Doctorate in Clinical Psychology | Lancaster University

Submitted in partial fulfilment of the Lancaster University Doctorate in Clinical Psychology

Doctoral Thesis

The moral distress and posttraumatic growth of the ambulance workforce: A systematic review and meta-synthesis

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2017 intake

May 2023

Word Count

Section	Main Text	Appendices inc. key words, abstract, tables, figures, and references	Total
Thesis abstract	300	0	300
Chapter One, systematic review and meta synthesis	7,975	14,950	22,925
Chapter Two, systematic review	7,997	9,924	17,921
Chapter Three, critical appraisal	3,993	4,418	8,411
Ethics section	3,862	0	3,862
Total	**24,127**	**29,292**	**53,419**

Thesis Abstract

Ambulance personnel (AP) face repeated traumatic events that may affect their wellbeing. This thesis concerns resultant moral distress and post-traumatic growth. Chapter One reports a systematic review and meta-synthesis exploring moral distress (MD) for APs. MD is the psychological distress experienced due to a moral event involving a moral decision that may challenge, threaten, or violate one's core beliefs and integrity. Systematic searches screened 8,264 unique records against *a priori* eligibility criteria. Nineteen papers were selected, comprising 689 participants across nine countries. MD was often experienced as frustration, guilt, fear, helplessness, and shame and varied in its onset, duration, and intensity. MD arose from differences between APs expectations of themselves, their role, and their performance and the actualities of the day-to-day role. Other sources were the nature of the emergency call and patient presentations and being constrained from taking the morally correct course of action. Implications for prevention and interventions are explored.

Chapter Two was a quantitative systematic literature review of positive changes APs experience following exposure to traumatic events (posttraumatic growth, PTG) and how coping may be related to this. A systematic search against *a priori* eligibility criteria identified five papers for inclusion out of 952 unique records. PTG was a common occurrence, but the majority of studies finding low levels of PTG. Coping was consistently related to and significantly predictive of PTG, as well as mediating the effects of personality and resilience. There was also evidence that the effects of coping may be moderated by factors such as self-efficacy/affectivity.

Chapter Three describes the intended thesis and how this was not feasible due to COVID-19 and personal circumstances. A critical reflection on how biases were mitigated

due to author's personal experiences of topics covered, the structural impacts of MD, and the conceptual links between MD and PTG.

Declaration

This thesis documents research undertaken in partial fulfilment of the Doctorate in Clinical Psychology at the Division for Health Research, Lancaster University. The work presented here is the author's own, except where references are made. The work has not been submitted for the award of a higher degree elsewhere.

Name: Suzanne Berry

Date: 31st May 2023

Acknowledgements

I would like to thank the Lancaster DClinPsy staff who have been there amidst all the ups and downs, encouraging me to the finish line. I would also like to thank my friends, family, and especially my partner who have stood by me at every stage of this journey. Their continued love and support have lifted me up and kept me going me in the midst of physical health issues, having children, moving across the country, and a global pandemic. Thank you.

Contents

Section 1: Systematic review and meta-synthesis

What is the current understanding of moral distress for ambulance personnel working in pre-hospital emergency medical services? A meta-synthesis and review.

Word count (excluding references, tables, and appendices): 7,975

Abstract: 300 words

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May 2023

Target Journal: *The Emergency Medicine Journal*[a]

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[a] See Appendix 1-A for author guidelines and Appendix 1-B for additional information to meet journal requirements for publication.

1.1 ABSTRACT

Background Moral distress (MD) is the psychological distress experienced due to an event that challenges, threatens, or violates a person's values and core beliefs. MD has been well researched for staff groups such as nurses, but ambulance personnel (APs) working in pre-hospital emergency medical services have been over-looked. Therefore, this review aimed to collate and synthesise the current knowledge on MD as experienced by APs.

Methods Embase, PsycINFO, MEDLINE, CINAHL, Cochrane Library, Scopus, and PTSDpubs were searched from their inception to 14/05/22 and extensive citation tracking completed. Primary research was retained exploring MD in solely APs; humanitarian, amalgamated populations, and papers that did not feature original analyses were excluded. The Quality Assessment for Diverse Studies was applied, and data extracted and analysed to form a meta-synthesis exploring the sources, expressions, and parameters of MD.

Results A total of 8,264 unique papers were identified and 19 selected for review; encompassing 689 participants, aged 19-65-years-old, from Iran, Israel, New Zealand, Australia, Sweden, Norway, UK, Canada, and the USA. MD varied in onset, intensity and duration; most commonly described as frustration, guilt, fear, helplessness, and shame. Thematic synthesis revealed MD emanated from unmet expectations APs held of themselves, their performance, and the type of work they encountered. Additional sources included the nature of the emergency attended, patient presentations, and constraints stopping APs from taking the morally correct course of action.

Conclusion The present review mobilised existent data to provide unique insights into the sources of MD and lived experience of this phenomena for APs. The findings indicate that a broad conceptualisation of MD for APs is beneficial to facilitate developments in support and

research. However, understanding is still within its infancy and the literature base would benefit from realist research exploring the aetiology, nature, outcomes and treatment of MD by APs.

1.2 KEY WORDS

Paramedic, Pre-hospital, Moral Distress, Moral Injury, Ethics, Emergency Medical Services, First Responders, Ambulance.

Work-related mental ill-health and distress are significant challenges for healthcare professionals (HCPs) and service providers[1-3]. A particularly high-risk group for work-related stress are ambulance personnel (APs) such as paramedics, emergency medical technicians, ambulance nurses, and physicians. AP's deliver emergency prehospital medicine using an emergency vehicle[4]. APs can experience long-term detrimental psychological, physical, and social consequences due to their occupation[5,6]. Longstanding occupational difficulties were exacerbated through the rise of new occupational hazards during the SARS-CoV-2 pandemic (COVID-19)[7-10]. For example, APs were one of the most at-risk groups for contracting COVID-19[11,12], were equipped with inadequate personal protective equipment alongside increased workloads[13] and increases in the burden of rapid decision-making[9]. These new occupational hazards have been associated with increased psychological distress, increased acute or post-traumatic stress, and long-term mental health difficulties[8,10]. Further, the pandemic exacerbated existing structural inequalities (i.e. the large scale factors that often result in intersecting disparities in health, social and financial access)[14,15] and systemic injustices (e.g. health inequalities, systemic racism, and socio-economic disparity)[16] and compounded damaging neoliberalist policies within healthcare[17]. The impact for APs on the front lines was an increase in exposure to clinical risk, death, and ethical decision-making[9,13,18]. Consequently, the risk of moral distress (MD) for APs has increased recently and this high-risk professional group require greater understanding and support.

MD is the psychological distress that arises due to a moral event[19], whereby exposure to a situation necessitating judgement either challenges, threatens, or violates a person's personal and/or professional moral integrity[20]. Those experiencing MD have described this as a psychological disequilibrium alongside a negative affect[21] consisting of difficult emotions such as anger, guilt, and shame[22-25]. Some authors have posited that MD occurs on a continuum of frequency and severity, with MD occurring more frequently and less severely

than its counterpart moral injury (MI)[26-29]. MI is experienced as a deep emotional wound with intense suffering and internal dissonance due to perpetrating, failing to prevent, bearing witness to, or learning about acts that transgress deeply held moral beliefs and expectations[30,31]. MI has also been associated with greater harm and impairment than MD[28,29,32].

Additionally, aetiological differences in the originating moral event may result in different types of MD. For example, moral constraint–distress arises when someone is constrained from taking the morally correct course of action[33,34], whereas moral dilemma-distress arises due to moral values conflicting (e.g., beneficence contrasting autonomy)[35]. Differences in the resultant psychological distress may also result in different facets of MD (e.g., mild compared to intense MD, or transient MD compared to long lasting MD - termed moral residue)[19,35-37]. It should be noted that the understanding of MD, how this relates to other moral constructs such as MI, as well as MDs situation within the wider moral landscape is still in its infancy and remains widely contested[26,38,39]. This is discussed in more detail in Chapter Three. Further description of the different types and facets of MD has been provided in Table 1-1, as well as constructs from the wider moral landscape such as MI.

MD can still have devastating impact on the individual, the patient, and the healthcare industry. MD has been linked with poorer standards of care and increased patient suffering[20,27], toxic work environments[40], and increased intention to and actual resignation from a job or the profession entirely[39,41]. For the individual suffering with MD, they may experience intense and difficult emotions[22-25], crises of faith and identity[42], and increased physical ill-health[40,43]. Whilst MD is not a mental health diagnosis in-of-itself, it has been linked with poorer mental health outcomes (e.g. increased rates and severity of depression, anxiety and post-traumatic stress disorder; PTSD)[28,40,44,45]. Additionally, although there are

similarities in some of the experiences of PTSD/complex PTSD and MD (e.g., intrusive thoughts/memories or emotional dysregulation), these are distinct constructs and each can be experienced without the other[28,45-49]. Significantly, PTSD has a unique aetiology and symptom trajectory in comparison to MD/MI (fear/danger-based compared to shame/guilt-based)[30,50,51] and unique neurobiological bases[52-55]. Furthermore, MI has been highlighted as a possible precursor to the development PTSD[46,55,56]. It should also be noted that MD has been associated with beneficial factors such as increased moral sensitivity[26], increased reflectivity and self-awareness[57], and increased patient advocacy[58]. However, the underlying mechanisms leading to such disparate associations, the causal direction of said relationships, as well as the links with the subtypes and facets of MD are not yet understood.

APs are particularly vulnerable to occupation-related detrimental long-term psychological, physical, and social outcomes, which have only been intensified by the COVID-19 pandemic[59,60]. Furthermore, APs may now be at an increased risk from MD post Covid-19[8,9,18]. Currently, there is limited understanding of MD for APs[24,61], impeding opportunities to implement suitable support. It is therefore necessary and timely to collate the current empirical understanding of MD within this population.

1.3 AIMS

The present review aimed to systematically identify, review, and synthesise existent data specifically in relation to MD within APs working in pre-hospital emergency medical services (PHEMS). Identification of the sources of MD within APs will enable appropriate preventative interventions to be considered by policy makers. Whilst increased awareness of how APs are afflicted by MD may enable suitable support to be identified to enhance positive outcomes for APs, patients and services.

1.4 METHOD

1.4.1 Design

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidance[62] was followed throughout and the search strategy substantiated by a specialist librarian. In order to ensure consistency in terminology and conceptualisation to underpin the accuracy of the search and selection process, a literature review of 41 major reviews, papers, and primary research studies exploring MD, moral injury, or ethical decision making was conducted (Appendix 1-C). The findings of this literature review were synthesised to create Table 1-1, which briefly describes the facets and types of MD as well as related moral constructs.

1.4.2 Eligibility criteria

Papers were selected for inclusion if they (a) explored the concept of MD in (b) the population of APs working in PHEMS. MD was defined as comprising of three core components: (1) psychological distress (2) directly arising from (3) a moral event (an experience that challenges, threatens, or violates a person's personal and/or professional values or identity)[19,20]. Papers were excluded if they covered APs in humanitarian crises, did not feature original analysis (i.e., commentaries, theoretical papers, essays, and reviews), and if results were amalgamated across multiple professional populations. Papers exploring the concept of moral injury were excluded if the Litz et al. [30] or Shay[31] definitions were used. This is because these definitions differ conceptually from MD. However, if a broader conceptualisation or operationalisation of MI that met the MD definition above was used, these were considered for inclusion.

1.4.3 Search and screening

Seven databases (Table 1-2) were searched from inception through to 14/05/2022. Search terms were identified via review of the literature base (Appendix 1-C), discussion with relevant stakeholders (two UK consultant paramedics working in PHEMS), and review of PHEMS in nine countries[b] with existent literature exploring MD[40]. Free-text full and truncated terms (e.g., "moral* distress" OR "stress of conscience") and applicable subject and MeSH headings for each database (e.g., CINAHL: MM "Morals+") were used, with limiters of English language and peer reviewed journal articles. The full search strategy for each database is included within Appendix 1-D. Authors who had prominent publications in the field (e.g., those with at least two papers as primary author) were also contacted for additional recommended papers for inclusion, no new papers were identified.

Duplicates were removed mechanically using EndNote X9.3.3 software after visual confirmation by the author, with remaining duplicates removed manually. Papers were screened against the inclusion and exclusion criteria by title and abstract, and then by full text. Upwards and downward citation tracking was performed for all papers included in the present study, including those transecting the relevant literature but excluded as they did not meet the full criteria. Scopus was used for upwards citation tracking, with PsycInfo used for three papers that were unavailable on Scopus. One paper[63] could not be found on any of the seven databases used within this study and no upwards citation tracking was performed. Primary authors were contacted for further information where necessary.

[b] USA, Italy, Canada, Israel, Australia, Japan, Jordon, Belgium, Sweden

1.4.4 Data extraction

The data to be extracted was decided a priori (Appendix 1-E, Table E-1). The data extraction proforma captured information regarding publication, participants, methodology, MD (e.g., definition used), findings, and any miscellaneous information. The initial proforma was then trialled on three[64-66] of the final studies to be included in this review and amended as necessary in line with the aims of this study (Appendix 1-E, Table E-2). Setting (i.e., country, type of PHEMS) was separated out from other sample information to enable clearer insight of the state of research into MD and APs. The collection of data pertaining to any other findings and conceptual understanding of MD were removed as these were deemed superfluous to the aims of this review. Lastly, "MD related findings" became "Brief overview of MD related findings" to give a better overall summary of MD related findings in each paper. The revised proforma was then trialled on a further three studies[67-69] with no further changes made. All studies used to trial the data extraction tool were chosen at random[c].

1.4.5 Quality assessment

The Quality Assessment for Diverse Studies (QuADS)[70] was used to appraise the methodology, evidence and reporting quality of the studies included herein. The QuADS has demonstrated high reliability and validity[70] and was chosen for its wide applicability. QuADS facilitated the consideration and comparison of studies with a variety of methodologies (qualitative and mixed methodologies) using the same scale. No papers were excluded based on the outcome of the quality assessment, as recommended in the user guide for the QuADS[70]. The ratings were used to consider trends in biases across papers and to weigh the

[c] All papers to be included in the present study were printed off and shuffled, the top three were then trialed. This was repeated for the second trial.

applicability of results as part of the synthesis. A copy of the scoring grid used in the present review can be found in Appendix 1-F.

1.4.6 Analytic approach to qualitative synthesis

To explore the current understanding of MD within APs, a dual approach to meta-synthesis was conducted, which included a critical interpretive synthesis (CIS)[71] of sources of MD, and a content analysis of the expressions of psychological distress consisting of MD. CIS was developed from Noblit and Hare's[72] meta-ethnography and transforms first and second order interpretations into synthetic constructs (i.e., third order interpretations under the lens of MD). CIS adopts a critical approach to the literature base, the process being undertaken, as well as any outcomes generated. The thematic synthesis enabled a rich understanding of the complex narratives and the diversity of peoples' experiences leading to MD, whereas the content analysis better demonstrated the divergent ways APs expressed MD. Additionally, the synthesis herein aligned with the author's critical realist perspective; that the ability to access the objective reality is tentative and biased and understandings will likely be incomplete[73]. Thus, the objective reality that MD does exist within APs may not have been considered by first or second order interpretations and their understanding could be reinterpreted under the lens of MD. It is acknowledged that the present author is not an AP and their own perspectives and beliefs will have biased the selection and understanding of the developed synthetic constructs. See Chapter Three for in-depth discussion of potential biases and their mitigation.

A combined approach through CIS and content analysis was appropriate because it enabled the navigation and collation of information across heterogeneous primary studies and inclusion of existing knowledge reinterpreted through the lens of MD. Furthermore, the dual synthesis of causal events alongside resultant psychological distress enabled increased

transparency around study selection and data extraction. This also facilitated a logical coherent structure herein and a suitable dissemination pathway for results. Moreover, it mediated author bias noted during data extraction through use of the reflexive log. The author experienced a pull to fit data to existent conceptualisations of MD (Table 1-1) and extract data regarding the wider moral landscape[26]. As well as a desire to place greater significance on the psychological distress experienced by APs, despite literature focusing on sources of MD. In consideration of the impact of these pulls, the author reviewed the aims of this review, revisited the data extraction proformas and went through the reflective log. The author felt that submitted to the above biases may lose nuance and population specific data that may be of significance. The dual approach also enabled a systematic approach to data extraction, whilst balancing the authors desires with the focus within the literature.

1.4.6.1 Data extraction and analysis

The process of data extraction is outlined in Figure 1-1. Data was hand-extracted through a process of familiarisation, identification, and then cleaning of data. Only the results and discussion sections of papers were used to ensure solely first and second order interpretations were extracted. Once extracted, data was handled and analysed separately for the content analysis and CIS[71]. Following the framework of CIS, the author conducted coding and then axial coding, explored how these may all relate to each other, with subthemes and eventual themes developed (depicted in Appendix 1-G). For the content analysis, expressions of MD were manually searched for potential commonalities and some expressions merged, e.g. the use of "frustrated/ing/ion". The types and frequencies of expressions were then derived across all included studies, within in each paper, and whether these were first or second order interpretations. Ideally, the analysis would have been a joint effort within a multidisciplinary research team, however, access to additional researchers was outside the scope of the current

review. To encourage a less enmeshed analysis and recognition of biases, one-to-two week breaks between stages of analyses were taken and the reflexive log utilised to review the process and outcome of syntheses[74,75]. It is acknowledged that this process will be inherently biased regardless of the steps taken and full transparency is not possible due to the nature of thematic development.

1.5 RESULTS

1.5.1 Study selection

A total of 9,858 papers were identified through the search strategy, 4,363 papers through the main search and 5,495 through citation tracking. De-duplication revealed 8,264 unique papers that were screened by title and abstract, with 882 of these sought for full text evaluation and 863 not meeting inclusion/exclusion criteria. A total of 19 papers were included in the present review (Figure 1-2 depicts the PRISMA[62] flowchart).

1.5.1.1 Critical appraisal

The QuADS[70] criteria were applied to all 19 of the included studies to assess the methodological quality and subsequent trustworthiness of findings (Table 1-3). The majority of papers appeared to be of good quality with clear aims, robust theoretical underpinnings, and appropriate study designs to address their research questions. However, all of the studies would have benefitted from greater inclusion of stakeholders (i.e. APs, especially those from the organisations explored) in the research process, with nine papers[64,66,76-82] making no mention of this. Furthermore, overall rigour would have significantly improved with greater discussion of recruitment processes, analytical decision processes, as well as more in-depth discussion of the strengths and limitations. The lowest scoring paper[81] was a secondary analysis of themes noted from a different study[83]. As such, Steen, Næss, and Steen[81] provided

little to no information on the sampling, recruitment, data collection, and analysis used. This significantly hampered the ability to fully assess the quality of the paper and resulted in a low score. When incorporating the information from the original study[83], the adjusted QuADS score was substantially higher at 30. Adjusted scores are reported in brackets alongside the original scores in Table 1-3. No paper showed evidence of substantial bias that would render results untrustworthy, and none were excluded based on the critical appraisal.

1.5.2 Study characteristics

Characteristics of the included 19 studies are presented in Table 1-4. The papers were published between 1996 and 2022, with the majority being published in the last decade (*n*=14). Eighteen of the 19 included papers were qualitative in nature using interviews (*n*=13)[64-67,69,76,78,79,81,82,84-86], a combination of interviews and focus groups (*n*=4)[77,80,87,88], a modified Delphi technique (*n*=1)[68], with the final paper being sequential mixed methods to devise a questionnaire of MD (*n*=1)[89]. There was a dearth of research exploring MD in APs, with the majority of second order interpretations focusing on the sources of MD. Significantly, Jafari, Ebadi, Khankeh, Maddah & Hosseini[89] have developed the first measure of moral constraint-distress in APs. It should be noted that this was intended to cater for socially and culturally specific facets of APs working in Iran. Its validity in other populations has not yet been assessed and should be used with caution.

1.5.3 Sample characteristics

A total of 689 participants from nine countries (Iran, Israel, New Zealand, Australia, Sweden, Norway, UK, Canada, and the USA) were included in this review, with an age range of 19-64. Participants had a wide range of experience working as an AP from less than one year through to 45 years. As well as a variety of job titles and roles working in PHEMS.

1.5.4 Synthesis

1.5.4.1 What can lead to moral distress? A critical interpretative synthesis

Six themes were derived of underlying moral conditions, external constraints, how APs saw themselves, expectations of their on the scene performance, the type of work the expect to face, and specific situations and presentations. These themes encompassed 19 subthemes that described various situations and circumstances that led APs to experience MD. Table 1-5 provides illustrative quotes and Table 1-6 details the distribution of themes and subthemes across the included studies.

Theme one: Underlying moral conditions - "the ethical gray zone"[82]

Some sources of MD appeared to be derived from certain *underlying moral conditions* (*n*=7)[65,76,77,82,84,85,87], regardless of the exact nature of the situation itself. These conditions were experiencing conflicts between moral values (*moral conflicts*)[65,77,82,84,85,87], *moral dilemmas*[65,82], when someone took the morally 'correct' action, but due to external uncontrollable factors the result was still the morally undesirable outcome (*moral bad luck*)[77], as well as *uncertainty* over which was the right course of action to take[76,82].

Theme two: How APs saw themselves - "failed to be someone you wanted to be"[79]

In 13 of the included studies, MD stemmed from not living up to expectations in how they saw themselves as practitioners, this could be from mere suggestion through having an expectation shattered completely. Four areas of expectations were identified: *APs self-image* (*n*=7)[65-67,79,80,84,85], *actions of self and/or others* (*n*=5)[64,65,80,82,89], *psychological states* (*n*=6)[65,67,76,79,84,85], and *professional skills and attributes* (*n*=5)[65,68,84,88,89]. The subtheme *APs self-image* encapsulated the inability to live up to a more generalised image of an ideal practitioner. Whereas the three other subthemes delineated failure to meet expectations

regarding specific aspects of the ideal practitioner. The ideal *psychological state* of APs mostly comprised of expecting to feel in control of a situation[84,85] and to not feel emotionally vulnerable or sensitive[67,84], overwhelmed[79], or powerless[65,84]. The ideal *professional skills and attributes* of an AP comprised of being: knowledgeable and competent[65,89], autonomous[65], truthful[65,89], and having a good level of clinical ability[88]. Alongside being able to uphold confidentiality[65,89], function immediately[84], hold a holistic perspective[76], and to respect patient autonomy[68]. Lastly, the *actions of themselves and/or others* (i.e., colleagues) pertained to not acting how they felt an AP should. For example, witnessing immoral actions of colleagues[80], not stopping said immoral acts[65,80,89], through to taking part themselves[64,65,82,89].

