identification in mass fatality incidents: Decision-support tool to facilitate human remains identification. *Disaster Medicine and Public Health Preparedness,* 6 (3), 277-290.

Charvériat, C. (20110). *Natural disasters in Latin America and the Caribbean: An overview of Risk*. IDB Publications (Working Papers) 1804, Inter-American Development Bank.

Danvers, K., Sivayokan, S., Somasudaram, D.J. & Sivashankar, R. (2006). Ten months on qualitative assessment of psychological issues in Northern Sri Lanka following the tsunami. *International Psychiatry*, 3 (3), 5–8.

De Boer, H. et al. (2019). The role of forensic anthropology in disaster victim identification (DVI): recent developments and future prospects, *Forensic Science Research*, 4 (4), 303-315.

Dobashi, K., Nagamine, M., Shigemura, J., Tsunoda, T., Shimizu, K., Yoshino, A., & Nomura, S. (2014). Psychological effects of disaster relief activities on Japan ground self-defense force personnel following the 2011 Great East Japan Earthquake. *Psychiatry: Interpersonal and Biological Processes*, 77 (2), 190–198.

Dyregrov, A., Kristoffersen, J. I., & Gjestad, R. (1996). Voluntary and professional disaster-workers: Similarities and differences in reactions. *Journal of Traumatic Stress,* 9 (3), 541–555.

Denzin, K.N. & Lincoln, S.Y. (2003). *Collecting and interpreting qualitative materials*, Sage Publications, London.

DeSantis, L. & Ugarriza, Doris. (2000). The concept of theme as used in qualitative nursing research. *Western journal of nursing research*. 22, 351-72.

Gatrad, R.A. (1994). Muslim customs surrounding death, bereavement, post-mortem examination and organ transplant s. *BMJ*, 209 (6953), 521–523.

Garbern, S. C., Ebbeling, L. G., & Bartels, S. A. (2016). A systematic review of health outcomes among disaster and humanitarian responders. *Prehospital and Disaster Medicine*, 31 (6), 635–642.

Glaysher, E., Vallis, J., & Reeves, P. (2016). Post-traumatic stress disorder and the forensic radiographer. *Radiography*, 22 (3), 212–215.

Griffths, C. et al. (2003). Aspects of forensic responses to the Bali bombing. *ADF Health*, 4, 50–55.

Goodman, N.R., Goodman, J.L. & Hoffman, W.I. (2011). Autopsy: Traditional Jewish laws and customs "Halacha". *The American Journal of Forensic Medicine and Pathology*, 32 (3), 300–303.

Gill, P., Stewart, K., Treasure, E., & Chadwick, B. (2008). Methods of data collection in qualitative research: interviews and focus groups. *British Dental Journal*, 204 (6), 291–295.

Given, M.L. (2008). *The Sage encyclopaedia of qualitative research methods*. London: Sage.

Ha, M.K. (2015). The Role of religious beliefs and institutions in disaster management: A case study. *Religious*, 6, 1314–1329.

Hofmeister, U. & Navarro, S. (2017). A psychological approach in humanitarian forensic action: The Latin American perspective. *Forensic Science International*, 280, 35–43.

Holmgaard, B.S. (2019). The role of religion in local perceptions of disasters: The case study of post-tsunami religious and social change in Samoa, *Environmental Hazards*, 18 (4). 311–325.

Hammarerg, K. et al. (2016). Qualitative research methods: When to use them and how to judge them. *Human Reproduction*, 31 (3), 498-501.

Harding, S. (2007). Man-made disasters and development. *International Social Work*, 295–306.

Fagen, P., (2008). *Natural disasters in Latin America and the Caribbean: national, regional and international interactions: A regional case study on the role of the affected state in humanitarian action*. London: HPG Working Paper.

Furin, A. M. (2018). Disaster planning: Introduction: The scope and nature of the problem, categorizing disasters, definitions and terminology. (2019). *EMedicine.* https://emedicine.medscape.com/article/765495-overview

Ibrahim, N., Abdullah, H., & Roslan, H. (2018). Relationship between civil and military in disaster response and recoveries. *International Journal of Academic Research in Business and Social Sciences*, 8 (6), 1216-1223.

ICRC (2006). Management of Dead Bodies after Disasters: A Field Manual for First Responders, Available at:

https://www.icrc.org/en/doc/assets/files/other/icrc_002_0880.pdf .

Iino, M. & Aoki, Y. (2016). The use of radiology in the Japanese tsunami DVI process. *Journal of Forensic Radiology and Imaging*, 4, 20–26.