Theme three: On the scene performance – "I should have been better than that... My mistake almost cost this guy his life"[78]

APs held overall hopes and expectations of how they would respond to a call and the subsequent patient outcome, failure to live up to this could lead to MD for some APs. This theme was found in 15 of the 19 papers, and comprised of five subthemes: *beneficence* (*n*=7)[67,76,77,79,80,84,85]*, inadequate care* (*n*=14)[65-67,76-81,84-86,88,89]*, poor patient outcome* (*n*=7)[65,66,77-79,84,85]*, nonmaleficence* (*n*=6)[65,78,79,85,87,89]*, and harming patients* (*n*=4)[65,66,80,89]. *Beneficence* comprised MD arising from the unmet hopes of some APs to "assist" (p202)[84], "benefit" (p201)[84], "be needed" (p48)[85], and most of all to "help" (p217)[79] patients. APs unmet expectations over the level of care they provided led to MD, with *inadequate care* also including missed opportunities[66,67,76,77] and not doing enough[78,79,85]. *Poor patient outcome* (e.g. death of patient[66,77,79,85], poor prognosis[65,78,84], severe and/or unexpected or an avoidable outcome[84]) also elicited MD, regardless of surrounding circumstances. Six papers[65,78,79,85,87,89] highlighted that MD arose when APs made decisions that contravened the principle of

nonmaleficence and they felt (rightly or wrongly) at fault for perceived or actual poor patient outcomes. This could be due to self-described deficiency[78,85], deviation from protocols[65,89], errors[78,87], misdiagnoses[78] or the wrong decisions[79].

Three papers[65,66,89] highlighted MD arose in circumstances where perceived or real harm was caused to patients, termed *harming patients*. Charlton, Franklin, and McNaughton[66] found APs experienced MD when they unwittingly denied or withheld care through their choice to include a patient in research. As part of a double blind randomised control trial to explore the efficacy of epinephrin in treating cardiac arrest[90], some patients received a placebo rather than the treatment as usual (epinephrin). Some APs felt responsible, guilty and ashamed about those recruited who subsequently died under their care[66]. One paper described the discrimination between patients in providing emergency services resulting in immoral performance[89], although they did not expand upon this further. Lastly, two papers discussed circumstances that directly caused the patient harm[65,66]. Charlton, Franklin, and McNaughton[66] highlighted how one paramedic "talks frankly about causing patient harm no matter what he does" (p538)[66], in terms of a patient who died after being recruited to a research trial. Jafari, Hosseini, Maddah, Khankeh, and Ebadi[65] noted four occasions MD arose from direct harm to patients:

- inadequate knowledge and experience resulting in "ineffective and even unsafe care provision" (p197),
- where APs "could not prevent or had to ignore low-quality care or malpractice by an incompetent colleague" for example "colleagues prescribed medications that I knew were not safe or beneficial" (p197),

- when the interference of people at the scene meant APs were unable to adhere to protocols, care provision was detrimentally impacted and "thereby inflict harm on patients" (p197),
- issues around ineffective interprofessional communication within the organisation (specifically the lack of trust between the PHEMS physician, dispatch nurse, and APs) disrupting "the process of care provision and result in problems for patients" (p199).

Theme four: The type of work – "see themselves as providers of emergency and high acuity care"[88]

MD could occur when expectations over the type of calls APs attended were unmet or shattered (*n*=10)[65,67,77,79,84-89]. The more general statements regarding the mismatch between the type of work APs expected to do and the day-to-day realities of their jobs were captured in the subtheme *role perception-reality mismatch* (*n*=2)[87,88].The specific mismatch between expecting high acuity work yet attending low acuity calls was captured within the subtheme of *high acuity and emergency care* (*n*=5)[77,79,84,85,88]. High acuity work endeavoured to "save lives" (p204)[84] and "rescue" (p179)[77], with APs often using words such as "urgent" (p5)[86], "emergency" and "critical" (p7)[88] to describe such work. Whereas APs used words such "nonemergency" (p198)[65] and "non-life threatening" (p12)[88] for low acuity calls.

The last subtheme captured the sources of MD arising from calls that were not an immediate danger to life falling under the remit of *Low acuity calls, repeated patients, and unnecessary care* (*n*=6)[65,67,86-89]. MD sources included calls for elderly people who have fallen[88], individuals who had harmed themselves in a non-life threatening way[86], those who had taken an overdose of medication without immediate danger to life (this may occur later on without intervention)[67], nonemergency transfers[65], unnecessary transfers and care provision[65,86-89], and those who repeatedly use the PHEMS[67,86]. This subtheme included work

where APs felt they were taken away from "something more urgent" (p5)[86], sometimes filling a gap in services[67,68,86,88], or completing work often considered best met by or avoidable with early intervention from other services (e.g., mental health services or social care). Although the impact on patient care when attending low acuity calls was not the focus of the included papers, there was no apparent animosity towards patients noted. For calls with transecting needs (i.e. social, mental and physical health) there was recognition this was a systemic issue (see theme six subtheme systemic issues) and patients were more often transferred to hospital[67,86,88], sometimes in the hope they would receive the wider care they needed[86]. For those with greater training and experience working specifically with low acuity calls, fewer patients were transferred[88].

It is significant that one paper[88] found that difference in training and role preparation may affect the likelihood a paramedic may develop MD. Two papers[86,88] also highlighted that greater frequency of these types of calls may be associated with increased likelihood of experiencing MD.

Theme five: Specific situations and presentations

The last theme was comprised of 16 *specific situations* and six *specific patient presentations* which led to MD. This was the most prolific theme mapping across 15 papers altogether (see Table 1-6). *Specific situations* were: broken promises[79], challenges in obtaining consent[65], COVID[76], delay in service delivery[65,67,84,89], Do Not Resuscitate/Medical Orders for Life Saving Treatment unavailable[67], providing futile care[65,69,85,89], giving bad news[85], inappropriate resuscitation[67,69,89], the termination of resuscitation[85], leaving a patient at home[87], recruiting patients to research[66], risk of harm to self[65], unable to support junior colleagues[88], being unable to meet the needs of others on scene[85], situations involving decisions which were time sensitive, complex and difficult to make[82], and double pressure

situations[64]. Double pressure situations are where APs face pressure from above (i.e. organisational and managerial factors such as protocols, organisation values) as well as pressure from below (e.g. paramedical professionalisation, personal values, or direct observation and beliefs from family/people on scene){Nordby, 2011 #1728}. The *specific patient presentations* including young patients[84], those who have used substances/taken an overdose[67], those who have intentionally harmed themselves[86], and those who have fallen- particularly older adults[88]. These situations and presentations were kept independent due the frequency they were mentioned and/or the lack of explanatory information as to why these led to MD for some APs. As such, the author did not want to introduce bias into the results and impose an underlying rationale that may not align with the APs actual experiences.

Theme six: External constraints – "lacked the required skills and equipment to intervene"[84]

MD arose in circumstances where APs were unable to take what they believed to be the right course of action due to external constraints. The constraints were grouped into the four subthemes representing the different levels of systems they arose from: *difficulties with others* (*n*=4)[65,68,85,89]*, issues within the organisation* (*n*=7)[65,76,78,81,84,88,89]*, systemic issues* (*n*=4)[67,76,77,86]*,* and *issues at a societal level* (*n*=2)[77,89]. *Difficulties with others* referred to situations when colleagues, lay people and patient companions constrained an AP from doing their job safely and/or effectively. For example, through the disruption of APs care provision[65], being unable to trust a colleague[65,89], pressure from others to go against the APs judgement[68,85], and difficulties in communication[65,89]. The most prolific external constraints that led to MD were from the PHEMS the APs worked within. Seven papers contained *issues within the organisation* such as a lack of coordination with other dispatched APs[89], limited resources (i.e., a lack of equipment[65,84,89], lack of hospital beds[76], or limited time[81]), and staffing issues (i.e., a lack of staff[89], poor skill mix of colleagues[84,89], insufficiently qualified

colleagues[89], and lack of training or poorly trained colleagues[78,88]). The lack of organisational understanding of the remit of an APs role in the field[81,89] and lack of organisational trust in the level of expertise held by an AP[65,89] were also highlighted as organisational constraints. APs also cited insufficient organisational support in complex and demanding situations as something that constrained them from taking the morally correct course of action[89].

Wider challenges and failures stemming from the overall healthcare systems outside of PHEMS in the USA[76], Canada[67,77] and the UK[86] were encapsulated within the subtheme *systemic issues*. This mostly took the form of not being the right service for a patient alongside other systemic issue[67,86]. For example "dealing with a symptom, not dealing with the issue" (p9)[67], witnessing tragedies due to the failure of protective systems such as the death of a child where an AP believed child services could have intervened to stop the abuse/neglect[77], or more generally noted "failures elsewhere in the health system" (p6)[86]. Lastly, in two of the papers[77,89] APs highlighted that MD arose from *issues at a societal level*. This was discussed generally[89] as well as in more specific circumstances where a young child died due to neglect, how "society failed"(p183)[77].

1.5.4.2 The psychological distress experienced: A content analysis

The total and unique expressions of MD found in each of the included studies, and each paper's most frequently used expression, are displayed in Table 1-7. A total of 216 expressions were initially extracted from the included studies, with 105 using unique wording. A further 39 expressions were collapsed into 17 merged categories as these denoted the same underlying meaning (e.g. shame and shameful collapsed into shame). In total, 83 unique expressions of MD were identified. Eighteen were found in first order interpretations, 57 being found in second order interpretations, and eight in both first and second order interpretations. The full list of expressions of MD and the number of papers these were

present in, also broken down by first and second order interpretations, are presented in Appendix 1-H.

Moral distress was experienced in a wide variety of ways by APs with a multitude of expressions found. MD was most commonly expressed as frustration[67-69,81,84,86-88], guilt[66,77-79,84,85], fear[79,84,85,87], helplessness[67,84,88] and shame (*n*=11)[66,78,79]. Whilst some expressions of MD were distinctive forms of psychological distress (such as those above), others were more general and non-specific, for example "difficult emotions/feelings"[64,84], or "feels bad"[76,80]. Across three papers[65,82,89], the term MD became a way for authors to describe APs psychological distress arising from moral events. This was also noted when moral injury was the focus of exploration[80], with this term then becoming a way for authors to encapsulate psychological distress arising from moral events.

1.5.4.3 The parameters of moral distress

Although not the aim of this review, it was noted during data extraction that MD varied in its onset from before, during, through to after attending a call. MD also varied in its intensity and duration, from fleeting and transient through to ongoing over a period of years to decades and mild through to severe in intensity. Further information around these additional findings is provided within Appendix 1-I.

1.6 DISCUSSION

This is the first meta-synthesis to explore moral distress in purely ambulance personnel working in pre-hospital emergency medical services. The review aimed to identify sources of MD for APs and identify how MD may be experienced and expressed by APs. A synthesis of 19 studies found that MD was individual to each AP in both aetiology and expression. The most common experiences of MD were feeling frustrated, guilty, helpless, ashamed or fearful

in response to moral events. Such feelings could be fleeting through to long-lasting (e.g., months/years), mild through to extreme, and could occur before, during or after the event (e.g. a delay to processing what happens or gaining further information). The most common source of MD was when reality did not meet APs expectations in terms of how they saw themselves, the type of work faced, and their on-the-scene performance. Other moral events emanated from specific situations and patient presentations (e.g. futile/unnecessary care) or when APs were constrained from taking what they felt was the right course of action. Moreover, regardless of the actual situation, MD arose when APs faced moral conflicts, moral dilemmas, moral uncertainty, or bad moral luck. The findings of this review have also indicated a suitable preliminary definition for APs experiencing MD: MD is the psychological distress caused by a moral event. Whereby a moral event is a situation necessitating a moral decision that challenges, threatens or violates one's core-beliefs and values that underpin one's personal and/or profession integrity.

1.6.1 Commonalities with existing research

APs face unique factors working with PHEMS such as the time constraints, lack of prior knowledge about a patient, and providing emergency medical care in a non-hospital setting[91,92]. However, they share common challenges with other healthcare populations such as resource constraints[13,58], blurring of professional roles and undefined work parameters[40,87], providing futile care[43,69], and a mismatch between expectations and the realities of the job role[58,88]. As such, it may be unsurprising that there may be common outcomes across healthcare professions with similar sources of MD to those found herein. For example, in nursing staff McCarthy & Gastmans[58] identified many of the same sources of MD found in this meta-synthesis. For example, there were common clinical situations encountered (e.g. futile care), resource constraints (i.e., the theme *External Constraints,* such as staffing issues),

as well as asymmetries of power and authority (e.g., difficulties communicating with colleagues from the theme *External constraints*). Of note, the *underlying moral conditions* and parameters of MD found herein directly corresponded to the existing subtypes and facets of MD[35,37] described in Table 1-1. With the theme of *external constraints* directly aligned with the definition of moral constraint-distress[26,33]. Finally, the psychological distress associated with MD has also been reportedly similar, with the prominent role of shame and guilt[22], as well as helplessness, anger, and fear[23,25] all found in nurses suffering with MD.

The above commonalities suggests that whilst research into MD and APs may be in its infancy, they may share similarities in the aetiology of MD with other populations such as nurses. It is not clear how applicable knowledge from other populations may be to APs, and this warrants further exploration. However, the findings of this review pose the possibility that the existing literature base may inform future understanding and research in this novel population. Furthermore, the findings herein highlight how MD in APs is broader than the subtype moral constraint-distress, which is currently the prominent conceptualisation of MD in other populations. This is significant to ensure policy makers, researchers, and APs themselves consider MD emanating from the full breadth of causes for APs. Thus, enabling interventions to be offered for all those afflicted by MD, not only a subset experiencing the subtype moral constraint-distress.

1.6.2 Clinical Implications

This review has collated the evidence that APs have been and continue to be suffering with MD. However, it is clear our understanding and recognition of MD as an occupational hazard for APs is in its infancy and, therefore, there is a dearth of potential strategies for the remediation of MD in APs. Some implications and recommendations could be gleamed from the included papers, however, these should be considered preliminary and warrant further

examination. When considering the implementation of any strategy discussed below in settings with limited resources, investment in any training/workshop would be beneficial. The clinical implications outlined below would have the potential to improve employee wellbeing whilst simultaneously reducing turnover, a significant outcome of MD[41]. Short term monetary costs could be reduced through drawing on the skills within existent workforce (with remit in their job role) to deliver any training in house. Moreover, employing these strategies would recuperate the initial monetary and staffing resources investment over time[93] and is recommended in the NHS in the UK following a major report in the UK exploring workforce wellbeing following COVID-19[94].

1.6.2.1 Preventative strategies

The sources of MD identified herein, particularly the type of work (theme four), offers rich foundations to extrapolate potential preventative strategies, with exploration. The general role-reality perception mismatch that appeared to occur for many APs[65,67,77,79,84-89] suggested a more realistic preparation of daily roles and responsibilities during the recruitment, training and continued education of paramedics may prevent MD. The findings of Simpson, Thomas, Bendall, Lord, Lord, and Close[88] enables insights into how to apply this more concretely. They found that differences in training for the type of work Australian APs would encounter could result in differences in who then developed MD. After qualifying as a paramedic, APs could choose to specialise and undergo significant training to become an intensive care paramedic (ICP; specialised in emergency/life threatening care) or an extended care paramedic (ECP; specialised in low acuity calls such as non-emergency management of patients, often older persons, with minor injury/medical conditions).

Simpson, Thomas, and Bendall's[88] results suggested APs who elected to specialise as ECPs did not experience MD in relation to low acuity calls, whereas ICPs did, due to great

training/knowledge, affinity for the type of work, and increased empowerment/autonomy. These findings highlight three areas for targeted preventative strategies: 1) greater training and knowledge on low acuity calls, 2) greater autonomy in managing such presentations, and 3) that this source was unlikely to result in MD for APs who would choose to become ECPs and they may represent a subset of the workforce who may be more resilient to this source of MD. An example of a specific preventative intervention within Australian PHEMS based on Simpson, Thomas, and Bendall's[88] results could be greater attempts to separate division of calls by high/low acuity to each AP specialism. Although this practice likely exists, ICPs were still encountering low acuity calls to a high frequency and therefore greater effort could be made to divide types of calls. This could be done within the triage process by call handlers[d] and/or through active recruitment drives and widening the availability for APs to specialise as ECPs. Recruitment to such positions could occur through enhancing knowledge of career progression both within qualified APs and to those considering a career within PHEMS. Being able to divide calls more consistently would reduce ICPs exposure to a source of MD specific for them, whilst reducing other sources of MD (e.g., theme five, specific situations (i.e. unnecessary transfer), theme six, external constraints (incompetent staff, difficulties communicating with colleagues).

Additionally, PHEMS internationally could implement/emphasise training for APs in the treatment and management of low acuity calls, particularly working with the elderly and those who fall or frequently call PHEMS. This could take the shape of post-graduate university education such as becoming an ECP in Australia[95,96], training using specific tools around the need to transfer to hospital[97], or placements outside of PHEMS (e.g. minor injury

[d]As call handlers are a workforce who encounter substantial occupational hazards with significant and sometimes detrimental personal and professional impacts[6,9], every effort should be made to negate additionally burdening the staff. For example, this could be mitigated through consultation with call handlers (who choose to do so) and the joint development of policies and protocols drawing on technical support that could separate such calls during triage for call handlers.

clinics) that could provide in depth training around holistic assessments and give better understanding of other services available[95]. From a recent scoping review of training around low acuity calls globally[98], generally APs appeared to report increased confidence and competence. More comprehensive training was associated with greater beneficial outcomes for APs[98], and a training pathway that included placements and/or in-field clinical training was associated with reduced conveyance to hospital[98]; thus, reducing systemic pressure in healthcare systems. However, due to the infancy of the literature base these are preliminary conclusions and it is not clear the parameters around length, depth, or breadth of training that may be wholly beneficial[98]. All of the disparate pathways to increasing knowledge and training on low acuity calls may reduce exposure of AP's more susceptible to this source of MD, whilst providing a workforce of APs who are willing and more competent working with low acuity calls. Thus, increasing knowledge of low acuity calls and their management would also target and potentially mitigate a wide range of other sources of MD identified herein. For example, *External Constraints* and the subthemes of working with others (e.g., reducing staffing incompetence), issues within the organisation (e.g., communication and trust/autonomy), and systemic issues (e.g., being the most appropriate service/being able to refer to a service). As well as supporting APs to meet their expectations around *How APs Saw Themselves* (theme two), *On The Scene Performance* (theme three) and the *Type of Work* they do (theme four), and addressing *Specific Situations and Presentations* (e.g. futile/unnecessary care).

1.6.2.2 Interventions

None of the included studies explored interventions for APs currently suffering with MD and therefore direct recommendations based on the literature included would be inappropriate. It should be noted that it would be premature to apply existing interventions for MD from other

HCPs to APs at this stage. Although MD in APs shares similarities with other populations[58], APs working in PHEMS face distinctive and unique challenges not otherwise encountered by HCPs in different settings[92,99]. Moreover, initial findings indicate that MD in AP's may have unique parameters and aetiology compared to other HCPs[40], including those with a shared identity such as other first responders (e.g. the police and fire fighters)[24,100]. The differences in MD between and even within populations are not yet understood[39,40] and to apply interventions from other HCPs without due consideration could be inefficacious and even potentially harmful[101,102].

An alternative approach would be to consider established general strategies for improving well-being in APs and how they may also reduce MD based on the findings herein. One possible intervention could be for PHEMS to support APs to access Schwartz centre rounds (Schwartz-rounds hereafter)[103]. Schwartz-rounds are intended as an organisation wide opportunity for staff to meet and discuss the emotional and psychological aspects of care, rather than focus on medical processes[103]. The sharing of these aspects of care in a non-judgemental environment can alleviate shame and guilt and reduce isolation[104,105]. Thus, this may alleviating some of the suffering of MD for some APs[106]. They have also been found to improve overall psychological wellbeing as well as trust, teamwork, and openness[107], also highlighting Schwartz-rounds as possible preventative intervention for APs through the mitigation of identified sources of MD. Schwartz-rounds are not widely implemented within ambulance trusts[107] and this may be a fruitful avenue for support that would target not only MD but a multitude of other occupational hazards such as compassion fatigue[108] and burnout[109].

Another efficacious intervention strategy that with careful adaptation for APs by APs working in PHEMS may circumnavigate potential distinctive features of such services, is the

"4 A's" developed by the American Association of Critical Care Nurses[110,111]. The four A's consist of Ask (determine what is being experienced is MD or something else, e.g. burnout/compassion fatigue), Affirm (identify what's causing these feelings, what transgressed which moral value(s)), Assess (consider the severity of distress), and Act (how could MD be addressed by the individual and within the organisation)[110]. This model has been adapted for other settings[112,113], and a recent randomised control trial (RCT)[114] has highlighted the 4 A's to be efficacious in reducing MD for Iranian nurses. The workshop developed for the RCT could be considered as a foundation to develop one that may be applicable to APs. It is of note that this RCT employed workshops across two days that moved between MD psychoeducation, group discussions and role-plays to enable the sharing and meaning making of experiences, reduction of isolation, and to move from feeling MD was unsolvable to identifying solutions[114]. Purely psychoeducational training is contraindicated due to the potential to sensitise individuals to developing an issue they otherwise wouldn't have and/or exacerbating existing difficulties[115,116]. Therefore, any workshop adapted for APs would need to retain this multifaceted approach. Attending such a workshop may also mitigate some sources of MD through improved communication and trust (theme six, External Constraints). As the author is not an AP, it felt inappropriate to deliberate how the 4 A's and such a workshop could be specifically adapted for AP's further.

1.6.3 Recommendations for future research

Further research exploring the population of APs is needed to address the substantive gaps in knowledge and understanding, particularly given the dearth of research directly exploring MD in APs and the potential bias from the author herein. Realist research[117] would be of substantial benefit, which would enable researchers, policy makers, and practitioners to

understand the sources of MD, how MD may be expressed by APs, the parameters of MD in this population, and the moral landscape that MD may be situated.

It is recommended that qualitative exploration of these factors is initially adopted, with the potential for mixed methodological and then quantitative examination of this phenomenon for APs subsequently undertaken. Given the dearth of research, a series of case studies would also be a worthwhile initial endeavour to explore the efficacy of the potential preventative strategies and interventions described above. This would enable a rich understanding of the possible aetiology, subsequently experience of MD, and efficacious ways to mitigate and remediate this. Case studies would give the deep foundation needed to develop future research, which is currently missing. Most significantly, it is recommended that a broad conceptualisation of MD in APs is adopted (e.g. Table 1-1) and a multidisciplinary and multicultural research team is used. As this would avoid transposing the current conceptual contentions existent in other populations and such a research team may further aid in developing a broad and inclusive understanding of MD in APs. This could include psychologists, bioethicists, occupational health providers, and those from the full variety of job roles in PHEMS from a variety of countries and cultures.

Additionally, this review identified 21 studies that presented evidence of MD amalgamated across APs and other populations (e.g. the police, first responders, and/or firefighters). Although a scoping review had been completed[24], the volume found herein warrants a full systematic exploration of MD in emergency services. This may also provide further insights into MD in APs and be more applicable to those who are dual trained (e.g. American firefighters who also deliver emergency medical services). In the process of conducting this review, an extensive literature review was completed and a multitude of systematic reviews into MD under various circumstances were identified. It may also be

timely to conduct an umbrella review to assess the current state of knowledge and understanding of MD more generally. This would enable gaps in the literature to be established as well as a greater understanding of the contentions and points of consensus around MD.

1.6.4 Strengths and Limitations

It was outside of the scope of the present review to include more than one researcher and as noted previously the author is a clinical psychologist in training, with relatively little experience within PHEMS. Although steps were taken to mitigate bias where possible, described in Chapter Three, this had the potential to introduce bias into the search strategy and synthesis. As such, findings should be interpreted with caution and warrant replication and further examination to ensure their robustness. However, the author's psychological background and biases towards psychology are viewed as a strength. A multidisciplinary approach to understanding MD and the specific value of the unique perspective that psychology could add to the literature base has been emphasised by various researchers[27,58,118]. The authors background supported the present review through the identification of diverse expressions of psychological distress and a wide variety moral events. Including the recognition of more nuanced psychological states that might otherwise have been missed.

Additionally, the present review was restricted to English language only. As such this study will likely have missed papers which would transect MD and APs in other languages and will be culturally biased. It was noted that no research was identified from the South Americas or Africa and there was limited research from Asia, which may be in part due to this restriction. With the continual development of free technology that would enable

translation of texts, the limitations of language restrictions may be overcome by future research.

1.7 CONCLUSION

This review is timely to promote awareness of MD in APs. The findings provide a preliminary understanding of the experience and expression of morally-related psychological distress in APs. A multitude of sources of MD for APs have been identified and the varied and highly nuanced experience of MD has also been highlighted. This review offers insights into how to enhance the incorporation of MD into everyday practice, policy, and procedures, as well as highlighting potential avenues for intervention. This review also clarifies the significant need for further research that could corroborate and add further insights to the findings of the present review. It is recommended that a multidisciplinary, multicultural approach is adopted to understanding this phenomenon in APs. Furthermore, the need for an open-minded approach to the conceptualisation of MD has been demonstrated, moving away from the narrow definition of moral constraint-distress to a broader understanding. This would ensure the recognition of and interventions for the full breadth of people suffering with MD, who would otherwise have been neglected. The findings of this review have significant clinical implications for future research, APs, and policy makers.

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1.9 TABLES AND FIGURES

1.9.1 Table 1-1: *A brief overview and description of the constructs within the moral landscape, including the types and facets of moral distress derived from a literature review*

Type or facet	Subtype	Alternative names	Definition	Example
Moral integrity			In general, the "soundness, reliability, wholeness, and integration of moral character. In a more restricting sense… [the] objectivity, impartiality, and fidelity in adherence to moral norms" (p40)[119]. This involves the sustained commitment to intellectual excellence and moral excellence.	
	Professional integrity		Where the intellectual and moral excellence are derived from the workplace, i.e. as striving for excellence as an evidence based practitioner (intellectual) and in terms of prioritising patient related needs than self-servicing needs (moral).	Continuing to attend activities to maintain the highest level of evidence-based practices as a professional (intellectual), adhering to the principles of non-maleficence, beneficence, autonomy, and justice (moral) to prioritise patient needs over the professionals
	Personal integrity		Where intellectual and moral excellence are derived from life outside of the workplace	This may be drawing from ones history, family, spirituality, role models, and philosophy (intellectual), prioritising significant others from a professionals non-work life (i.e. family, friends etc.)
Moral event		Moral decision-making	A situation involving a judgement where someone is confronted by a situation where a their moral integrity is transgressed	See subtypes below
	Challenging moral event	Morally concerning events	The individual retains agency within the moral even, yet the exposure to the event could **weaken** moral integrity. Resolving this situation may	A patient refuses oxygen despite having difficulty breathing and being advised of the consequences, then goes unconscious and the AP

Type or facet	Subtype	Alternative names	Definition	Example
			require personal and or professional sacrifice and be hard to do the right thing	is able to provide oxygen and their respiratory distress improves
	Threatening moral event	Morally dangerous events	Agency is lesser in these situations as immoral events are more difficult to prevent or unavoidable altogether. Exposure to such situations may **undermine** moral integrity. Resolution of the situation may not be possible and hostility whilst trying to do so may be incredibly intense	APs arrives on scene to a woman in labour. However, she does not want their help due to their religion prohibiting another man seeing them and violating their wishes would result in dismissal and potential prosecution. As the APs try to negotiate, the woman's husband becomes aggressive and threatening and they are told to desist by the physician on call. Despite the mother now bleeding substantially and concerns she may lose the baby, paramedic involvement is not sanctioned until a female AP arrives and takes over
	A moral event with a violation	Morally corrosive events	Where an individual has no agency and is unable to do the right thing. Moral integrity is **destroyed and/or fragmented**	An AP makes a gross medical error that results in the death of the patient.
Moral stress		Initial distress	A physical reaction that occurs immediately as recognition of a moral event occurring	Increased heartrate, nausea, diarrhoea, headaches, sense of unease, knot in stomach
Moral outrage		Ethical outrage	A sense of frustration, anger, or disgust directed toward others who violate ethical values or standards that is justified.	A feeling of exhaustive frustration, anger, disgust, and powerlessness
Moral distress		Reactive distress, ethically significant moral distress	The psychological distress directly arising from a moral event	See subtypes below
	Moral constraint-distress	-	A person knows the morally correct course of action, but is unable to take this due to internal/external constraints	An AP wants to take a patient to hospital, but the hospital has no beds so unable to.

Type or facet	Subtype	Alternative names	Definition	Example
	Moral uncertainty-distress	-	An individual doesn't know the morally correct choice	A person may face a new situation and not know what to do in that circumstance.
	Moral dilemma-distress	Moral conflict-distress	When two or more clear moral principles apply, but choosing one will result in transgression of the other(s)	Patient declines transport to hospital but requires medical care (i.e., autonomy clashing with beneficence).
	Bad moral-luck distress	-	A person takes the morally 'correct' action, but due to extraneous factors outside of their control the outcome still results in morally undesirable consequences	An AP does everything they could have correctly whilst attempting to save the life of an individual, but the person still passes away.
	Moral distress by association	-	The connection with someone/a party/institution that compromises an individual's moral beliefs	Working in neglectful and abusive institutions (e.g. in the UK working in places from the Winterbourne View Inquiry, or the Francis inquiry in the UK)
	Mild moral distress	Moral regret	The resultant psychological distress is experienced mildly	Fleeting thoughts about the worry or annoyance of an event that occurred.
	Retroactive moral distress	Delayed moral distress	Distress that occurs once an individual is able to process an event/gains more information	Dealing with the death of a loved one, only as grief intensity subsides the individual can think about what occurred; Providing care to multiple victims but allowing someone to go back into the care of an abuser, later given this information.
	Moral residue	Long lasting moral distress-	The distress that lingers following a moral event	Months after an event a person still feels angry about what happened.
Moral injury		Standard moral injury	Perpetrating, failing to prevent, bearing witness to, or learning about acts that transgress deeply held moral beliefs and expectations (i.e. experiencing a moral event that threatens and/or violates one's moral integrity)	An intense form of suffering (e.g. shame, guilt, disgust) due to a deep emotional wound and internal dissonance

Type or facet	Subtype	Alternative names	Definition	Example
	Repeated moral distress	Moral crescendo effect	The repeated exposure to moral distress resulting in unresolved moral residue that over time leads to moral injury	Same as moral injury
	Complex Moral injury		The moral injury that occurs from a world-view discrepant and foundational level moral core belief being transgressed and shattered, whereby a persons moral compass becomes disorientated and unable to tell what is right and wrong	An AP attends a call where they are physically attacked and sustain life altering injuries, they/their colleagues cannot reconcile the fact they went to help and were attacked in such a way.
Moral decline			Habitual distorted moral decision making associated with normalised maladaptive and impaired moral values	An AP repeatedly not following the procedures during a call and dismissing when any concerns are raised. A culture of a lack of due regard for patients and going off protocol alongside many errors and harm to patients (intentional or not)
Moral repair		Moral healing	The process of healing from a moral wound whereby ones moral values and beliefs are reintegrated and strengthened to form a person's moral integrity	An AP reflects on an event they found morally distressing, discusses with colleagues the situation, learning how to handle it in the future and that others experience the same difficulties, integrating their new beliefs about themselves, their colleagues, the profession and what is morally correct in that situation into their moral integrity
Moral resilience			How well someone is able to manage with and recover from with morally-related crises	An AP faces a moral event that challenges their integrity, but any distress is transient with no long lasting impact

Note. AP. Ambulance personnel.

A bibliography of the literature review used to collate the above table is presented in Appendix 1-C. The above table is not intended to be a comprehensive overview of all types and facets of moral distress nor the wider moral landscape as this was outside the scope of the present review. Nor is it definitive, as the above continues to be contended within the literature base. Additionally, examples provided are based on the authors understanding only.

1.9.2 Table 1-2: *The database providers, databases and database coverage used within the search strategy*

Database	Coverage
Ovid	
Embase	1974 to present
EBSCOhost	
PsycINFO	1806 to present
MEDLINE complete	1916 to present
CINAHL (Cumulative Index to Nursing and Allied Health)	1937 to present
Cochrane Library	1995 to present
Scopus	1788 to present
ProQuest	
PTSDpubs (formerly PILOTS)	1871 to present

Note. Dates taken from the information section freely available online for each database

1.9.3 Table 1-3: *Quality Assessment for Diverse Studies scoring grid of included studies*

QuADS criteria of quality appraisal	Paper number																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16(A)*	17	18	19
Theoretical or conceptual underpinning to the research	2	3	3	3	2	3	3	3	3	2	3	3	2	3	3	1(2)	3	3	3
Statement of research aim/s	3	3	3	3	2	2	3	3	3	3	3	3	3	3	3	2(3)	3	3	3
Clear description of research setting and target population	3	2	2	3	3	3	3	3	2	1	1	2	3	3	3	1(3)	3	2	3
The study design is appropriate to address the stated research aim/s	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2(2)	3	2	3
Appropriate sampling to address the research aim/s	2	3	3	3	3	2	2	2	2	2	2	2	3	2	3	0(3)	3	2	3
Rationale for choice of data collection tool(s)	0	3	3	3	0	2	2	0	2	2	1	3	2	3	2	0(2)	2	0	2
The format and content of data collection tool is appropriate to address the stated research aim/s	2	3	3	3	3	3	3	3	3	3	3	3	3	2	3	1(3)	3	2	3
Description of data collection procedure	2	2	3	3	3	2	2	3	3	0	1	2	3	3	3	0(3)	3	3	3
Recruitment data provided	1	2	2	3	3	3	2	0	0	0	0	0	1	3	2	0(2)	0	0	2
Justification for analytic method selection	3	3	3	3	0	3	0	0	1	1	0	1	1	2	3	0(2)	3	1	2
The method of analysis was appropriate to answer the research aim/s	3	3	3	3	3	3	2	2	2	3	3	2	3	3	3	1(3)	3	2	3
Evidence that the research stakeholders have been considered in research design or conduct.	1	1	0	1	0	0	0	1	2	0	0	0	2	1	2	0(1)	1	0	2
Strengths and limitations critically discussed	2	1	0	2	3	1	2	0	1	0	2	3	3	2	3	1(1)	3	0	3
Total score (0-39)	27	32	31	36	28	30	27	22	27	19	21	27	32	33	36	9(30)	33	20	35

Note. Each criteria is scored from 0 through to 3.

* (A) and all scores in brackets refers to the adjusted score taking into consideration the information provided in the original study by Naess, Steen, and Steen[83]

1.9.4 Table 1-4: *Characteristics of included studies*

Study number	Publication details	Purpose of the study	Setting	Sample characteristics	Methodology and analysis employed	Brief overview of MD related findings	Miscellaneous information
1	Anderson, Gott, & Slark (2018)[69]	To identify the clinical, ethical, cognitive and emotional challenges that emergency APs experience when making decisions to commence, continue, withhold, or terminate resuscitation.	New Zealand. Ambulance service.	16 participants (8 Women). FR, EMT, Paramedic, ICP. Under 25 to 64 years old. Ethnicity: New Zealand European, New Zealand European and Māori, Other European.	Qualitative. Individual semi-structured interviews, between 55 and 145 minutes ($\bar{x}$=90 minutes). Analysed using IPA and double hermeneutics.	APs reported frustration when colleagues initiated/continued resuscitation efforts on a patient that they believe to be futile.	There is a certified route to becoming an AP in New Zealand, with increasing levels of education from FR through to ICP.
2	Avraham, Goldblatt & Yafe (2014)[84]	To explore Paramedics experiences of encountering and coping with critical incidents.	Israel. Mobile intensive care units and intensive care ambulances without a physician.	15 paramedics (5 women). Aged 23-51 years with 1-26 years paramedical experience.	Qualitative. Individual semi-structured interviews, between one and three hours. Thematic analysis identifying initial and then central themes.	APs appeared to experience a wide variety of psychological distress (i.e., frustration or helplessness) from a wide variety of moral events (e.g. unexpected outcomes or providing inadequate care). MD appeared to be brief in nature, did not interfere overly at work, with work-demands being protective to some extent.	A critical incident is defined as "any situation that causes exceptionally strong emotional reactions in emergency service personnel" (p194).

Study number	Publication details	Purpose of the study	Setting	Sample characteristics	Methodology and analysis employed	Brief overview of MD related findings	Miscellaneous information
3	Barcinas & Braithwaite (2022)[76]	To explore how paramedics acquired, developed and applied their expertise in navigating ethical decision making in the field.	USA, one Southern state. An EMS system.	25 paramedics.	Qualitative. Individual semi-structured individual interviews, between 45 and 120 minutes (mean=75 minutes). Analysed through coding, situation mapping diagrams, and thematic concepts.	MD (such as "hurt" or "stress"; p12). arose from multiple sources (e.g. conflicts between the ethical values of beneficence and autonomy). MD could occur immediately or be delayed in onset.	In the state sampled, paramedics have to be nationally registered and have completed a training pathway in order to use this title.
4	Bremer, Dahlberg & Sandman (2012)[85]	To analyse EMS personnel's experiences of caring for families when patients suffer cardiac arrest and sudden death.	Southern Sweden. An EMS system.	10 participants (4 women). Paramedic, ANP, PEN, SICN, and SAN. Aged 26-62 years (mean=40.9 years), less than 1 year to over 20 years AP experience. The estimated number of treated OHCA patients ranged from less than 10 to over 100.	Qualitative. Individual semi-structured interviews lasting 40-100 minutes, conducted January 2007. Interpretive analysis drawing on Gadamer[120] and Nyström's[121] process grounded in phenomenology and hermeneutics.	APs appeared to experience a wide range of psychological distress such as "grief" or "despair (p48) from a wide range of sources. For example, not being able to adequately attend the needs of family, difficulties around resuscitation, and not being able to save a patient.	In Sweden the EMS system includes specialist nurses, registered nurses, EMTs and paramedics, and (rarely) prehospital emergency physicians. At least one registered nurse is part of the ambulance team.

Study number	Publication details	Purpose of the study	Setting	Sample characteristics	Methodology and analysis employed	Brief overview of MD related findings	Miscellaneous information
5	Charlton, Franklin, & McNaughton (2019)[66]	To explore paramedics perceptions of their experiences of Paramedic-2 RCT and how this may be related to the wider world of paramedic practice.	UK, North East. Ambulance Service.	Six Paramedics (one woman), age range 26-53, work experience of 5+ years	Qualitative. Individual interviews lasting up to 45 minutes, conducted between April-July 2018. Analysed using IPA with theoretical underpinnings centred on the Martin Heidegger (1889-1976) paradigm[122].	MD arose from multiple sources, which were all related to including people in a trial where some people were denied potentially life-saving medication without their expressed consent. Various types and intensities of psychological distress typically centring on emotions such as guilt, shame, and regret. MD could be a possible underlying factor associated with paramedics' decision to recruit people to the trial and their decision to withdraw from the research altogether.	The Paramedic-2 trial was a double-blind randomised control trial of the effectiveness of epinephrine in patients who have out-of-hospital cardiac arrest. A waiver of consent was granted.

Study number	Publication details	Purpose of the study	Setting	Sample characteristics	Methodology and analysis employed	Brief overview of MD related findings	Miscellaneous information
6	Halpern, Gurevich, Schwartz & Brazeau (2009)[77]	To explore ambulance workers' understanding of a critical incident and potential interventions.	Toronto, Canada. A large urban EMS.	60 participants (33% were women). Average age of 39 (a range of 26-56 years), with 13 years service (range of 2-30), and 49% were level 3 ambulance workers.	Qualitative. Individual semi-structured interviews (60-90 minutes) and 8 focus groups (90-120 minutes). Thematic coding trees alongside ethnographic content analysis for the individual interviews only. The constant comparative method[123] was used for themes.	MD was interpreted from mostly direct participant quotes and expressed through emotions such as anger, guilt, self-doubt, and blame. The authors understanding suggested MD may be related to overwhelming intense compassion for the patient/situation. MD arose in situations where paramedics were unable to save someone or when they felt society had failed in its responsibilities to an individual.	The results of this study have been split across two papers, with the other focused on support, barriers and interventions. It was not included in this review. In the EMS there were three levels of ambulance worker (1, 2, and 3). Level 3 workers had the most advanced training.
7	Hoff, Zimmerman, Tupetz, Van Vleet, Staton & Joiner (2022)[78]	To explore sentinel events, specifically how shame and guilt may be driven by them and any potential consequences.	North Carolina, USA. Two EMS agencies an urban and rural communities respectively.	Eight participants (four women), with an average of 9.4 years experience. Seven were paramedics. Five were from the urban agency.	Qualitative. Individual interviews lasting between 30-60 minutes. Critical incident (shame or guilt) approach used 24 hours before participation. Thematic content analysis using deductive and inductive techniques.	MD was experienced as shame or guilt with different aetiologies and intensity of distress. Guilt appeared to stem from "inevitable" (p7) patient outcomes, was less intense than shame and shorter lived. Shame arose mostly from AP's perception the care given was inadequate/deficient, particularly where this was associated with poor patient outcomes.	Sentinel events defined as "a bad patient outcome, a medical error, or a poor interaction with a superior" (p2). The critical incident approach involved identification of the critical incident, its contributing factors and evaluating solutions to prevent reoccurrence.

Study number	Publication details	Purpose of the study	Setting	Sample characteristics	Methodology and analysis employed	Brief overview of MD related findings	Miscellaneous information
8	Jafari, Ebadi, Khankeh, Maddah & Hosseini (2022)[89]	To design a valid and culturally sensitive measure of MD within Iranian APs.	Iran. EMS centres in Tehran, Kerman and Bam.	Qualitative: 14 EMS providers (master degree nurses, bachelor nurses, EMT). Quantitative: 40 initial participants with PHEMS related expertise. Then 265 EMS providers (all were men, 49% were EMTs, remaining were undergraduate or masters level nurses.	Exploratory sequential mixed-method study. Qualitative: initial item pool generation. A pragmatism approach to concept analysis involving a literature review, individual semi-structured interviews (between 40-60 minutes), content analysis, then combination of results. Quantitative: scale validity and reliability assessed. Items were adjusted at each stage sequentially.	Developed an operational definition of MD. The development of a 20 item culturally sensitive questionnaire of MD within Iranian APs, using a five point likert scale from not at all (0) through to very high (4). This had five factors accounting for 41% of the variance: Immoral Performance (item *n*=4), Care Provision (*n*=7), Privacy (*n*=3), Communication (*n*=3), Conflict (*n*=3). The scale demonstrated good internal and external validity and reliability.	
9	Jafari, Hosseini, Maddah, Khankeh & Ebadi (2019)[65]	To explore EMS staff's experiences of the factors behind their MD.	Iran (several cities, does not stipulate which). Pre-hospital emergency medical services.	14 male EMS staff (10 stated they were married). Six nurses with a bachelor's degree and eight EMTs. Age range of 26-45 years old. Work experience ranged from 4-22 years.	Qualitative. Individual unstructured and semi-structured interviews lasting 40-75 minutes. Analysed using content analysis, using Graneheim and Lundman[124] five-step process.	Five main factors behind moral constraint-distress with 13 subcategories: lack of knowledge and competence, inability to adhere to EMS protocols, restraints on care provision, ineffective interprofessional communications, and conflicts in value systems. The term MD as well as concerns, and upsetting were the only types of psychological distress identifiable.	EMS in Iran: established in 1975 to provide emergency care, basic life support, and patient transfer to hospital settings.

Study number	Publication details	Purpose of the study	Setting	Sample characteristics	Methodology and analysis employed	Brief overview of MD related findings	Miscellaneous information
10	Jonsson & Segesten (2004)[79]	To better understand how APs experience and handle traumatic events.	Sweden, other information purposefully not disclosed due to issues of anonymity.	10 participants. Ambulance nurses and technicians with a variety of ages, educational background and experience. All had experienced a traumatic event. Further details are not included.	Qualitative. Interviews lasting around an hour and half. Thematic development analysed according to descriptive phenomenology[125,126] and a secondary analysis using an interpretive existential perspective[122].	MD was mostly experienced as shame, guilt, and isolation. such feelings arose from a variety of events such as feeling they had failed in some way. More generally, MD arose when participants self-image and concepts were shattered after experiencing a traumatic event. There was substantial variation found in the intensity and duration of MD, from mild to overwhelming and from hours to still experiencing distress. Emotional sequelae of MD was worsened if participants' attempts to talk to others about their experiences was received negatively.	No participant quotations were used due to issues around anonymity.