Interpol (2018). INTERPOL Disaster Victim Identification Guide. Available at: file:///C:/Users/PC/Downloads/18Y1344%20E%20DVI_Guide.pdf

James, H. (ed.) (2005). Thai Tsunami Victim Identification – Overview. *The Journal of Forensic Odonto–Stomatology*, 23 (1), 1-18.

Jones, R. D. (1985). Secondary disaster victims: the emotional effects of recovering and identifying human remains. *American Journal of Psychiatry*, 142 (3), 303–307.

Jamshed, S. (2014). Qualitative research method-interviewing and observation. *Journal of Basic and Clinical Pharmac*y, 5 (4), 87-88.

King, N. (2004). Using Templates in Thematic analysis of text. In: C. Cassell & G. Symon (Ed.). *Essential Guide to Qualitative methods in organizational research*. SAGE Publications Ltd, Los Angeles, 256-270.

King, N., Horrock, C. & Brooks, J. (2019). *Interviews in qualitative research* (2nd ed.). Sage, London.

Knoppers, B. M., Saginur, M., & Cash, H. (2006). Ethical issues in secondary uses of human biological materials from mass disasters. *The Journal of Law, Medicine & Ethics*, 34 (2), 352–365.

Khoo, L. S., Lai, P. S., Saidin, M. H., Noor, Z., & Mahmood, M. S. (2018). Reprint of: Cling film plastic wrap: An innovation for dead body packaging, preservation and transportation by first responders as a replacement for cadaver body bag in large scale disasters. *Forensic Science International*, 288, 242–255.

Lau et al. (2005). After the Indian Ocean Tsunami: Singapore's contribution to the international disaster victim identification effort in Thailand. *Annals Academy of Medicine*, 34 (5), 342–351.

Lain. R et al. (2003). Forensic dental and medical response to the Bali bombing. *MJA*, 179, 361-365.

Landesman, L. & Public Health Association, American. (2019). *Public health management of disasters: the practice guide*. American Public Health Association.

Levison, J. & Domb, J.A. (2014). Religion and Disaster Victim Identification. *Medicine and Law*, 33, 55-60.

Khorram - Manesh, A. (ed.), (2017). *Handbook of disaster and emergency management*. Institute of Clinical Science, University of Gothenburg, Sweden.

Morgan, D. & Spanish, M. (1984). Focus groups: A New tool for qualitative research, *Qualitative Sociology*, 7, 253–270.

Morner, A. N. (2010). Natural, man-made and imagined disaster. *Disaster Advances*, 3 (2), 3-5.

Mundorff, A. Z., (2011). Integrating forensic anthropology into disaster victim identification., *Forensic Science, Medicine and Pathology*, 8 (2), 131–139.

Makinae, H., Numata, N., Kitaoka, H., Daimon, M., Yamamoto, T., & Amano, A. (2013). Use of pacemaker programmers for disaster victim identification. *Forensic Science, Medicine, and Pathology*, 9 (4), 551–553.

Merli, C., & Buck, T. (2015). Forensic identification and identity politics in 2004 post-tsunami Thailand: Negotiating dissolving boundaries. *Human Remains and Violence: An Interdisciplinary Journal*, 1 (1), 3–22.

Morgan, O. W. et al. (2006). Mass Fatality Management following the South Asian Tsunami Disaster: Case Studies in Thailand, Indonesia, and Sri Lanka. *PLoS Medicine*, 3 (6), 195.

Nagamine, M., Shigemura, J., Fujiwara, T., Waki, F., Tanichi, M., Saito, T., Toda, H., Yoshino, A., & Shimizu, K. (2018). The relationship between dispositional empathy, psychological distress, and posttraumatic stress responses among Japanese uniformed disaster workers: a cross-sectional study. *BMC Psychiatry*, 18 (1), 328.

Nepal, V., Banerjee, D., Perry, M., Scott, D. (2012). Disaster preparedness of linguistically isolated populations: practical issues for planners. *Health Promotion Practice*, 13 (2), 265-271.

Oloruntoba, R., Sridharan, R., & Davison, G. (2018). A proposed framework of key activities and processes in the preparedness and recovery phases of disaster management. *Disasters*, 42 (3), 541-570.

Ormston, R., McNaughton Nicholls, C., Lewis, J., Ritchie, J. (eds) (2003). *Qualitative research practice: a guide for social science students and researchers* (2nd ed.). Sage, National Centre for Social Research, London.

O'Brien, S. Federici, F., Cadwell, P., Marlowe, J., & Gerber, B. (2018). Language translation during disaster: A comparative analysis of five national approaches. *International Journal of Disaster Risk Reduction*, 31, 627-631.