Study number	Publication details	Purpose of the study	Setting	Sample characteristics	Methodology and analysis employed	Brief overview of MD related findings	Miscellaneous information
11	Murray, Krahé & Goodsman (2018)[80]	To consider how moral injury may help conceptualise medical students experiences of practicing in PHEMS, including if social support was protective and accessible.	UK, further information not disclosed.	Five medical students involved in prehospital care and a taught course in prehospital medicine.	Qualitative exploratory pilot study. Focus groups (two with two participants) and an interview (one participant) lasting between 24 and 68 minutes. It was theoretically thematically analysed under the lens of moral injury.	MD appeared to occur when participants were unable to provide further help/alleviate suffering of patients, and when they believed they would not be able to live up to the standards of others in PHEMs. MD was described as feeling bad, concerned, or worried.	Moral injury is defined as the "psychological sequelae of bearing witness to the aftermath of violence and human carnage and can occur as a result of witnessing human suffering or failing to prevent outcomes which transgress deeply held beliefs" (p590).
12	Nordby & Nøhr (2011)[64]	To understand paramedics' experience of resuscitating patients with cancer.	Norway. National ambulance services.	15 paramedics (no other information provided).	Qualitative. Individual semi-structured interviews lasting between 30-45 minutes. Thematic development analysis in line with cognitive-emotional perspective (as theory neutral as possible so no theoretical framework used).	MD arose from double pressure situations when there are differences between beliefs and actions, where there are pressures from 'above' and 'below' to perform a certain action. MD was experienced as difficult, having a negative impact for APs and something which can build up over time. The paper alludes to MD throughout, however, the focus is on the moral and ethical difficulties around resuscitating patients with cancer and not on any resultant psychological distress.	A double pressure situation occurs when pressure from above comes from management/organisational based factors. The pressure from below comes from professional experiences (e.g. witnessing patient suffering, wanting to help patients, wishes from people at the scene such as relatives, and Moral/ethical values).

Study number	Publication details	Purpose of the study	Setting	Sample characteristics	Methodology and analysis employed	Brief overview of MD related findings	Miscellaneous information
13	Rees, Porter, Rapport, Hughes & John (2018)[86]	To explore and develop a theory of paramedics' perceptions of caring for those who self-harm.	UK. Ambulance service.	11 paramedics (three women). One to 38 years of experience, age range of 19-60 years. Five had attended specific training on self-harm.	Qualitative. One-to-one semi-structured interviews, 2 participants completed a second interview to explore insights from the first round of interviews. Evolved grounded theory using a constructivist view and an inductive-deductive approach was used.	Paramedics experienced primarily frustration when they did not believe attending calls regarding self-harm should be within the remit of their work. For example, that they weren't the right service to meet patients needs or that other services/the health care systems was failing patients (i.e., they visited the same patients or experienced a high frequency of self-harm related call outs).	Self Harm is defined as "an intentional act of self-poisoning or self-injury, regardless of the motivation or degree of suicidal intent" (p2).
14	Rosén, Persson, Rantala, & Behm (2018)[87]	To understand what constitutes as the Swedish Ambulance service.	Sweden, Helsingborg. All those participating in a knowledge-gathering workshop regarding a national registry in ambulance services.	Eighteen participants (eight were women). 15 were specialist nurses and three were physicians. The average age was 46 years (range of 32-60 years old) and average work experience was 11 years (range 3-28 years).	Qualitative. Three focus groups using semi-structured interview guides, lasting between 115-142 minutes (mean=127 minutes). Thematic development analysed according to Krueger[127] whereby relevant discussions related to the purpose of the study were categorised, summarised and interpreted.	Moral distress arose in situations where APs believed a patient did not need the level of care an AP provides (i.e., low acuity calls) or when hey were uncertain they had made the right decision (i.e., leaving someone at home). This could result in frustration, role conflict, and dissatisfaction with their work.	All participants were clinically active as well as having a leadership role (i.e., unit/operations manager).

Study number	Publication details	Purpose of the study	Setting	Sample characteristics	Methodology and analysis employed	Brief overview of MD related findings	Miscellaneous information
15	Simpson, Thomas, Bendall, Lord, Lord & Close (2017)[88]	To investigate and develop a theory of paramedic decision making regarding older patients who have fallen.	Australia. A large state-based single ambulance service.	33 paramedics (12 women); QPs, ICPs, ECPs, with an average of 12 years of service. 40% had a qualification in higher education and 60% from metropolitan areas.	Qualitative. 1:1 semi-structured interviews were completed lasting between 40-60 minutes. Then focus groups to clarify theoretical concepts from the interviews. Organisational, internet, and media sources were also analysed for the 'perception of role' theoretical construct. Constructivist grounded theory adopted, and inductive analyses used to identify theoretical and conceptual categories.	MD was primarily expressed as frustration or negative emotions/feelings and stemmed from a role reality-perception mismatch. Some APs appeared to believe their core business was emergency, life-threatening situations where they could make the most difference. When attending low acuity calls (i.e., falls by older people), this could then lead to MD for those APs. ECPs reported lower levels of MD, which may be related to the differences in their training, job roles and expectations. The emotive words used also denote differences in the intensity of MD experienced.	The ambulance service has three tiers of paramedic care: QPs can provide advanced life support and ICPs and ECPs have completed additional specialist training. ICPs have focused on serious/ life threatening illness or injury and ECPs on low acuity, geriatric syndromes, and those not requiring transport. ECPs also have further training in risk identification, mitigation and management, as well as clinical decision making.
16	Steen, Næss & Steen (1997)[81]	To raise questions about possible needs for attitude changes towards the paramedics.	Norway, Oslo. The EMS system.	Thirty-three paramedics.	Qualitative. Interviews, no other information reported.	MD was experienced when APs felt frustrated when faced with conflicted demands on their time, for example being unable to adequately attend to the needs of the family as they needed to attend another call. This appeared to be mild in nature. The APs role in looking after relatives and	This was a secondary study on data initially collected to determine the criteria used by paramedics to initiate or terminate resuscitation efforts.

Study number	Publication details	Purpose of the study	Setting	Sample characteristics	Methodology and analysis employed	Brief overview of MD related findings	Miscellaneous information
						others on the scene was not well recognised.	
17	Svensson, Bremer, Rantala, Andersson, Devenish, Williams & Holmberg (2022)[68]	To Swedish Ambulance personnels' attitudes about older patients' self-determination in cases where patients have impaired decision-making ability, and who are in urgent need of care.	Sweden. Two ambulance services which cover two southern regions (rural and urban areas).	Initially 31 participants (16 women); EMTs, registered nurses, ambulance nurses; age range of 25-65 years old (mean=45 years old), 1.5-45 years AP experience ($\bar{x}$=16 years). Two male EMT dropped out by the third round of data collection.	Qualitative. Explorative design using a modified Delphi technique. Six focus groups consisting of 4-6 participants in each, lasting 77-95 minutes ($\bar{x}$=86 minutes). Four rounds of data collection to create a questionnaire from descriptive data collection through to reaching consensus on all items.	Two of the 72 item questionnaire were indicative of MD (question 20 of category 3, question 3 of category 4). Items suggested when APs are unable to respect a patient's self-determination they may experience frustration or a bad conscience.	This was a secondary study on data initially collected.

Study number	Publication details	Purpose of the study	Setting	Sample characteristics	Methodology and analysis employed	Brief overview of MD related findings	Miscellaneous information
18	Waldrop, Waldrop, Mcginley, Crowley & Clemency (2020)[82]	To explore PHEMS decision making process when responding to an end-of-life call, and the influence of state authorised documents such as NHDNR or M/POLST (or lack thereof).	USA, north-eastern state. PHEMS, (serving urban, suburban and rural) areas.	50 participants (31% were women); paramedics and basics, advanced, and critical care EMTs. 94% were white, 37.9 years old on average, with 1-37 years of experience (mean=13.74 years) and worked an average of 44.9 hours per week.	Qualitative. Individual semi-structured interviews lasting between 30-45 minutes. Data analysis was iterative, using open coding, then systematic coding and finally axial coding to develop themes.	MD was expressed as being upset and cognitive dissonance, with the authors directly referencing MD in the discussion. Sources of MD appeared to be from ethical dilemmas or uncertainty, particularly when APs felt conflicted between upholding patient autonomy and beneficence. MD could also come from APs beliefs conflicting with the beliefs and wishes of others (i.e., family/colleagues). The above was exacerbated by lack of/missing legal documentation.	

Study number	Publication details	Purpose of the study	Setting	Sample characteristics	Methodology and analysis employed	Brief overview of MD related findings	Miscellaneous information
19	Williams-Yuen, Minaker, Buxton, Gadermann & Palepu (2020)[67]	To explore paramedics' experiences responding to those who have taken an overdose, specifically for those working within a community significantly affected by the overdose crisis.	Canada, downtown eastside (North Shore district) of Vancouver. Singular ambulance station.	10 paramedics (five women) with an average age of 49. Nine were employed full time, and one part time.	Qualitative. Individual semi-structured interviews lasting between 45-60 minutes and (after an initial round of coding) 20 minute follow up telephone interviews to deepen data around the central topics identified. Analysed using Saldana's[128] approach combined with the concept of a core category from grounded theory to identify higher-order concepts (themes) and a core concept.	MD arose from a variety of sources when responding to those who have taken and overdose. For example, the paramedics own emotional reactions to a scene, conflicting ethical values, insufficient care provision, as well as wider issues such as not being the right service to meet patient needs and the failure of the wider health system meet the patients' needs. The core category of APs capacity to help subsumed the above. MD appeared to vary in intensity given the descriptions of psychological distress and was expressed using words such as frustrated, helpless, heart-breaking, hopeless, and overwhelmed. Situations which could lead to MD could alternatively lead to compassion for some paramedics.	The downtown eastside of Vancouver in British Columbia (Canada) has the highest levels of overdose events within Vancouver and the province. Purposeful sampling to attain equitable representation of a wide range of paramedics. No questions within the interview guide would appear to implicitly or explicitly pull out information pertaining to MD.

Note: MD, moral distress; AP, ambulance personnel; FR, first responder; EMT, emergency medical technician; ICP, intensive care paramedic; ANP, paramedic- assistant nurse paramedic; PEN, prehospital emergency nurse; SICN, specialist intensive care nurse; SAN, specialist anaesthesia nurse; EMS, emergency medical services; RCT, randomised control trial; IPA, interpretative phenomenological analysis; OHCA, out of hospital cardiac arrest; PHEMS, prehospital emergency medical services; QPs, qualified paramedics; ECPs, extended care paramedics; NHDNR, non-hospital do not resuscitate; MOLST/POLST, medical/physicians' order for life-sustaining treatment.

1.9.5 Table 1-5: *Illustrative quotes of the themes and subthemes*

Themes	Subthemes	Illustrative quote
Underlying moral conditions		Conflicting feelings about what is right (p5)[82]
External constraints		Lacked the required skills and equipment to intervene (p201)[84]
	Difficulties with others	Disagreement with a colleague about appropriate treatment intervention on the scene (p270)[89]
	Issues within the organisation	"No" they cannot go to the hospital. Every hospital was full. No one taking COVID. Staff was low… (p12)[76]
	Systemic issues	Felt unable to provide care that would end the repeating cycles they witness (p11)[67]
	Issues at a societal level	… the infant died… society failed her. It wasn't an accident! ... It did not have to happen (p183)[77]
How AP's saw themselves		Feel they have fallen short of the standards expected of a paramedic and those they expect of themselves (p538)[66]
	APs' self-image	The image that they had built up of themselves and for others cracked (p220)[79]
	Psychological state	Overwhelmed by all the impressions from the scene of the accident (p220)[79]
	Professional skills and attributes	Do not respect a patient's self determination (p8)[68]
	Actions of themselves and/or others	Could not prevent or had to ignore low-quality care or malpractice by an incompetent colleague (p197)[65]
On the scene performance		If the call didn't go well, is if I missed something. If I didn't do something (p6)[82]
	Beneficence	We are the help… we cannot help (p12)[76]
	Inadequate care	… hadn't given that patient the definitive care we could have done… (p537)[66]
	Non-maleficence	Perceived poor outcomes… due to … self-described deficiencies (p5)[78]
	Harming patients	Causing patient harm no matter what he does (p538)[66]
	Poor patient outcome	…all this fancy intervention life saving stuff and people still died... This is not supposed to happen (p180)[77]

Themes	Subthemes	Illustrative quote
The type of work		Taking us away from something more urgent (p5)[86]
	Role perception-reality mismatch	Perceived imbalance in the work they have been trained to do and the work they actually spend their time doing (p10)[88]
	High acuity and emergency care	Altruistic and strongly held belief that high-acuity 'real work' is where they can make the most difference and do the most good (p6)[88]
	Low acuity calls and unnecessary care	May need emergency services when that we are involved in an unnecessary mission (p198)[65]
Specific situations and presentations		Concept of a double pressure situation (p68)[64]
	Specific patient presentations	Patients were young—infants, or children (p199)[84]
	Specific situation	Resuscitation of deceased person (p271)[89]

1.9.6 Table 1-6: *Distribution of themes and subthemes across the included studies*

Themes and subthemes	Paper number																			Total papers
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
Underlying moral conditions		*	*	*		*			*					*				*		7
Moral conflicts		*		*		*			*					*				*		6
Moral dilemmas									*									*		2
Moral bad luck						*														1
Uncertainty			*															*		2
External constraints		*	*	*		*	*	*	*				*		*	*	*		*	12
Difficulties with others				*				*	*								*			4
Issues within the organisation		*	*				*	*	*						*	*				7
Systemic issues			*			*							*						*	4
Issues at a societal level						*		*												2
How AP's saw themselves		*	*	*	*			*	*	*	*	*			*		*	*	*	13
APs' self-image		*		*	*				*	*	*								*	7
Psychological state		*	*	*					*	*									*	6
Professional skills and attributes		*						*	*						*		*			5
Actions of themselves and/or others								*	*		*	*						*		5
On the scene performance		*	*	*	*	*	*	*	*	*	*		*	*	*	*			*	15
Beneficence		*	*	*		*				*	*								*	7
Inadequate care		*	*	*	*	*	*	*	*	*	*		*		*	*			*	14
Non-maleficence				*			*	*	*	*				*						6
Harming patients					*			*	*											3
Poor patient outcome		*		*	*	*	*		*	*										7
The type of work		*		*		*		*	*	*			*	*	*				*	10
Role perception-reality mismatch														*	*					2
High acuity and emergency care		*		*		*				*					*					5
Low acuity calls and unnecessary care								*	*				*	*	*				*	6
Specific situations and presentations	*	*	*	*	*	*		*	*	*		*	*	*	*			*	*	15
Specific patient presentation		*											*		*				*	4
Specific situation	*	*	*	*	*	*		*	*	*		*		*	*			*	*	14

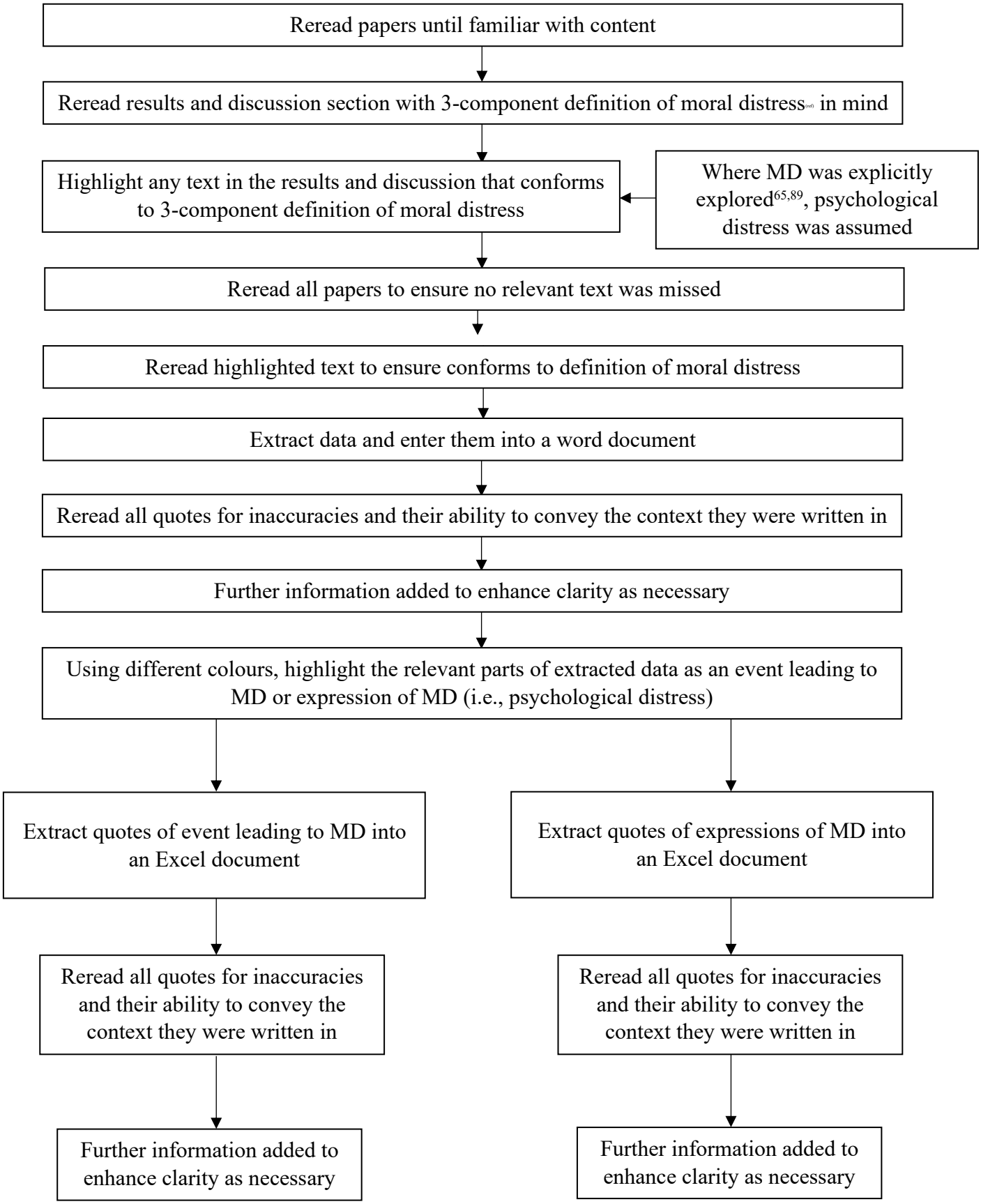
1.9.7 Table 1-7: *Content analysis of each included study displaying the frequencies and most frequently used expressions of moral distress.*

Paper number	Expressions extracted of moral distress		Most frequently used expression of moral distress
	Total	Unique	
1	1	1	Frustrat(ion/ed/ing)*
2	43	24	Helplessness
3	6	5	Hurt
4	29	15	Guilt(y)*
5	12	11	Guilt(y)*
6	6	5	Ang(er/ry)*
7	4	2	Shame
8	5	2	Moral distress
9	22	5	Moral distress
10	27	17	Shame
11	6	5	Feels bad
12	3	3	Difficult… emotions and thoughts; Tension; Negative experiences
13	4	2	Frustrat(ion/ed/ing)*
14	3	3	Frustrat(ion/ed/ing)*; Fear; Dissatisfaction
15	20	12	Frustrat(ion/ed/ing)*
16	2	2	Frustrat(ion/ed/ing)*; hard
17	2	2	Frustrat(ion/ed/ing)*; Bad conscience
18	4	4	Moral distress; Upset; Worst case scenarios; Cognitive dissonance
19	17	14	Frustrat(ion/ed/ing)*

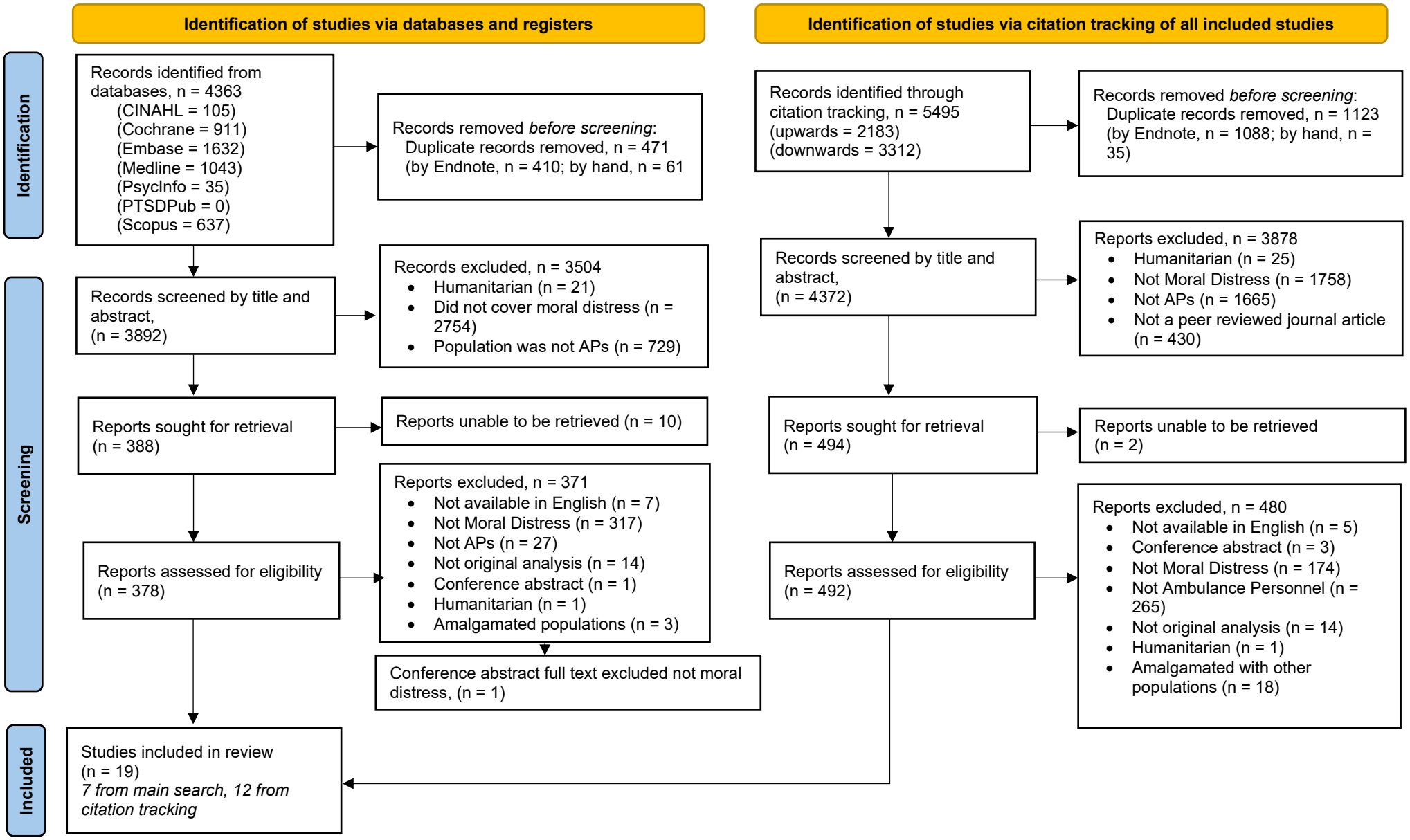
Note. Where more than one expression is listed, this is because all were extracted at equal rates.

* This is a collapsed category of expressions using differing tenses.

1.9.8 Figure 1-1: *Process map of the data extraction for the content analysis and critical interpretative synthesis*



1.9.9 Figure 1-2: *PRISMA[62] flow chart indicating study selection process*



1.10 APPENDICES

1.10.1 Appendix 1-A: Author guidelines for the emergency medicine journal[129]

1.10.1.1 Submission guidelines

Please review the below article type specifications including the required article lengths, illustrations, table limits and reference counts. For all submissions, the word count should be included on the cover page. The word count excludes the title page, abstract, tables, acknowledgements, contributions and references. Manuscripts should be as succinct as possible. For further support when making your submission please refer to the resources available on the BMJ Author Hub. Here you will find information on writing and formatting your research through to the peer review process. You may also wish to use the language editing and translation services provided by BMJ Author Services.

1.10.1.2 Systematic review

This article type includes all research reviews that systematically synthesise evidence (e.g. Systematic reviews, Meta-analysis, Mixed methods reviews, etc). Systematic reviews summarise and evaluate existing literature to answer a particular question (e.g. what is the best method of beta-agonist delivery for patients with acute asthma exacerbations). EMJ does not accept scoping reviews. PRISMA guidelines should be followed and a checklist submitted. Registration with PROSPERO is recommended. The methods should include a description of the process of literature retrieval, including who the abstractors were and how agreement was reached on which articles to include. The exact search terms should be available in an on-line appendix. An evaluation of the papers for presence of bias is essential. Meta-analysis is optional. Please include the research type in your title to make the nature of

your study clear. This type of paper is considered research and the paper should have a structured abstract and key messages.

Word count: up to 3000 words

Illustrations and tables: up to 6 tables

References: up to 30

Please include the key messages of your article after your abstract using the following headings. This section should be no more than 3-5 sentences and should be distinct from the abstract; be succinct, specific and accurate.

- **What is already known on this topic** – *summarise the state of scientific knowledge on this subject before you did your study and why this study needed to be done*
- **What this study adds** – *summarise what we now know as a result of this study that we did not know before*
- **How this study might affect research, practice or policy** – *summarise the implications of this study*

This will be published as a summary box after the abstract in the final published article.

1.10.1.3 General writing and formatting guidelines

Keywords

Keywords are specific terms that define what your paper is about. Keywords are important for search engine optimisation and enhance the discoverability of your work and its impact. They also help editors to identify peer reviewers for your manuscript.

We ask authors to use Medical Subject Headings (MeSH) descriptors as keywords to optimise discoverability. MeSH provides two tools to help authors select MeSH descriptors as keywords:

- **MeSH on Demand** – input text from an abstract to automatically identify related terms
- **MeSH Browser** – search for related terms and descriptors using an existing list of keywords

You can start to type in a term and select from a list of suggested matches or search the full list of keywords. If your required MeSH descriptor is not available in the keyword list please contact the editorial office who will arrange for it to be added. You will be able to include this at revision.

Manuscript format

The manuscript must be submitted as a Word document (*BMJ Case Reports* and *Veterinary Record Case Reports* request that authors submit using a template which should also be in Word format). PDF is not accepted.

The manuscript should be presented in the following order:

- Abstract, or a summary for case reports (Note: references should not be included in abstracts or summaries)
- Main text separated under appropriate headings and subheadings using the following hierarchy: BOLD CAPS, Bold lower case, Underlined, Italics
- Tables should be in Word format and placed in the main text where the table is first cited. Tables should also be cited in numerical order

- Acknowledgments, Competing Interests, Funding and all other required statements
- References. All references should be cited in the main text in numerical order

BMJ has introduced a submission prefill tool to help authors populate various fields on submission of their manuscript to ScholarOne. When authors start their submission they will have the option, when prompted, to upload their manuscript enabling the system to automatically extract and populate the following submission fields if available in the main manuscript document: Title, Abstract, Authors, Institutions, Funders. This tool typically reduces the time taken to submit a manuscript by 25%.

Figures must be uploaded as separate files (view further details under the Figures/illustrations section). All figures must be cited within the main text in numerical order and legends should be provided at the end of the manuscript.

Online Supplementary materials should be uploaded using the File Designation "Supplementary File" on the submission site and cited in the main text.

Please remove any hidden text headers or footers from your file before submission.

Style

Acronyms and abbreviations should be used sparingly and fully explained when first used. Abbreviations and symbols must be standard. SI units should be used throughout, except for blood pressure values which should be reported in mm Hg.

Whenever possible, drugs should be given their approved generic name. Where a proprietary (brand) name is used, it should begin with a capital letter.

To ensure a consistent approach, submitted articles should not include Trademark or Registered trademark symbols in the main text, tables or figures.

Figures and illustrations

Images must be uploaded as separate files. All images must be cited within the main text in numerical order and legends must be provided (ideally at the end of the manuscript).

Colour images

For certain journals, authors of unsolicited manuscripts that wish to publish colour figures in print will be charged a fee to cover the cost of printing. Refer to the specific journal's instructions for authors for more information.

Alternatively, authors are encouraged to supply colour illustrations for online publication and black and white versions for print publication. Colour publication online is offered at no charge, but the figure legend must not refer to the use of colours.

Tables

Tables should be in Word format and placed in the main text where the table is first cited. Tables must be cited in the main text in numerical order. Please note that tables embedded as Excel files within the manuscript are NOT accepted. Tables in Excel should be copied and pasted into the manuscript Word file.

Tables should be self-explanatory and the data they contain must not be duplicated in the text or figures. Any tables submitted that are longer/larger than 2 pages will be published as online only supplementary material.

References

BMJ reference style

BMJ formats references using Vancouver style; references are sequentially numbered within the text of the main document and match the reference list at the end of the article. The first three authors are listed by last name and initials, with additional authors acknowledged by the use of 'et al' if applicable. Depending on the type of reference, we may also include: the publication name, date of publication, volume and page numbers, chapter, DOI, URL, PubMed ID, access date, and any other necessary information.

Exception: Medical Humanities uses Chicago author-date referencing which is more commonly used in social sciences; references are listed by author and date within the text of the main document with the an alphabetical reference list at the end of the article. Please see the online style manual for details and this published article for examples.

Preparing references

- Authors are asked to follow these guidelines when formatting their references:
- References should be cited in numerical order (i.e., 1,2,3) in the text and be listed numerically in the reference list at the end of the article
- The reference list should be included as part of the main text document and not in the footnotes
- References cited in the text should be presented in square brackets [6] or parentheses (6) rather than superscript
- Multiple reference citations should be separated by commas [6, 9, 12] or by hyphens if numbers are sequential [12-15]

- Reference citations within figures and tables (or their legends/footnotes) should be listed in the reference list
- References in the reference list should include:

    1. author names in any format
    2. article title
    3. DOI or PubMed ID

Acknowledgements

Authors whose research has been presented at a scientific meeting are of course still able to publish in any of our journals, but we ask that prior presentation of the work at a conference should be acknowledged in the manuscript and any published conference abstract(s) should be cited

1.10.2 Appendix 1-B: Additional information to meet journal requirements for publication

1.10.2.1 Key messages

What is already known on this topic

Moral distress is thought to be the psychological distress that arises from a moral event, it could affect anyone. Moral distress could occur due to constraints meaning a person is unable to take what they believe to be the right course of action, because there is no 'good' option, because an individual may not know the right course of action, or because the outcome was negative despite the efforts an individual took to ensure otherwise. There is a plethora of research into moral distress in various populations, however ambulance personnel working in prehospital emergency services have been neglected.

What this study adds

This paper corroborates that moral distress is something afflicting ambulance personnel working in prehospital emergency services internationally. This paper adds unique insights into the sources of moral distress in ambulance personnel (for example from potential underlying conditions that lead to moral distress through to specific situations and presentations APs respond to), how ambulance personnel may express moral distress (such as frustration, guilt, and shame), as well as some of the parameters of moral distress (e.g. a range of intensity from mild to extreme experiences).

How this study might affect research, practice or policy

This study shows the dire need for further research into moral distress in APs in order to expand upon the current limited understanding. The current knowledge base within this population is still in its infancy therefore recommendations around policy and procedures are

not made. However, moral distress has been and will likely continue to be something that APs will face. Therefore, the occupational hazard of moral distress should be given greater recognition and credence by ambulance personnel, the organisations they work for, the wider health system, as well as the society they serve. When the knowledge base is more substantive, this should be incorporated into practice and policy for APs moving forward.

1.10.3 Appendix 1-C: Bibliography of the papers used to derive the types and facets of moral distress and the wider moral landscape contained in Table 1-1

Topic overview	Paper	Brief description of the aim/scope of the paper
Moral injury, any population	Litz et al (2009)[30]	Leading paper on moral injury, provides a narrative about moral injury and discusses their quantitative study and a potential the treatment model
	Griffin et al. (2019)[50]	Mixed methods review of moral injury. They focus on studies: • Describing/predicting MI, looking at the sequalae in terms of religious/spiritual, biological, psychological, behavioural, social factors, • Describing factors that impact outcomes of MI, including intervention studies.
	Williamson, Stevelink, Greenberg (2018)[130]	Quantitative review of potentially moral injurious events examining: • Associated mental health outcomes, • Moderation effects of other variables
Complex Moral Injury, veterans	Fleming (2022)[131]	A conceptual paper introducing the concept of complex MI, how this is different to standard MI, and how both may occur and be healed and recovered from
Moral injury, healthcare populations	Rushton, Turner, Brock, Braxton (2021)[26]	A literature review of moral injury, presents a model of the moral landscape that includes MD. It has an implicit focus on critical care nursing.
	Cartolovni, stolt, scott, suhon (2021)[21]	A scoping review of MI in HCPs and its relation to MD.
	Murray (2019)[99]	Information piece on the author and why she became interested in MI. Discusses MI in paramedics.
	Lentz, Smith-MacDonald, Malloy, Carleton, Bremault-phillips (2021)[24]	Scoping review of moral injury among firefighters, paramedics and police officers
	Epstein & Delgado (2009)[132]	Opinion piece describing the crescendo effect and an intervention strategy for MD

Topic overview	Paper	Brief description of the aim/scope of the paper
Moral distress, healthcare populations	Corley (2002)[133]	A major review of research up to 2002, with a model of MD presented and collation of relevant terms.
	Lamiani, Borghi & Argentero (2017)[40]	Quantitative systematic literature review and bibliometric analysis of MD and the organizational and psychological related constructs in healthcare populations.
	Giannetta, vila, pennestri, sala, mordacci, manara (2020)[134]	A systematic literature review of the different measurement scales used to assess MD in healthcare populations.
	Schluter et al (2008)[41]	A systematic literature review exploring if nurse turnover is a consequence of MD poor organizational ethical climate.
	Delgado, siow, de Groot, McLane, Hedlin (2021)[27]	Moral resilience and communities of practice by healthcare professionals in the background of COVID-19.
	Oh & Gastmans (2015)[43]	Quantitative narrative review of MD in nurses (frequency/intensity of, demographic factors associated with, sources of, psychological responses to, and coping with MD).
	McAndrew, Leske, Schroeter (2018)[135]	Mixed methods state-of-the science review of MD in critical care nurses.
	Burston & Tuckett (2012)[39]	Systematic literature review of MD of nurses, focused on the definition of moral constraint-distress. The original focus was to identify literature within the aged care environment, but limited literature here.
	Shepard (2010)[136]	Opinion piece on MD in oncology nursing.
Conceptualization of moral distress, any population	Thomas & McCullough (2015)[20]	A select review of papers using moral-constraint conceptualization. Provides a philosophical taxonomy the categories of MD, termed ethically significant moral distress.
	Nassehi et al. (2019)[42]	A concept analysis of MD and review of studies on MD in Iran. Focuses on distinguishing features of MD from other similar concepts.
	McCarthy & Gastmans (2015)[58]	A systematic literature review of argument-based literature of moral constraint-distress in nurses. Explores conceptualisations and normative meaning, other related terms, sources of distress, and the impact of MD.

Topic overview	Paper	Brief description of the aim/scope of the paper
	Walsh (2018)[38]	Ethical review of concept of MD in nurses. Presents the argument for inclusion of a relational component to MD.
Broadening of moral distress	Morley, Ives, Bradbury-Jones, Irvine (2019)[19]	A narrative systematic review to identify existing conceptualisations of MD and derive the necessary and sufficient components of MD. Looks across multiple healthcare professions.
	Morley (2018)[137]	Opinion piece arguing for broadening of the definition of MD.
	Morley (2020)[36]	Original piece of research utilizing the subtypes of moral distress.
	Fourie (2017)[35]	Opinion piece calling for careful consideration of the broadening of MD and to create subcategories of MD.
	Fourie (2015)[138]	Opinion piece on expanding the definition of moral distress past moral constraint-distress understanding.
	Campbell, Ulrich & Grady (2016)[37]	Opinion piece on expanding MD to include six types of distress fall outside of the narrow definition (moral uncertainty, mild distress, delayed distress, moral dilemma, bad moral luck, distress by association).
	McCarthy & Deady (2008)[57]	Narrative review of the development of MD and broadening to healthcare professionals.
Moral distress special issue, health care ethics forum	Pauly, Varcoe, Storch (2012)[139]	Editorial detailing different parts of a symposium on MD. The paper focuses on lack of conceptual and theoretical clarity in MD.
	Lutzen & Kvist (2012)[140]	Explores key definitional features of MD and its relation to moral stress, stress of conscience, and the wider moral landscape (moral sensitivity, ethical climate, moral agency, moral awareness, moral responsibility). Highlights the need for an interdisciplinary approach to MD.
	Austin (2012)[141]	Highlights the organisational impact on MD, and how constraints (moral constraint-distress) are causes to enact change.
	Hamric (2012)[22]	Reviews research on MD to the symposium with a focus on the challenges and opportunities related to studying moral distress.
	Varcoe, Pauly, Webster, & Storch (2012)[118]	Focus is on the key contextual, conceptual, and definitional contentions. Highlights the importance of interdisciplinary working i.e., psychologists.

Topic overview	Paper	Brief description of the aim/scope of the paper
Moral distress in specific contexts	Sasso et al (2016)[142]	MD in undergraduate nursing students.
	Cohen & Erickson (2006)[143]	MD in oncology.
Moral decision making	Jones (1991)[144]	Reviews previous decision making literature and models, presents a new moral decision-making model
	Rest (1986)[145]	A decision-making model which relates to when MD can occur.
	Trevino (1986)[146]	A decision making model which relates to the internal/external constraints of moral constrain-distress.
	Kohlberg (1976)[147]	A moral developmental model.
Ethical decision making, first responder populations	Francis et al. (2018)[148]	Quantitative study on ethical decision making.
	Oginska-bulik (2013)[149]	Quantitative study on ethical decision making.
	Ozcan et al (2014)[150]	Quantitative study on ethical decision making.

Note. MI, moral injury; MD, moral distress.

1.10.4 Appendix 1-D: Full search strategy for each database searched

1.10.4.1 Embase

Embase was searched via Ovid on the 08th May 2022. The database coverage was 1974 to present.

1. exp morality/
2. exp ethical decision making/
3. conscience/
4. conscience/ or exp ethical decision making/ or exp morality/
5. (moral* distress or moral* transgressi* or moral* betray* or morality or PMIE or moral* conflict or moral* colo* psychological trauma or moral* violation or moral* incongru* or morally discrepan* or moral* problem or ethical* conflict or ethical* problems or ethical* dilemma or moral* sensitiv* or ethic* stress* or stress of conscience or moral* integrity or ethical* climate or moral* residu* or MDS or ECNQ).af.
6. 4 OR 5
7. exp emergency health service/ or exp psychiatric emergency service/ or exp emergency care/ or exp psychiatric emergency/ or exp emergency psychiatry/ or exp pediatric emergency medicine/ or exp emergency medicine/ or ambulance/ or ambulance transportation/ or Paramedical personnel/ or exp rescue personnel/ or exp paramedical profession/ or exp paramedical student/ or exp first responder/ or ambulance/ or ambulance transportation/ or exp rescue personnel/ or paramedical personnel/ or exp paramedical profession/ or exp paramedical student/ or exp "first responder (person)"/

8. (emergency medical technician or Ambulance or paramedic or EMT or clinical advisor or emergency care assistant or ECA or emergency practitioner or ECP or MedSTAR or emergency responder* or first responder*).af.
9. 7 OR 8
10. 6 AND 9

1.10.4.2 PsycINFO

PsycINFO was searched via EBSCOhost on the 08th May 2021. The database coverage was 1806 to present.

1. Ambulance OR paramedic OR “emergency medical technician” OR EMT OR “clinical advisor” OR “emergency care assistant” OR ECA Or “emergency practitioner” OR “emergency care practitioner” OR ECP OR MedSTAR OR “emergency responder*” OR “first responder*”
2. DE "Emergency Services" OR DE "Emergency Medicine"
3. S1 OR S2
4. “moral* distress” OR “moral* transgressi*” OR “moral* betray*” OR morality OR PMIE OR “moral* conflict” OR “moral* colo* psychological trauma” OR “moral* violation” OR “moral* incongru*” OR “morally discrepan*” OR “moral* problem” OR “ethical* conflict” OR “ethical* problems” OR “ethical* dilemma” OR “moral* sensitiv*” OR “ethic* stress*” OR “stress of conscience” OR “moral* integrity” OR “ethical* climate” OR “moral* residu*” OR MDS OR ECNQ
5. DE " Moral Development"
6. S4 OR S5
7. S3 AND S6
8. Limiters – English Language

9. Limiters - Peer Reviewed
10. Limiters - Publication Type: All Journals
11. S9 AND S10
12. S8 AND S11

1.10.4.3 MEDLINE

MEDLINE Complete was searched via EBSCOhost on the 08th May 2021. The database coverage was 1916 to present.

1. (MH "Pediatric Emergency Medicine") OR (MH "Emergency Services, Psychiatric") OR (MH "Emergency Medicine") OR (MH "Emergency Responders") OR (MH "Emergency Medical Services") OR (MH "Ambulances+") OR (MH "Emergency Medical Technicians")
2. Ambulance OR paramedic OR “emergency medical technician” OR EMT OR “clinical advisor” OR “emergency care assistant” OR ECA Or “emergency practitioner” OR “emergency care practitioner” OR ECP OR MedSTAR OR “emergency responder*” OR “first responder*”
3. S1 OR S2
4. (MH "Morals+")
5. “moral* distress” OR “moral* transgressi*” OR “moral* betray*” OR morality OR PMIE OR “moral* conflict” OR “moral* colo* psychological trauma” OR “moral* violation” OR “moral* incongru*” OR “morally discrepan*” OR “moral* problem” OR “ethical* conflict” OR “ethical* problems” OR “ethical* dilemma” OR “moral* sensitiv*” OR “ethic* stress*” OR “stress of conscience” OR “moral* integrity” OR “ethical* climate” OR “moral* residu*” OR MDS OR ECNQ
6. S4 OR S5

7. S3 AND S6
8. Limiters – English Language
9. Limiters - Publication Type: Journal Article
10. Limiters - Scholarly (Peer Reviewed) Journals
11. S9 AND S10
12. S8 AND S11

1.10.4.4 CINAHL

CINAHL was searched via EBSCOhost on the 08th May 2021. The database coverage was 1937 to present.

1. (MH "Emergency Medical Technicians") OR (MH "Prehospital Care") OR (MH "Emergency Medical Services") OR (MH “Ambulances”)
2. Ambulance OR paramedic OR “emergency medical technician” OR EMT OR “clinical advisor” OR “emergency care assistant” OR ECA Or “emergency practitioner” OR “emergency care practitioner” OR ECP OR MedSTAR OR “emergency responder*” OR “first responder*”
3. S1 OR S2
4. (MM “Morals+)
5. “moral* distress” OR “moral* transgressi*” OR “moral* betray*” OR morality OR PMIE OR “moral* conflict” OR “moral* colo* psychological trauma” OR “moral* violation” OR “moral* incongru*” OR “morally discrepan*” OR “moral* problem” OR “ethical* conflict” OR “ethical* problems” OR “ethical* dilemma” OR “moral* sensitiv*” OR “ethic* stress*” OR “stress of conscience” OR “moral* integrity” OR “ethical* climate” OR “moral* residu*” OR MDS OR ECNQ
6. S4 OR S5

7. S3 AND S6
8. Limiters – English Language
9. Limiters - Publication Type: Journal Article
10. Limiters - Scholarly (Peer Reviewed) Journals
11. S9 AND S10
12. S8 AND S11

1.10.4.5 The Cochrane Library

Cochrane Library was searched on the 08th May 2021 and the database coverage was 1995 to present.