Othman, R. Nath, N., & Laswad, F. (2013). Sustainability reporting by New Zealand's local governments. *Australian Accounting Review*, 27 (3), 315-328.

Patton, M. Q. (2002). Two decades of developments in qualitative inquiry: A personal, experiential perspective. *Qualitative social work*, 1 (3), 261-283.

Parker et al. (2013). Incidental Findings in the Use of DNA to Identify Human Remains: An Ethical Assessment. *Forensic Science International Genetics*, 7 (2), 221-229.

Petju, M., Suteerayongprasert, A., Thongpud, R., & Hassiri, K. (2007). Importance of dental records for victim identification following the Indian Ocean tsunami disaster in Thailand. *Public Health*, 121 (4), 251–257.

Perera, C. & Briggs, C. (2008). Guidelines for the effective conduct of mass burials following mass disaster: post – Asian Tsunami disaster experience in retrospect. *Forensic Science, Medicine and Pathology*, 4, 1–8.

Persaud, R. & Fuham, A. (2017). Coping with not knowing, what happen to missing loved one, *Psychological Today*, Retrieved from: https://www.psychologytoday.com/intl/blog/slightly-blighty/201706/coping-not-knowing-what-happened-missing-loved-one.

Philips, D.B. (2014). *Qualitative disaster research*, Oxford.

Powell, A.R. & Single, M.H. (1996). Methodology matters, *International Journal of Quality in Health Care*, 8 (5), 499-504.

Perry, W. R. (2017). Defining disaster: An evolving concept. in: H. Rodriguez, E. Quarantelli, R. Dynes (Ed.) *Handbook of Disaster Research,* Springer: Switzerland (2nd edition), 3–22.

Rossman, B.G. & Rallis, F.S. (2012). *Learning in the field: An introduction to qualitative research*. Sage, London.

Robins, S. (2010). Ambiguous loss in a non – western context: Families of the disappeared in post- conflict Nepal, *Family Relations*, 59, 253–268.

Robins, S. (2012). Constructing meaning from disappearance local memorialization of the missing in Nepal. *International Journal of Conflict and Violence*, 8 (1), 104–118.

Royds. D. et al. (2004). A case study in forensic chemistry: The Bali bombings. *Talanta,* 67, 262–268.

Rogl, R. (2017). Chapter 12. Language-related disaster relief in Haiti: Volunteer translator networks and language technologies in disaster aid. In: R.. Antonini, L. Cirillo, L. Rossato, I. Torresi, I.(eds.), *Non-Professional Interpreting and Translation,* John Benjamins: e Publishing, 231–255.

Rutty, G.N., Biggs, M.J.P., Brough, A. et al. Remote post-mortem radiology reporting in disaster victim identification: experience gained in the 2017 Grenfell Tower disaster. *International Journal of Legal Medicine*, 134, 637–643 (2020). https://doi.org/10.1007/s00414-019-02109-x

Quatrehomme, G., Toupenay, S., Delabarde, T, Padovani, B. & Alunni, V. (2019). Forensic answer to the 14th of July 2016 terrorist attack in Nice. *International Journal of Legal Medicine*, 133, 277 – 287.

Quevillon, R. P., et al. (2016). Helping the helpers: assisting staff and +volunteer workers before, during, and after disaster relief operations. *Journal of Clinical Psychology*, 72 (12), 1348–1363.

Savage, J. (2000). One voice, different issues raised by dual analysis of a segment of qualitative data, *Journal of Advanced Nursing*, 31 (6), 1493–1500.

Sapir, D. G. (1993). Health effects of earthquakes and volcanoes: Epidemiological and policy issues. *Disasters*, 17(3), 255–262.

Shigemura, J., Nagamine, M., Harada, N., Dobashi, K., Yoshiga, M., Esaki, N., Tanaka, M., Tanichi, M., Yoshino, A., & Shimizu, K. (2018). The effects of living environment on disaster workers: A one-year longitudinal study. *BMC Psychiatry*, 16 (1), 358.

Sakuma, A., et al. (2015). Post-traumatic stress disorder and depression prevalence and associated risk factors among local disaster relief and reconstruction workers fourteen months after the Great East Japan Earthquake: a cross-sectional study. *BMC Psychiatry*, 15 (1), 358.

Schou, P.M. & Knudsen, T.J.P. (2011). The Danish victim identification effort in the Thai Tsunami: organization and rules. *Forensic Science*, *Medicine and Pathology*, 8 (2), 125–130.

Scanlon, J. T. (1988). Disaster's little known pioneer: Canada's Samuel Henry Prince. *International Journal of Mass Emergencies and Disasters*, 6 (3), 213-232.