1. MeSH descriptor: [Emergency Responders] this term only
2. MeSH descriptor: [Ambulances] 1 tree(s) exploded
    a. Tree number 2 only: [Health Care facilities, Manpower, and Services]
3. MeSH descriptor: [Emergency Medicine] this term only
4. MeSH descriptor: [Emergency Medical Services] this term only
5. MeSH descriptor: [Emergency Medical Technicians] this term only
6. MeSH descriptor: [Emergency Services, Psychiatric] explode all trees
7. MeSH descriptor: [Pediatric Emergency Medicine] explode all trees
8. S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7
9. Ambulance OR paramedic OR “emergency medical technician” OR EMT OR “clinical advisor” OR “emergency care assistant” OR ECA Or “emergency practitioner” OR “emergency care practitioner” OR ECP OR MedSTAR OR “emergency responder*” OR “first responder*”
10. S8 or s9
11. MeSH descriptor: [Morals] explode all trees

   a. Tree number 1: [Behavior and Behavior Mechanisms]
   b. Tree number 2: [Humanities]
12. “moral* distress” OR “moral* transgressi*” OR “moral* betray*” OR morality OR PMIE OR “moral* conflict” OR “moral* colo* psychological trauma” OR “moral* violation” OR “moral* incongru*” OR “morally discrepan*” OR “moral* problem” OR “ethical* conflict” OR “ethical* problems” OR “ethical* dilemma” OR “moral* sensitiv*” OR “ethic* stress*” OR “stress of conscience” OR “moral* integrity” OR “ethical* climate” OR “moral* residu*” OR MDS OR ECNQ
13. S11 or S12
14. S10 AND S13

1.10.4.6 Scopus

Scopus was searched on the 08th May 2021 and the database coverage was 1788 to present.

1. TITLE-ABS-KEY (ambulance OR paramedic OR "emergency medical technician" OR emt OR "clinical advisor" OR "emergency care assistant" OR eca OR "emergency practitioner" OR "emergency care practitioner" OR ecp OR medstar OR "emergency responder*" OR "first responder*")
2. SUBJTERMS (3604)
3. SUBJTERMS (2711)
4. S1 OR S2 OR S3
5. TITLE-ABS-KEY ("moral* distress" OR "moral* transgressi*" OR "moral* betray*" OR morality OR pmie OR "moral* conflict" OR "moral* colo* psychological trauma" OR "moral* violation" OR "moral* incongru*" OR "morally discrepan*" OR "moral* problem" OR "ethical*

conflict" OR "ethical* problems" OR "ethical* dilemma" OR "moral* sensitiv*" OR "ethic* stress*" OR "stress of conscience" OR "moral* integrity" OR "ethical* climate" OR "moral* residu*" OR mds OR ecnq)

6. S4 AND S5
7. S6 AND (LIMIT-TO (DOCTYPE , "ar"))
8. S7 AND (LIMIT-TO (SRCTYPE , "j"))
9. S8 AND (LIMIT-TO (LANGUAGE , "English"))

1.10.4.7 PTSDpubs (formerly PILOTS)

PTSDpubs was searched via ProQuest on the 08th May 2021. The database coverage was 1871 to present.

1. Ambulance OR paramedic OR "emergency medical technician" OR EMT OR "clinical advisor" OR "emergency care assistant" OR ECA OR "emergency practitioner" OR "emergency care practitioner" OR ECP OR MedSTAR OR "emergency responder*" OR "first responder*"
2. MAINSUBJECT.EXACT("Emergency Personnel")
3. MAINSUBJECT.EXACT.EXPLODE("Paramedical Personnel")
4. #2 OR #3
5. #1 OR #4
6. MAINSUBJECT.EXACT.EXPLODE("Moral Development")
7. "moral* distress" OR "moral* transgressi*" OR "moral* betray*" OR morality OR PMIE OR "moral* conflict" OR "moral* colo* psychological trauma" OR "moral* violation" OR "moral* incongru*" OR "morally discrepan*" OR "moral* problem" OR "ethical* conflict" OR "ethical* problems" OR "ethical* dilemma" OR "moral*

sensitiv*" OR "ethic* stress*" OR "stress of conscience" OR "moral* integrity" OR "ethical* climate" OR "moral* residu*" OR MDS OR ECNQ

8. #6 OR #7
9. #8 AND #5
10. #9 AND PEER(yes)

1.10.5 Appendix 1-E: The data extraction proformas

1.10.5.1 Table E-1: The initial data extraction form.

Publication details	Sample characteristics	Purpose of the study	Md related conceptual understanding	Methodology and analysis employed	Md related findings	Any other key findings	Miscellaneous information
i.e., author, publication date	***i.e., age, gender, job title, country, type of pre-hospital emergency medical service, sample size***	***i.e., aims, hypothesis***	***i.e., MD definitions/related terminology, how related to MD if indirectly studying this***	***i.e., qualitative/ quantitative/mixed, type of analysis***			

1.10.5.2 Table E-2: Final data extraction form

Study number	Publication details	Purpose of the study	Setting	Sample characteristics	Methodology and analysis employed	Brief overview of MD related findings	Miscellaneous information
i.e., author, publication date	***i.e., aims, hypothesis***	***i.e., country, type of pre-hospital emergency medical service***	***i.e., age, gender, job title, sample size***	***i.e., qualitative/ quantitative/mixed, methodology, type of analysis***			

1.10.6 Appendix 1-F: A blank copy of the QuADS critical appraisal score sheet

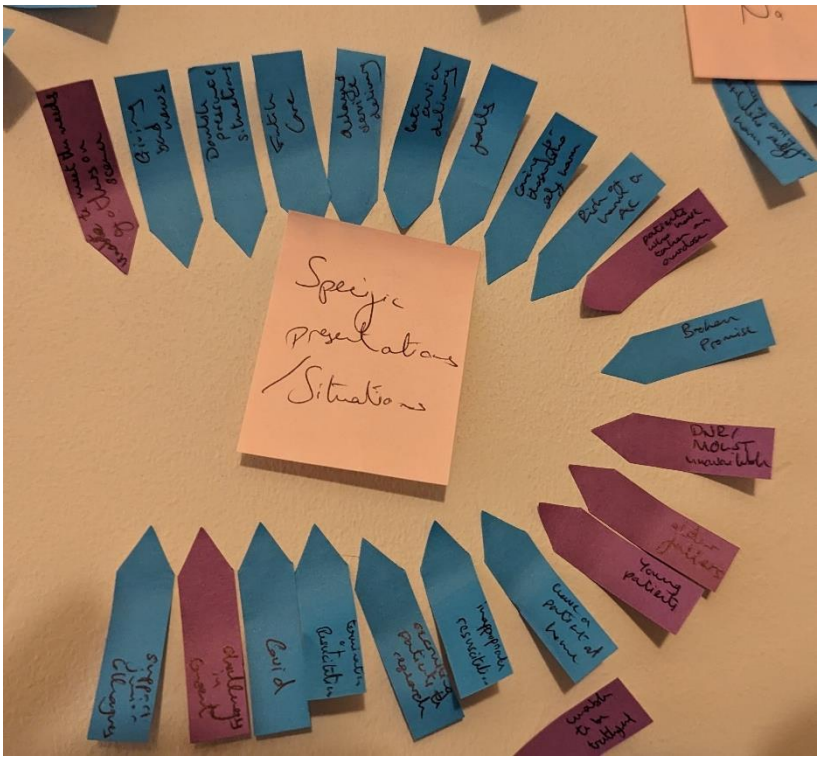
	Score (0-3) and notes
QuADS Criteria	Paper:
Theoretical or conceptual underpinning to the research	
Statement of research aim/s	
Clear description of research setting and target population	
The study design is appropriate to address the stated research aim/s	
Appropriate sampling to address the research aim/s	
Rationale for choice of data collection tool(s)	
The format and content of data collection tool is appropriate to address the stated research aim/s	
Description of data collection procedure	
Recruitment data provided	

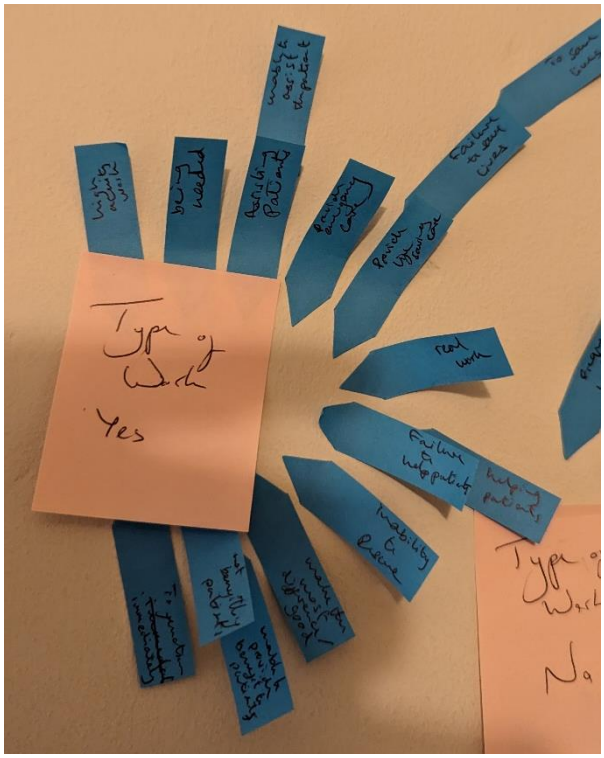
	Score (0-3) and notes
QuADS Criteria	Paper:
Justification for analytic method selection	
The method of analysis was appropriate to answer the research aim/s	
Evidence that the research stakeholders have been considered in research design or conduct.	
Strengths and limitations critically discussed	

Note. Maximum score range is 0-39.

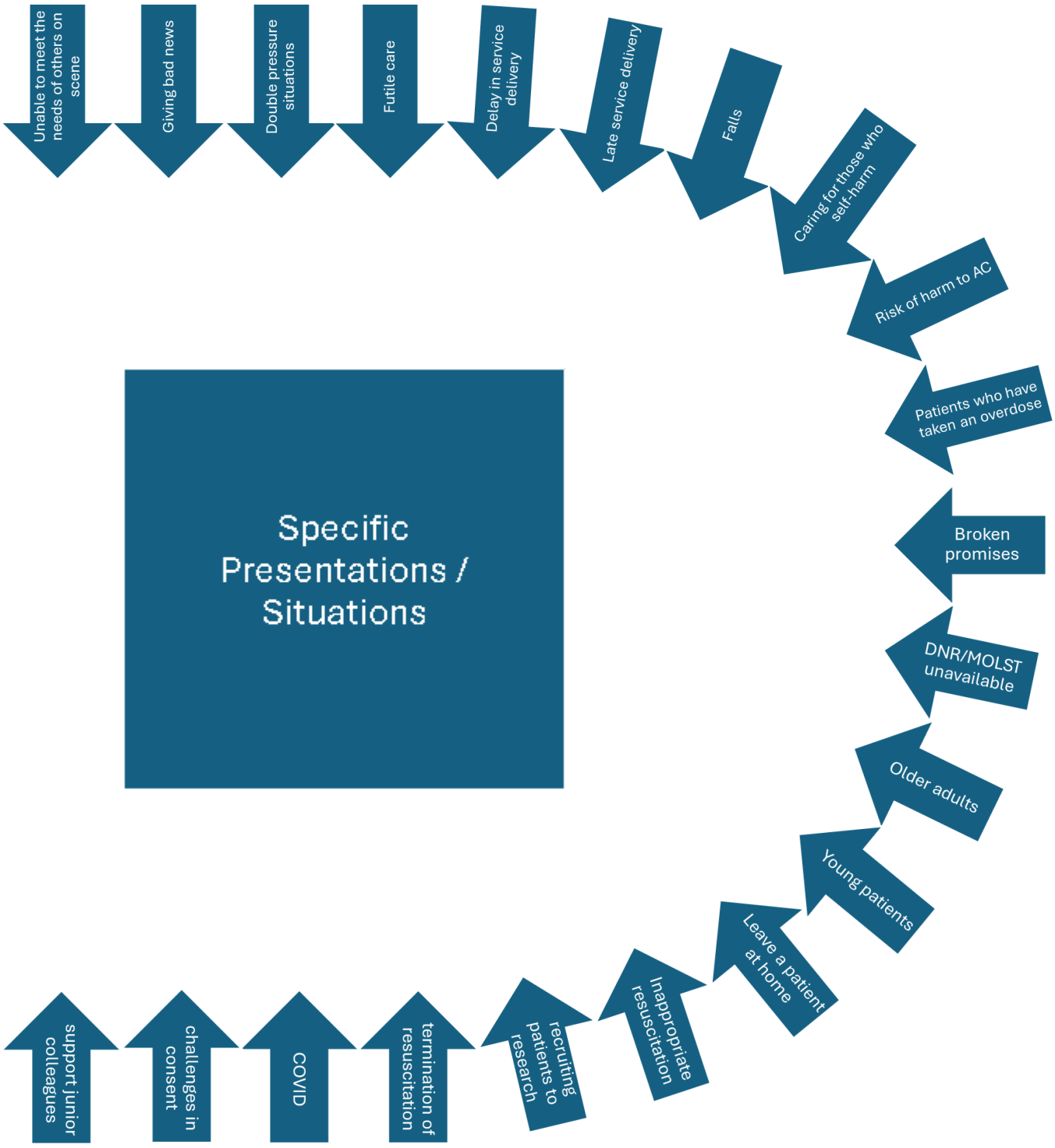
1.10.7 Appendix 1-G: photos and typed up figures of the photos mapping the process taken of deriving subthemes and themes from axial codes.

1.10.7.1 Pictures G-1 and G-2: deriving subthemes.

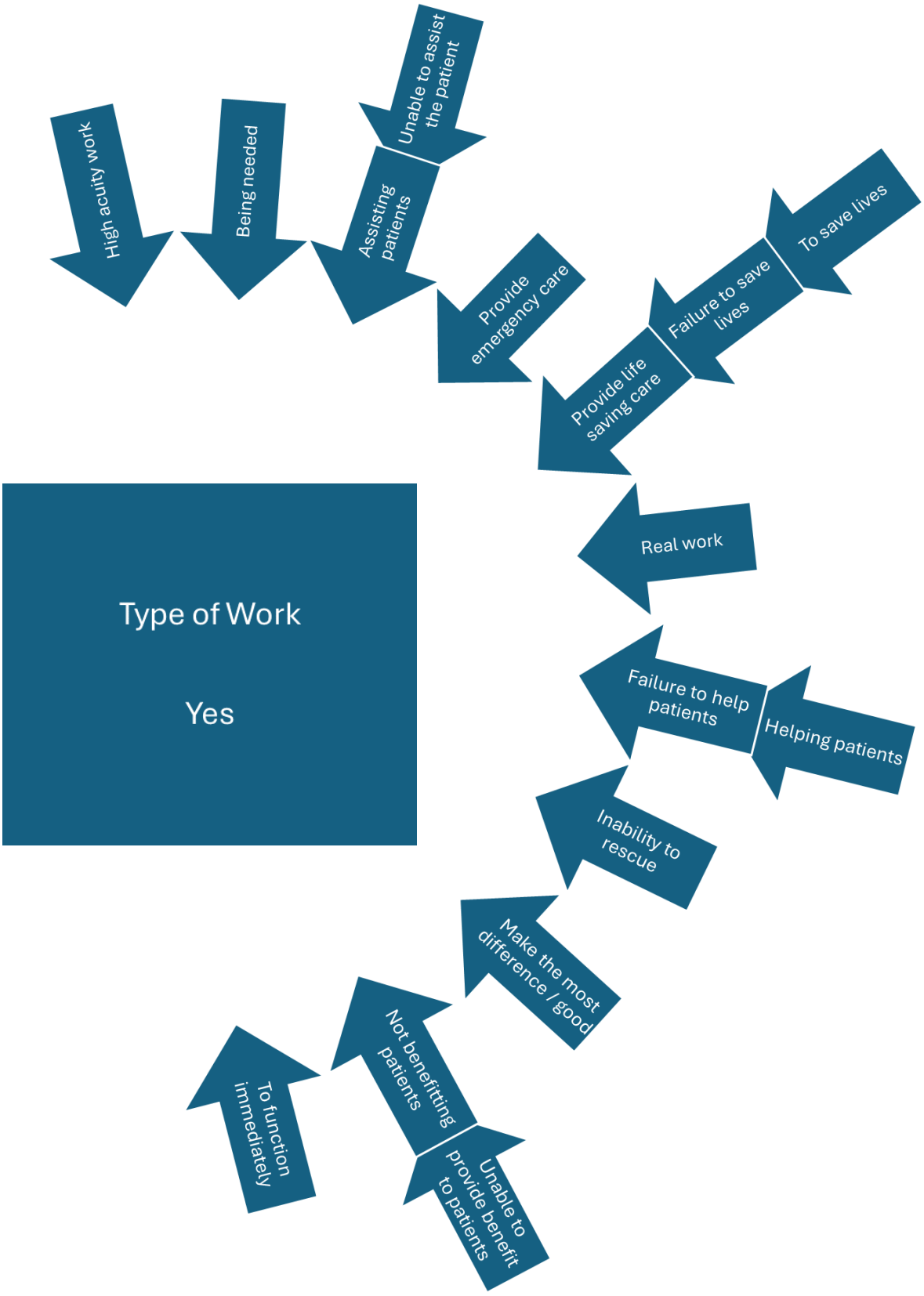




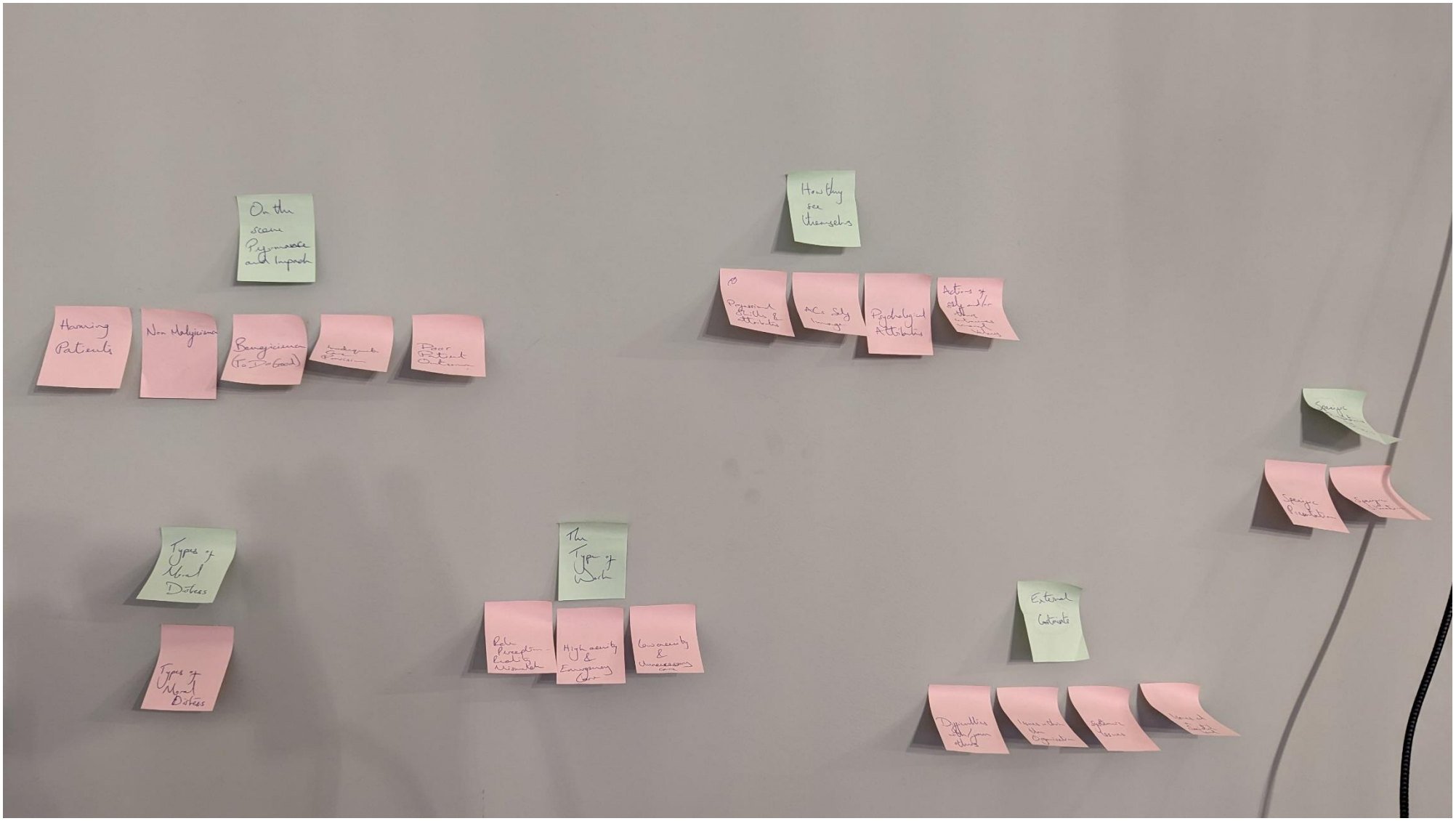
1.10.7.2 Figure G-1: typed up version of Picture G-1 of deriving subthemes.



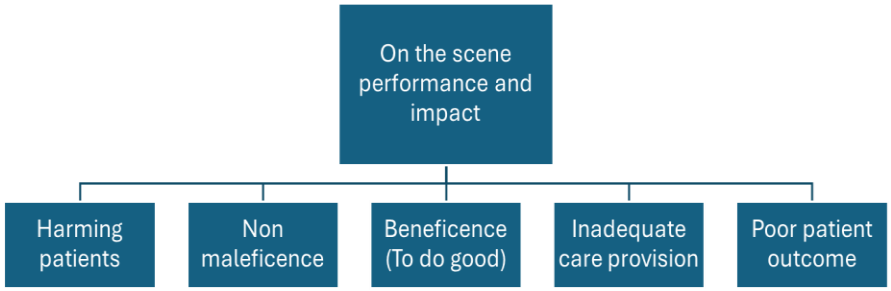
1.10.7.3 Figure G-2: typed up version of photo G-2 deriving subthemes.

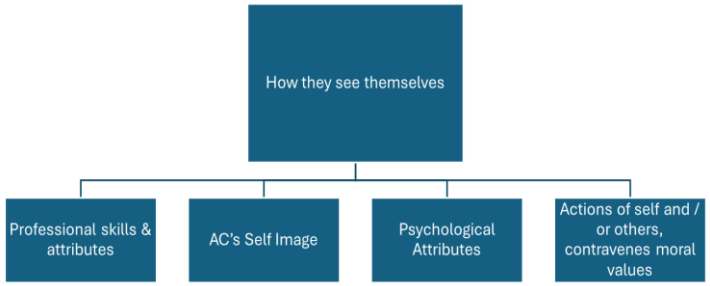


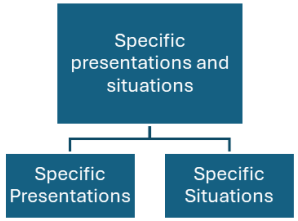
1.10.7.4 Picture G-3: Exploring themes of subthemes.

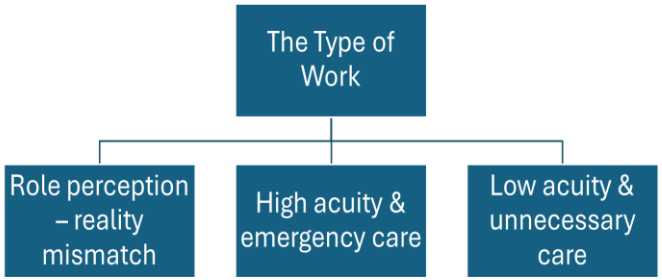


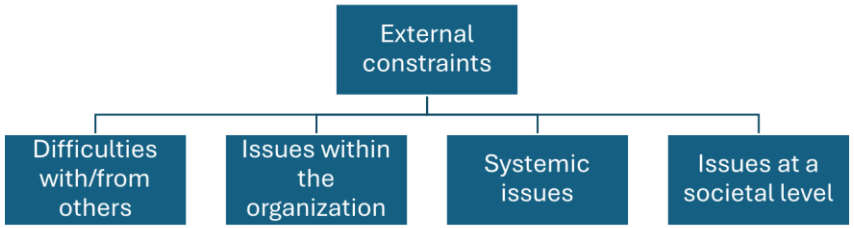
1.10.7.5 Figure G-3: Typed up version of photo G-3 exploring themes of subthemes.











1.10.8 Appendix 1-H: Expressions of the psychological distress of moral distress

1.10.8.1 Table H-1*: The frequencies expressions of moral distress were found in each paper, ordered from most-to-least frequency.*

Expression of psychological distress	The number of papers the expression was found in		
	Total	Source of interpretations	
		First order	Second order
Frustrat(ion/ed/ing)*	10	3	7
Guilt(y)*	6	1	5
Helplessness	4	1	3
Fear*	4	0	4
Ang(er/ry)*	3	1	2
Self-blame*	3	0	3
Un/discomfort*	3	0	3
Negative emotions/feelings*	3	0	3
Distress*	3	1	2
Failure*	3	0	3
Struggle	3	1	2
Concern(s)	3	1	2
Shame*	3	0	3
Moral distress	3	0	3
Overwhelmed	3	1	2
Difficult… emotions and thoughts*	2	0	2
Powerlessness	2	0	2
Stress	2	0	2
Vulnerability	2	0	2
Feels bad*	2	2	0
Disappointment	2	0	2
Self-doubt*	2	0	2
Upset*	2	2	0
Negative experiences	2	0	2
Irritation	1	0	1
Sorrow	1	0	1
Pain	1	0	1
Blame of others*	1	0	1
Lack of control	1	0	1
Undermining of their professional confidence	1	0	1
Sensitivity	1	0	1
Threat	1	0	1
Horrible	1	1	0
Hurt*	1	1	0
Heaviness	1	1	0

Expression of psychological distress	The number of papers the expression was found in		
	Total	Source of interpretations	
		First order	Second order
Unfair	1	0	1
Unethical	1	0	1
Unworthy	1	0	1
Inadequacy*	1	0	1
Betrayal	1	0	1
Suffering	1	0	1
Grief	1	0	1
Despair	1	0	1
Miffed	1	1	0
Disturbed	1	1	0
Horrendous, personally and professionally	1	1	0
Loss of personal and professional integrity	1	0	1
Regret	1	0	1
Despondency	1	0	1
Bummed me out	1	1	0
Mental and physical harms	1	0	1
Isolation	1	0	1
Insufficient	1	0	1
Worthless	1	0	1
Uselessness	1	0	1
Shortcomings	1	0	1
Negative self-perceptions	1	0	1
Inferior to others	1	0	1
Lack of understanding	1	0	1
Self-loathing	1	0	1
Hard	1	1	0
Bad conscience	1	0	1
Moral injury	1	0	1
Worry	1	0	1
Tension	1	0	1
Dissatisfaction	1	0	1
Annoying	1	1	0
Tired	1	1	0
Burnt out	1	1	0
Low acuity fatigue	1	0	1
Emotional conflict	1	0	1
Indifference	1	0	1
Worst case scenarios	1	1	0
Cognitive dissonance	1	0	1
Helpless	1	0	1

Expression of psychological distress	The number of papers the expression was found in		
	Total	Source of interpretations	
		First order	Second order
Heart-breaking	1	1	0
Disheartened	1	1	0
Resentment	1	0	1
Bothered	1	1	0
Disempowerment	1	0	1
Stigma	1	0	1
Hopeless	1	0	1
Feeling too much	1	1	0

* This is a collapsed category of expressions that used either different tenses or exact synonyms.

1.10.9 Appendix 1-I: Parameters of moral distress, its variability in onset, intensity, and duration.

1.10.9.1 Onset

The majority of APs experienced MD whilst on a call or after when they thought about what had occurred. MD could occur prospectively (e.g. on the way to low acuity calls when experiencing a role perception-reality mismatch)[67,78,79,87,88], all included papers identified MD occurred as the event unfolds or immediately after as they think about what's happened. It could also be delayed, for instance occurring once the AP has had a chance to process the event after a particularly busy shift[76,77,79,84]. Alternatively, MD could occur retrospectively, such as after gaining further information that had led to reinterpretation of an event[76,78-80,88].

1.10.9.2 Intensity and duration

The intensity varied greatly with some having mild MD (e.g. miffed[66], annoyed[88], uncomfortable[84-86], or worried[80]) through to others having a more extreme reaction (e.g. sorrow[84], despair[85], horrendousness[66], or fear[79,84,85,87]). Some morally distressing experiences were more fleeting in nature or resolved fairly quickly (i.e., guilt)[79], whilst others' MD (i.e., shame) could last far longer[77,79]. Some APs reported they were still experiencing MD decades later at the time of interviews[79]. Additionally, Jonsson & Segesten[79] found differences between shame and guilt that developed due to a moral event, with differences in intensity, duration, aetiology, and coping mechanisms.

Section 2: Systematic Literature Review

What is the current understanding of the post-traumatic growth in ambulance personnel working in pre-hospital emergency medical services? A systematic literature review

Word count (excluding references, tables, and appendices): 7,997

abstract: 273 words

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[e]See Appendix 1-A for author guidelines, and Appendix 2-A for additional information to meet journal requirements for publication.

2.1 ABSTRACT

Background. Posttraumatic growth (PTG) is the positive change that occurs in people's behaviour, goals, and beliefs following traumatic experiences; it does not negate the negative trauma-related sequalae. There is increasing interest in PTG in ambulance personnel (AP) working in prehospital emergency medical services, and it is now timely to collate findings and seek to understand how PTG and coping may be related.

Methods. A systematic literature review was conducted across seven databases (Embase, PsycINFO, MEDLINE, CINAHL, The Cochrane Library, Scopus, and PTSDpubs). Included papers explored PTG using validated questionnaires in APs. Upwards and downwards citation tracking was completed, inclusion/exclusion criteria were agreed *a priori,* and data extracted according to a proforma. All included articles were appraised using the AXIS Appraisal Tool for cross sectional studies.

Results. Five papers were selected from 952 records. All were methodologically good but suffered from poor reporting and potential non-responder bias. A total of 904 APs (e.g. paramedics, emergency medical technicians, or physicians) participated across Europe (n=3) and Australasia (n=2). Overall, PTG was experienced commonly, but this was limited. Coping was consistently positively associated with PTG, with adaptive (problem/emotion-focused) coping strategies significantly predictive of PTG. Significant mediation, suppression, and moderation effects around coping and PTG were found. Dysfunctional coping was not consistently related to PTG.

Conclusion. PTG was evident in APs, with adaptive coping being consistently related to it. Coaching in this regard may be beneficial. There were significant cross-cultural differences and the literature base is still within its infancy. Further research, preferably using a realist

approach and a longitudinal design, is warranted to take the evidence base further in understanding coping and PTG in APs.

2.2 KEY WORDS

Paramedic, First Responder, Pre-hospital, Ambulance, Post-traumatic Growth, Trauma, Coping, Emergency Medical Services.

Ambulance personnel's (APs) roles and responsibilities are complex and time-sensitive with potential life-and-death consequences[1]. APs are at high risk of mental health difficulties (e.g. depression/anxiety)[2,3] and substance-misuse difficulties[4], as well as physical health conditions, musculoskeletal issues, accidental injuries, fatal injuries, and they face higher standardized mortality rates than the general population[5,6]. One facet of an APs' role contributing to such detrimental health outcomes is the frequent exposure to traumatic events. Traumatic events are situations that are experienced as frightening, dangerous or stressful[7,8] with a personal threat to physical safety[9,10] (e.g., witnessing/being subjected to physical injury, assault, or violence[11]). For some APs, experiencing a traumatic event can result in severe psychological distress that can impede the lives they want to live, overwhelm their ability to work[12,13], and for some, lead to significant life-limiting detrimental outcomes[14-16].

The negative psychological distress following trauma can be characterised by hyperarousal, avoidance of stimuli associated with the traumatic event, and intrusive and/or recurrent thoughts, memories, dreams, and/or flashbacks[17]. These signs are termed posttraumatic stress symptoms (PTSS) and if they interfere in one's daily life for longer than one month a person may be diagnosed with posttraumatic stress disorder (PTSD)[17]. Increased exposure to traumatic events has been linked with increased social withdrawal and dissociation[18], and increased levels of burnout[19]. They have been noted to experience higher levels of secondary/vicarious traumatic stress[20] (the psychological distress from indirect exposure to a traumatic event, e.g. witnessing the aftermath of a traumatic event[21,22]), and compassion fatigue[23] (the decline in a person's ability to feel sympathetic and empathic to another person's plight, and feeling unable to approach this pain compassionately[24]). APs have been identified as a population at a greater risk than the general population for developing the above difficulties[25,26], particularly the more severe reactions from trauma such as PTSD[27]. Moreover, there is now evidence that the SARS-COVID-19 pandemic (COVID-

19 hereafter) has compounded the existing difficulties noted above, suggesting APs may be suffering more than ever[28-30].

Understanding how APs cope, recover, and grow from the myriad of detrimental occupational outcomes is highly important. Especially considering the potential life changing detrimental impact to APs of the trauma-related occupational hazards discussed above[31,32]. However, it is now recognised that positive outcomes can also occur, such as multidimensional positive changes in a persons' behaviour, beliefs, goals, and their sense of identity[33] following a traumatic event (posttraumatic growth; PTG). Conversely to trauma-related distress, PTG is associated with increased psychological and physical wellbeing[34], greater life satisfaction[35], and increased happiness[36]. Those experiencing PTG have been found to have decreased distress and PTSD years after the initial trauma[37], as well as continuing to experience the aforementioned benefits up to a decade later[38]. Specific to work-related PTG, work-related outcomes include positive work identity, career proactivity, and prosocial leadership[39].

The positive changes encapsulated within PTG can occur across five areas of people's lives: 1) a person's perception of their own internal strength to handle such situations, 2) recognition of new possibilities for their life, 3) closer and more compassionate relationships with others, 4) a greater appreciation for life and a change from intrinsic to extrinsic priorities (for example from gaining wealth to having new experiences with significant others), and, for some individuals, 5) positive changes to personal spirituality[40]. These five areas form the basis for measurement scales, such as the 21 item[f] post-traumatic growth inventory (PTGI)[41]. This is the most widely used and validated questionnaire[42] and can establish prevalence rates

[f]Using a six-point Likert scale from zero ("I did not experience this change as a result of my crisis"), through to five ("I experienced this change to a very great degree as a result of my crisis"). Higher scores indicate a greater degree of PTG experienced.

that at least some growth occurred, however nominal. Interpretation of the PTGI scores in terms of clinical significance and utility has not yet been standardised and are often arbitrary[43]. However, a preliminary guide to interpretation is emerging from the literature base, whereby a cut off of 60% of the maximum possible score is seen as indicating moderate levels of PTG[43].

PTG is thought to occur through a complex process beginning with a traumatic event, whereby there is personal threat to one's safety. The threat from a traumatic event must then reach a level that can challenge, threaten, violate or shatter a persons' worldview and/or belief system, resulting in significant psychological distress and dysregulated emotions[39,40,44]. The person can go through periods of cognitive engagement (i.e., rumination and self-reflection), and cognitive processing (i.e., disclosure of their trauma(s) with others, narrative development, and developing life wisdom)[40,44]. Thus, enabling meaning making, emotional regulation, and repairing/rebuilding of internal schemas[39]. The ability to engage in these cognitive strategies that support the development of PTG relies on a person's ability to be resilient[44,45] (i.e. their ability to tolerate and adapt to negative experiences, which has developed through previous exposure to adversity[46]). Whilst PTG can co-occur with psychological distress (i.e., PTSS or PTSD)[47-51], this is a small association and PTG can sometimes replace the distress[52].

The relationship between PTG and the level of threat and PTSS, as well as level of resiliency, appears to be curvilinear[44,53]. Too much distress and too little resiliency and the individual may be overwhelmed. Therefore, unable to engage in the cognitive strategies needed to process, emotionally regulate, and repair/restore their core beliefs necessitated for the development of PTG[40,44]. However, not enough distress or too high a level of resiliency and the core beliefs are not transgressed. Thus, no restoration or meaning making is needed

and the likelihood of developing PTG is reduced[44,53-55]. This curvilinear relationship is evident where low and high growth associated with low PTSS and moderate PTG with moderate PTSS[56,57]. Significantly, the optimum levels of resilience or distress needed to create the necessary conditions for PTG to develop are not yet understood[44,53]. These relationships require further examination, with a better understanding of what constitutes too little, too much, or just the right amount of distress and resilience and the associated factors of these.

Despite a multitude of factors being examined to better understand how to encourage and enhance development of PTG[51,52], the nature of these relationships are not well understood and are contested[48,53,58]. Contrastingly, coping has consistently been found to be of prominence in the literature exploring PTG[59,60]. Coping is conceptualised as the ways in a person reacts to and manages life events and difficult experiences[61,62]. The strategies one uses are typically thought of as adaptive or maladaptive[63,64], with adaptive coping further delineated into two areas. Namely, problem-focused strategies, which attempt to deal with or remove the source of stress itself through planning, problem solving, seeking help from others with the issue, and putting other problems to one side (i.e., prioritising needs)[65]. Secondly, emotion focused strategies attempt to regulate an emotional reaction and the subsequent expression[65] (i.e., use of emotional support, acceptance, religious coping, positive reinterpretation and growth, and mental disengagement)[66]. Maladaptive or dysfunctional coping are typically ways in which one avoids the stressor either emotionally, cognitively, or physically (i.e., behavioural disengagement, a focus on venting one's emotions, substance use, and denial)[64,66,67]. The prominence of coping within PTG[59,60] could be expected given the dominant developmental models of PTG[39,44]. Attempts to engage with, process and regulate one's emotions and the process of meaning making are all integral and necessary steps in the development of PTG[39,44]. Depending on one's coping strategies, these steps would be

achieved more or less effectively. The prominence and fundamental nature of coping strategies for PTG has been found within various healthcare populations[43,52,64]. For example, HCPs receive training to use specific coping strategies known to be associated with greater levels of PTG, alongside possibly higher exposure to traumatic events[43], highlighting potential intervention strategies.

Naturally, the literature base has expanded to include factors related to coping strategies and their possible utility in enhancing PTG. For example, one's affective state[68] has been associated with PTG[69,70] and differing choices around coping strategies[71]. Positive affectivity is associated with the use of adaptive coping strategies[71] and PTG[72], whilst negative affectivity has been associated with dysfunctional coping[71] and unrelated to PTG[72]. One's affectivity has also been shown to mediate the relationship between personality (the trait characteristics of an individual's disposition[73]) and coping[74]. With one's personality characteristics (e.g. hardiness or openness) being directly positively associated with PTG as well[52,69,75]. Of note, resiliency and coping has also gained substantial focus, with similar patterns to the research around affectivity in that adaptive strategies and resilience supported the development of PTG[63,64]. From the various ways coping has been explored in relation to PTG, it is clear that a person's style of coping is likely integral for the understanding of how PTG develops.

Despite the prominence of coping and PTG within other HCPs[64], there are currently no systematic literature reviews exploring PTG and coping within prehospital emergency medical services (PHEMS). Given the high level of exposure to traumatic events and significant occupational hazards APs must navigate as a profession, particularly following the aftermath of COVID, it would be timely to gain a better understanding of the literature base surrounding PTG. Focusing on collating PTG and coping related literature gives an

alternative understanding to the impact of trauma APs regularly face, whilst elucidating potential avenues for interventions to encourage PTG for the individual[70] as well as the organisations they work within[39]. Therefore, it would be efficacious to conduct a review exploring PTG in APs that specifically explored if/how AP's coping strategies were related.

2.3 AIMS

To systematically identify, appraise and collate evidence that explicitly explores coping and PTG in APs working in PHEMS. This review aimed to 1) establish whether coping has been consistently associated with PTG in the literature base so far, and 2) explore the nature of the relationship found between coping and PTG. Collation of this literature also enables identification of any gaps in knowledge and understanding that would benefit from further exploration. Initial scoping searches and a recent systematic review by Coyte, Betihavas, Devenish, and Foster[63] that closely transects the present review highlighted there would be insufficient qualitative research to conduct a systematic review. As an integrative review was outside the scope of the present paper, the present review focused on quantitative research to explore coping and PTG in APs.

2.4 METHOD

2.4.1 Design

This review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidance[76] and neither patients nor public were involved in the review. No other reviews covering PTG and coping of APs had been conducted to the authors knowledge.

2.4.2 Eligibility criteria

2.4.2.1 Inclusion criteria

I. Studies that explicitly explored the concept of post traumatic growth.
    a) The perceived positive change that arose from the difficulty of experiencing traumatic event related distress[41,44].

II. Studies that used a validated quantitative measure of post traumatic growth,
    a) This included studies with or without the measurement of any other factors,
    b) PTG did not have to be the primary focus of the paper.

III. Included participants who were 18 or more years old only.

IV. Participants were ambulance personnel who worked within an ambulance service (i.e., those who provided critical medical care to patients, on a face-to-face basis, using an emergency vehicle within the context of pre-hospital emergency medical services).
    a) This included but was not limited to job titles such as paramedics, emergency medical technicians (EMTs), ambulance professionals, nurses and physicians etc. who practice within the ambulance service.
    b) Terms that are generic in nature did not meet this criterion, i.e., “front line” or “healthcare worker”.

V. Full texts were available in English.

VI. A peer reviewed journal article.

2.4.2.2 Exclusion criteria

I. When a full text was unavailable after reasonable attempts to obtain them (i.e., through interlibrary loans, contacting the lead author, grey literature searches).

II. Papers not featuring original analyses of primary data (i.e., commentaries, theoretical papers, essays, and reviews).

III. Papers which presented findings amalgamated across populations, where ambulance personnel specific data could not be separated (e.g. police, firefighters and ambulance personnel as one result).

IV. Papers not explicitly exploring the concept of coping.

2.4.3 Information sources

Seven databases of Embase via OVID, PsycINFO, MEDLINE, and CINAHL using EBSCOhost, The Cochrane Library, Scopus, and PTSDpubs (formerly PILOTS) via ProQuest.

2.4.4 Search and screening

The main search was completed on 11/03/23 and used free text and truncated terms, as well as appropriate index terms, MeSH and Subject headers. For example, on the Cochrane database: paramedic OR “Emergency responder*” AND “posttrauma* growth” OR MH "Posttraumatic Growth, Psychological". The limiters of English language, being a journal article, and peer reviewed were applied. The full search strategy is available in Appendix 2-B. Articles were extracted and initially de-duplicated using EndNote X9, with any further duplicates removed by hand. Titles and abstracts were screened against the eligibility criteria and remaining articles sought for full text screening. Included articles were subjected to upwards and downwards citation tracking, on 13/03/23. Any additional articles identified for inclusion underwent upwards and downwards citation tracking, on 14/03/23. Any meta-analyses identified during the search that used amalgamated population data but met all other eligibility criteria were hand searched for any further relevant articles, yielding one further study. Scopus was used to identify citing and cited references as this proffered the majority of articles included from the initial search. After the search process was complete, it was noted

that no articles were included from North and South Americas or Africa. A brief grey literature search for research conducted in North America was completed to explore if this may be a limitation of the search strategy or representative of a dearth of research. Free text search terms for APs, PTG and relevant countries (USA, America, Canada) were used and no additional papers identified.

There were two instances where the same study was published in different journals in 2015[46] and then in 2018[77]. The 2018 paper was excluded as no new data, analyses, or findings were presented.

2.4.5 Quality assessment

The Appraisal Tool for cross sectional studies (AXIS)[78] was used to assess quality, Appendix 2-C contains a blank version of the score sheet. It was developed to systematically examine the reliability and validity of cross-sectional studies. It uses a flexible approach to quality appraisal whereby reviewers assess risk of bias whilst incorporating the quality of reporting. Nineteen questions cover a papers' aims, design, description and interpretation of results, and any conclusions drawn, with specific questions regarding funding/ethical issues. Reviewers appraise a paper as meeting a criterion (yes, no, or don't know), with the option to include comments as necessary. This tool was chosen for its applicability to cross-sectional studies and comprehensive coverage of topics from inception through to conclusion of a study. Each paper was inspected against the AXIS criteria and appraised individually for quality. Papers were not excluded based upon AXIS ratings. However, the ratings were used to weigh evidence from each paper as part of the process synthesising the data. The AXIS was also used to examine potential trends across studies, for example where there were consistent strengths or weaknesses.