Scanlon, J. (2008). Identifying the Tsunami Dead in Thailand and Sri Lanka: Multi – National Emergent Organization. *International Journal of Mass Emergences and Disasters,* 26 (1), 1-18.

Scully, L.J. & Williams, R. (2015). Approaching disaster victim identification. *New Genetics and Society*, 33 (3), 233–238.

Stadler, N. (2006). Terror, corpse symbolism and taboo violation: 'The Haredi Disaster Victim Identification Team in Israel' (Zaka). *Journal of the Royal Anthropological Institute (N.S.),* 12, 837–858.

Solomon, Z., & Berger, R. (2005). Coping with the Aftermath of Terror-Resilience of ZAKA Body Handlers. Journal of Aggression, *Maltreatment & Trauma*, 10 (1-2), 593–604.

Taylor, J.S. et al. (2009). *Introduction to qualitative research methods: A handbook and resource*, 4th edition, Wiley.

Trengrove, H. (2011). Operation earthquake 2011: Christchurch earthquake disaster victim identification. *The Journal of Forensic Odonto-Stomatology*, 29 (2), 1–7.

Thompson, J., & Solomon, M. (1991). Body recovery teams at disasters: Trauma or challenge? *Anxiety Research*, 4 (3), 235–244.

Tsokos, M., Lessig, R., Grundmann, C., Benthaus, S., & Peschel, O. (2005). Experiences in tsunami victim identification. *International Journal of Legal Medicine*, 120(3), 185–187.

Tucker, P., et al. (2002). Body handlers after terrorism in Oklahoma City: Predictors of posttraumatic stress and other symptoms. *American Journal of Orthopsychiatry*, 72 (4), 469–475.

UN Office for Disaster Risk Reduction. (2009), What is disaster risk reduction? Retrieved from https://www.unisdr.org/who-we-are/what-is-drr

UN Office for Disaster Risk Reduction. (2015). Words into Action Guidelines. Implementation guide for man-made and technological hazards, UNISDR, Geneva. Retrieved from https://www.unisdr.org/files/54012_manmadetechhazards.pdf

Van Mannen, J. (1983). *Qualitative methodology*. Sage, London.

Walch, C. (2014). Collaboration or obstruction? Rebel group behaviour during natural disaster relief in the Philippines. *Political Geography*, 43, 40 – 50.

Watts, J. (2002). Kuta Bali bombing offers lessons for disaster relief. *The Lancet*, 360 (9343), 1401.

Wayland, S., Maple, M., McKay, K., & Glassock, G. (2015). Holding on to hope: A review of the literature exploring missing persons, hope and ambiguous loss. *Death Studies*, 40(1), 54–60.

Wright, K., Mundorff, A., Chaseling, J., Maguire, C., & Crane, D. I. (2018). Identifying child victims of the South-East Asia Tsunami in Thailand. *Disaster Prevention and Management: An International Journal*, 27 (4), 447–455.

Winskog, C., Tonkin, A. & Byard, W.R. (2012). The educational value of disaster victim identification (DVI) mission – transfer of knowledge. *Forensic Science, Medicine and Pathology,* 8, 8487.

Winskog, C., Tsokos, M., & Byard, R. W., (2012). The progression from disaster victim identification (DVI) to disaster victim management (DVM): A necessary education. *Forensic Science, Medicine and Pathology*, 8 (2), 81–83.

Witharaarachchi, S. (2011). Participatory development approach in local governance - its

   relevance for economic development: a case study of Sri Lanka. *Federal*

   Governance, 8. 50-68.

Yamamura, H., Kaneda, K., & Mizobata, Y. (2014). Communication Problems After the

   Great East Japan Earthquake of 2011. *Disaster Medicine and Public Health*

   Preparedness, 8 (4), 293–296.

Zawawi, D. Qualitative versus qualitative methods in social science: bridging the gap.

   Available at: https://core.ac.uk/download/pdf/42988233.pdf (accessed:

   15.10.2020).

Zerach, G., & Levin, Y. (2018). Posttraumatic stress symptoms, burn-out, and compassion

   satisfaction among body handlers: The mediating role of sense of coherence and

   spirituality at workplace. *Journal of Interpersonal Violence*, 33 (12), 1931-1957.

Zibulewsky J. (2001). Defining disaster: the emergency department perspective. *Proceedings*

   (Baylor University. Medical Center), 14 (2), 144–149.

Zietkiewicz, E., Witt, M., Daca, P., Zebracka-Gala, J., Goniewicz, M., Jarzab, B. & Witt, M.

   (2011). Current genetic methodologies in the identification of disaster victims and

   in forensic analysis. *Journal of Applied Genetics,* 53 (1), 41–60.