2.4.6 Data extraction

Specific data to be extracted was decided a priori, including publication details and information on the sample, design, context, and analyses conducted as well as specific PTG information (i.e., definitions, measurement, results) and other outcome related information (i.e., factors explored, measurement scales, and results). The initial data extraction form (Appendix 2-D, Table D1) was trialled on two of the included studies[65,66g], and amendments made to improve the relevancy of information extracted (e.g., focussing extraction template to coping related information and specific statistical analysis and results regarding the relationship between PTG and coping). The rationale for any changes made has been noted at the end of Appendix 2-D. The final data extraction form (Appendix 2-D, Table D2) was used for the remaining three studies,

2.4.7 Data synthesis

The findings of the included studies were narratively synthesised[79] in line with the aims and purposes of the present review. The state of research exploring PTG of APs was reported, including the frequency and degree of PTG experienced. Interpretation of the degree of change was based on Wu et al.'s [43] cut off of 60% of the total possible score on the PTGI[h] indicating moderate degree of positive change. The results of the five papers were then explored in for consistent relationships between coping and PTG and then in greater depth, synthesising the nature of said relationships. Cross-cultural differences in PTG have been noted[80-82] alongside significant cross-cultural differences in ambulance service infrastructure,

[g] Chosen based on alphabetical order of first author.
[h] Equivalent to an average of ≥63 or more out of a possible 105 on the PTGI.

organisational structure, and the certification routes to working in PHEMS[83,84]. Therefore, further statistical analysis was not conducted to combine results of the included studies.

2.5 RESULTS

2.5.1 Study selection

The search strategy (see Figure 2-1) identified 1,252 papers, of which 952 unique titles and abstracts were screened. A total of 890 papers were then excluded based on the inclusion/exclusion criteria and a further 57 full text papers screened and excluded. A total of five articles were retained for synthesis, with the study characteristics outlined in Table 2-1 alongside the PTG and coping related results.

2.5.1.1 Critical appraisal

Table 2-2 denotes the scores on each of the criteria of AXIS[78] for the five included studies. All were of good quality overall, with clearly stated aims, well thought out and ethically minded designs, and robust methodologies. Additionally, no concerns were identified around discussions or conclusions drawn from results, nor conflicts of interest or biases from funding. However, all studies were limited by the lack of reporting regarding the populations sampled and the sampling methods used; see items three, five, seven, 12, and 13. Additionally, potential non-responder bias was highlighted by the two studies[65,67] reporting response rates (9.3%[67] and 27%[65]). Most significantly, these issues were not substantial enough to call into question the overall quality of the five studies, although caution was noted around the generalisability of findings due to risk of sampling bias.

2.5.2 Sample and study characteristics

The five studies included 904 APs (25% women), aged 18-67, across Poland[46], Slovakia[66], Portugal[65], and Australia[67,85]. The participants had a range of job titles (i.e., paramedics[46,66,67], paramedic peer support officers[67], emergency technicians/nurses[65], or ambulance officers[85]) and a wide range of experience working in PHEMS (six weeks to 39 years[67]).

All included studies were cross-sectional in nature and published between 2005 and 2022. PTG was defined across the five studies as the positive changes that occurred after experiencing a traumatic event and conceptualised as an outcome. Jurišová[66] also integrated the Schaefer & Moo[86] model of life crises and personal growth. This model describes the influence of individual and external factors on a person's perception and coping after a traumatic event and, therefore, the influence on the development of potential positive outcomes from trauma. The included papers used correlations, hierarchical regressions, and structural equation modelling to explore the relationship between coping and PTG.

2.5.2.1 Measuring PTG

All included studies used the PTGI[41] to measure PTG, with three different versions used. Three studies[66,67,85] reported using the original PTGI[41], two of which[i] measured work-related PTG by asking participants to think of a work-related traumatic event in Slovakia[66] and Australia[67]. Fonseca et al.[65] and Ogińska-Bulik & Kobylarczyk[46] used cross-validated Portuguese[87] and Polish[88] versions respectively and specified the most traumatic event with no distinction between home/work life trauma. Characteristics of the different versions are

[i] One study gave no description of any directions regarding the traumatic event participants could use to complete the PTGI[85].

presented in Table 2-3. Only two studies reported the internal consistency of the PTGI, finding excellent internal consistency in APs from Australia (α=.97)[67] and Portugal (α=.95)[65].

2.5.2.2 Measuring the ways that APs cope with stressful events

Most studies used the full or abridged cross-validated versions of the multidimensional coping inventory[62] (COPE; *n*=4); full details of which are presented in Appendix 2-E. The 60 item Slovakian COPE[89] (used by Jurišová[66]) and the 28 item Portuguese Brief-COPE[90] (used Fonseca et al.[65]) contain the three domains of coping covering adaptive (problem/emotion-focused), and dysfunctional (avoidance) strategies. Whilst Fonseca et al.[65] reported findings according to these three domains, Jurišová[66] did not group individual coping strategies during analyses. Correlations reported by Jurišová[66] for individual coping strategies have been collated into these domains for the purpose of synthesising findings across studies, other analyses were not collated. Kirby, Shakespeare-Finch, and Palk[67] used the 40 item revised COPE[91] measuring five factors (self-help, approach, accommodation, avoidance, and self-punishment). They collapsed these five factors into two domains of adaptive strategies (approach, self-help, and accommodation; α=.91), and maladaptive strategies (avoidance, and self–punishment; α=.78), which are equivalent to the adaptive/dysfunctional domains noted above. Whilst Ogińska-Bulik & Kobylarczyk[46] used the Polish version of the Mini-COPE[88], strategies were not grouped or collated into any domain.

Shakespeare-Finch, Gow & Smith[85] used the 32 item Coping Responses in Rescue Workers Inventory[92] (CRRWI). The CRRWI explores coping strategies focused on meaning-making, distraction, support seeking, cognitive avoidance/numbing, cognitive reappraisal and self-talk, and self-reflection. However, the factor structure of the CRRWI has been contended[93], as such Shakespeare-Finch, Gow & Smith[85] only examined the total score on the CWWRI.

2.5.3 Synthesis

2.5.3.1 Prevalence and degree of PTG experienced by APs[j]

Only Jurišová[66] reported prevalence rates, with 100% of the Slovakian APs reported at least some degree of PTG (range=21-94). However, the degree of positive changes following trauma was low on average (mean=55.87, standard deviation [*SD*]=17.99). Contrastingly, whilst prevalence rates were not offered, Fonseca et al.[65] found that some APs reported no changes after a traumatic event (range=0-98), indicating that not all Portuguese AP's experienced PTG (even minimally). Only four[k] studies[46,65,66,85] reported the overall degree of growth APs experienced (see Table 2-4), with the majority reporting low levels of PTG except Ogińska-Bulik & Kobylarczyk[46], who reported a moderate degree of change in Polish APs (65.26%, *SD*=17.13%). Some studies[46,65,66] offered interpretations of the degree of PTG found that contrasted Wu et al.'s [43] interpretative guide, but did not expand upon how this was derived. For example, Ogińska-Bulik & Kobylarczyk[46] noted 46.2% of APs experienced high PTG, 33.8% experienced average PTG and 20% low but did not report the score ranges for each grouping. Whereas Fonseca et al[65] noted they found a moderate degree of PTG and Ogińska-Bulik & Kobylarczyk[46] reported an average degree without expanding on how this was derived. Additionally, whilst two studies did not find any significant differences between men and women[66,67], Shakespeare-Finch, Gow & Smith[85] found women scored significantly higher (mean=52.04%, *SD*=20.26%) than male APs (mean=45.45%, *SD*=20.43%); $t(502)= -2.86$, $p<.01$.

Only three studies conducted in in Slovakia[66], Portugal[65], and Poland[46] reported the average PTG for each subscale of the PTGI employed (see Table 2-5). Ogińska-Bulik &

[j] All versions of the PTGI used by included studies has a total possible score between 0 and 105, see Table 2-3.
[k] Kirby, Shakespeare-Finch & Palk[67] did not report overall PTG but did note there non-significant differences between men/women.

Kobylarczyk[46] found moderate positive change for Polish APs across all subscales except spiritual change, which was low (mean=51.10%, *SD*=29.10%). Jurišová[66] found the degree of positive change was low on all subscales except appreciation for life for Slovakian APs, which was moderate (mean=63.73%, *SD*=29.13%). Similarly, Fonseca et al.[65] found low levels of positive change across all subscales in Portuguese APs. The greatest positive changes occurred within appreciation of life for Slovakian[66] (mean=63.73%, *SD*=29.13%) and Polish[46] APs (mean=68.66%, *SD*=23.46%). Whilst Portuguese[65] APs reported one's personal strength to handle traumatic situations was the respective greatest positive changes reported (mean=51.80%, *SD*=28.80%). The lowest degree of change occurred in spiritual changes across all studies reporting subscales scores[46,65,66].

2.5.3.2 Coping and PTG

A basic overview of the findings related to coping and PTG are presented in Table 2-6

The correlations between APs ways of coping and reported PTG

Four of the included papers[65-67,85] reported correlation analyses (see Table 2-7), finding coping was consistently significantly correlated with PTG. Only Shakespeare-Finch, Gow & Smith[85] explored coping as a singular construct, finding significant moderate positive correlations with total PTG in an sample of Australian APs (r=.44, p<.001) and weak-to-moderate positive correlations across the five subscales of the PTGI[1] (r=.27 to .43, p<.001). All other included studies explored coping in terms of the domains of coping strategies - adaptive (problem/emotion-focused) and dysfunctional/avoidance (see Appendix 2-E), with variance in the direction and strength of these relationships across the countries sampled (e.g.,

[1] Increased compassion and connection with others, recognition of new possibilities for one's life, a greater appreciation for life, recognition of one's personal strength to handle such situations, and spiritual changes.

r= -.26, *p*<.05[66] to *r*=.57, *p*<.001[65]). In Slovakian[66] and Portuguese[65] APs problem-focused coping strategies were consistently positively related with overall PTG and the subscales of the respective PTGI used[41,87]. However, Fonseca et al.[65] found the stronger associations than the other papers[75,83,66], with strong positive associations between coping and overall PTG (*r*=.57, *p*<.001) and all PTGI subscales (*r*=.53 to .57, *p*<.001) except for spiritual changes that was moderately related (*r*=.41, *p*<.001). Conversely, Jurišová[66] found the weakest associations, with significant weak correlations between problem-focused strategies and overall PTG (*r*=.29 to .40, *p*<.05), and weak-to-moderate associations across all PTGI subscales (*r*=.26, *p*<.05; to *r*=.46, *p*<.01). Kirby, Shakespeare-Finch & Palk[67] results were less consistent[m], with significant positive but weak correlations between adaptive coping strategies across only three of the PTGI[41] subscales of relating to others (*r*=.23, *p*<.05; to *r*=.29, *p*<.01), personal strength (*r*=.25, *p*<.05), and spiritual change (*r*=.26, *p*<.01).

The use of emotion-focused coping strategies was consistently significantly associated with the three PTGI subscales of relating to others, personal strength, and spiritual change. However, the nature and strength of these relationships varied across studies[65,67], as well as within Jurišová's[66], study depending on the specific strategy APs employed. Fonseca et al.[65] found the strongest associations, with this type of coping style significantly moderately correlated with overall PTG (*r*=.47, *p*<.001) and with all four of the Portuguese PTGI subscales (*r*=.40-.44, *p*<.001). Whereas Shakespeare-Finch & Palk[67] found consistently weak correlations (*r*=.23, *p*<.05 to *r*=.29, *p*<.01). Jurišová[66] found significant moderate positive relationships between the use of emotional social support to cope with overall PTG (*r*=.30, *p*<.05) and the subscale relating to others (*r*=.32, *p*<.05), compared to a moderate relationship with spiritual changes (*r*=.52, *p*<.01). Furthermore, mental disengagement was only

[m] Kirby, Shakespeare-Finch & Palk[67] did not explore PTG as a singular construct.

significantly weakly negatively correlated with positive changes in personal strength (r= -.26, p<.05). Dysfunctional coping strategies were significantly positively associated with PTG, however, these were inconsistent across studies and varied considerably depending on the strategy used. Jurišová[66] found the most consistent associations, with significant weak-to-moderate positive associations with overall PTG (r=.26, p<.05; to r=.37, p<.01) and significant weak-to-strong positive relationships with three PTGI subscales (relating to others, r=.33 to .39, p<.01; personal strength, r=.36, p<.01; and spiritual change, r=.25, p<.05). Whereas Fonseca et al.[65] found dysfunctional coping was only significantly positively related to the PTGI subscale of new possibilities/appreciation for life (r=.33, p<.001) and Kirby, Shakespeare-Finch & Palk[67] found no significant relationships. Of note, Kirby, Shakespeare-Finch & Palk[67] found significant positive weak-to-moderate relationships between dysfunctional (avoidance) coping styles and negative post-trauma sequalae (r =.18, p<. 05; to r=.33, p<.01) whilst adaptive coping styles were significantly negatively weakly correlated (r=-.19, p<.05; r=-.20, p<.05).

Regression models: how coping may predict PTG

Two of the included studies[65,67] explored this, finding adaptive coping only was a significant predictor of PTG. A third (Jurišová[66]) also explored predictive models, however, as this was in terms moderation effects this is discussed in the relevant section below. Fonseca et al.[65] found that the domain of coping strategies used significantly predicted overall PTG (F(5, 105)=12.11, p<.001; R^2=.34), with problem and emotion-focused coping strategies being significant predictors of PTG (β=0.45, p<.001; β=0.23, p<.05). Moreover, use of dysfunctional coping strategies was not a significant contributor to the model and unrelated to predicting PTG outcome (β=0.07, p=.41). Their[65] model also included emotion regulation strategies but these were not predictive of PTG (F(2, 108)=0.33, p=72; R^2= -.01) and did not

significantly contribute to the final model (β=-0.19, p=.06; β=0.04, p<.70). Kirby, Shakespeare-Finch & Palk conducted regression analysis to explore how adaptive and dysfunctional coping styles may predict a positive or negative outcome following trauma (PTG/PTSS). They focused on the five subscales of the PTGI and found APs who utilised adaptive coping strategies were significantly more likely to experience PTG, although this was a weak relationship. Notably, only three of the PTGI subscales were predicted by use of adaptive strategies (relating to others, β=.28, p=.006, R^2=.08; personal strength, β=.22, p=.03, R^2=.05;, and spiritual change, β=.37, p<.001, R^2=.12). When exploring the underlying type of strategies, analysis revealed the PTGI subscale of Personal Strength was predicted by APs' coping through approach (problem-focused) strategies (r=.25, p<05), whilst Spiritual Change was predicted by self-help (emotion-focused) strategies (r=.28, p<.01). Whereas Relating to Others was predicted by both self-help strategies (r=.29, p<.01) and approach strategies (r=.23, p<.05).

How coping may mediate and suppress the impact of other factors on PTG

Only two studies[46,85] explored the mediated and/or suppressive effects of coping on the relationships between personality[85] or resiliency[46] and PTG. Shakespeare-Finch, Gow & Smith[85] found that coping significantly mediated the relationship between four[n] of five personality characteristics and PTG (F(1, 503)=119.34, p<.001), with extraversion accounting for unique growth directly, as this added unique significant variance to the model (F(1, 502)=5.37, p<.05; β=.10, p<.05). Ogińska-Bulik & Kobylarczyk[46] found that the positive relationship between resiliency (one's ability to tolerate and adapt to difficult experiences)[94] and PTG was supressed by dysfunctional coping styles, yet partially mediated

[n] Neuroticism (maladjustment and emotional instability), openness (preference towards thinking/creativity), agreeableness (empathy, helpfulness, and trustworthiness), and conscientiousness (reliability, perseverance, and organisation).

by adaptive coping styles. The dysfunctional strategies of venting and denial suppressed the direct positive relationships between overall resiliency and total PTG (β=0.21, p<.01; β=0.21, p<.05); denial also suppressed the relationship with subscale of spiritual changes (β=0.32, p<.05). Venting suppressed the positive relationship between a facet of resilience (openness to new experiences and a sense of humour) with total PTG (β=0.22, p<.01). However, the adaptive problem-focused strategy of planning partially mediated the relationship between facets of resiliency and overall PTG (optimism and ability to mobilise in difficult situations; β=0.27, p<.05; and competencies to cope and tolerating negative affect with; β=0.28, p<.05). Planning also partially mediated overall resiliency and the PTG subscale of appreciation of life (β=0.34, p<.001).

The moderation of the association between coping and PTG

The only study to employ moderation analysis was Jurišová[66], finding significant moderation effects of affectivity (emotional state[68]) and self-efficacy (i.e., the perceived ability of oneself to manage daily stressors and recover from major life events[95]) on coping and PTG. The problem-focused strategy of suppressing competing activities explained 7.6% of the variance of PTG when Slovakian APs reported high or moderate levels of positive affectivity only (β=4.68, p<0.01; β=2.22, p<0.05). Coping through smoking explained 9.3% of variance of PTG at high levels of self-efficacy only (β=6.75, p<.05). Notably, there were no significant moderation effects by self-efficacy/affectivity on the majority of coping strategies (n=13) measured on the Slovakian COPE[89] (total n=15).

2.6 DISCUSSION

This review aimed to set out the extent and nature of associations between coping strategies and post-traumatic growth in ambulance personnel. There was a dearth of literature exploring

coping in relation to PTG within APs, with only five studies from 952 potential papers being relevant. Insights into the connection between coping and PTG within APs and the prevalence/degree of PTG in this population are discussed in comparison to existing literature below. As none of the included studies explored intervention strategies, any applicable interventions from other populations that may enhance PTG are considered. Future recommendations are also discussed in regard to gaps in the literature that warrant further exploration.

In line with research in other populations[33,63,64,96-99], adaptive coping was consistently significantly positively[o] associated with PTG and mediated the association between resiliency and PTG. Additionally, adaptive coping's predictive ability for PTG was moderated by positive affectivity. However, there are no extant studies to compare this to. Nonetheless, this finding is unsurprising given the consistent positive associations found between positive affectivity and the use of adaptive coping strategies, as well as PTG in the wider literature[69-72]. It is of significance that all correlations between dysfunctional strategies and PTG were positive, i.e. greater use of dysfunctional strategies were consistently associated with greater PTG herein. However, dysfunctional (avoidant) strategies were not predictive of PTG, had suppressive effects on resiliency and PTG, and were not impacted by affectivity. This lack of predictive ability was consistent with studies of PTG and coping in other populations[100-102] but there is a lack of comparative research exploring mediative/moderative effects around coping and PTG[63,64,98]. Interestingly, the use of smoking as a dysfunctional coping strategy was found to account for almost 10% of the variance in PTG in Slovakian APs, but only at high levels of self-efficacy[66]. This is in contrast to the literature base that typically views

[o] Contrastingly one study[66] found those who used the adaptive emotion-focused strategy of mental disengagement, where one purposefully distracts oneself, experienced significantly less PTG in their perceived personal strength to manage such situations. Although contradictory to all other associations found herein, this was in line with previous research[63].

dysfunctional (avoidance) coping strategies as maladaptive, associated with psychological distress[67,103], and unrelated or negatively correlated to PTG[100-102,104]. This generalised understanding may contribute to lack of research exploring this in other populations (e.g., researchers may be discouraged as they believe they will not find significant results and prospects for publication will be reduced). Of significance, only Jurišová[66] found consistent significant associations between dysfunctional coping and PTG in Slovakian APs, with only one other study[65] finding significant correlations yet in a differing subscale of the PTGI[87] to Jurišová[66]. Moreover, Kirby, Shakespeare-Finch & Palk[67] found dysfunctional coping was nonsignificant to PTG yet significantly positively associated with PTSS. This inconsistency warrants further exploration and is discussed in more detail in the next section.

The findings regarding dysfunctional coping may highlight contentions within our conceptualisations of helpful and/or unhelpful ways of coping. Strategies typically thought of as dysfunctional that actively avoid dealing with/acknowledging the stressor have been shown to be beneficial to reduce feelings of inability and helplessness following a stressor (e.g., COVID-19), which then enables the individual to use their personal and systemic resources to face the stressor when able[105]. Thus, enabling the individual to use other coping strategies more typically thought of as adaptive, which would have otherwise been impossible due to emotional overwhelm[105]. Additionally, other dysfunctional strategies may serve different purposes within the workplace. For example, smoking and venting may provide opportunities for informal social contact and tap into receiving support that can encourage emotion regulation and meaning making, which is integral for PTG[39,40,44]. This complex relationship is difficult to translate into quantitative measurement scales and reductionism and lack of depth are a known limitation of quantitative research[106,107]. This richness to understanding the efficacy of coping may have been lost within the present studies

and highlight the benefits for future research adopting qualitative/mixed methodologies when interpreting the usefulness of coping strategies.

Insights into the prevalence and degree of PTG were also reported, although inconsistent. The majority of APs experienced at least some positive changes following trauma, whilst there was evidence that some APs did not experience PTG at all[65]. According to Wu et al.'s [43] interpretive guide, APs experienced low PTG on average in the majority of studies except for male Polish APs, who reported moderate levels of PTG[46]. These findings were lower than expected, with a recent meta-analysis[43] finding the majority of samples reported moderate-to-high levels of PTG. It is of note that three of the included studies[46,65,66] offered interpretations of the degree of PTG experience, all of which were higher than indicated using Wu et al's[43] guide (majority high[46] or moderate/average[65,66] levels of PTG). Furthermore, similar prevalence and levels of PTG were found in similar populations (i.e., the police, recovery teams, and firefighters)[58,108], with reported growth ranging from 40–75% for more traumatizing professions[39,98,109]. This is in line with the present research, which found PTG ranged from 44.20%-65.26%. It is possible that the preliminary interpretive guide offered by Wu et al.[43] may not be applicable to APs as this was originally developed based on direct trauma survivors following an earthquake in China[110]. Contrarily, Wu et al's[43] criteria may be less applicable when used to interpret the average PTG of an entire sample and may be more appropriate to identify the number of participants scoring above 60% in a study. The validity and clinical utility of Wu et al's[43] and Xu and Liao's[110] preliminary interpretive cut-off warrants further examination.

2.6.1 Differences across the studies

Despite some consistent results, there were also substantial differences found in the significance, strength, and direction of the relationships between coping and PTG. PTG has

been found to be culturally sensitive[43,82,111], with the possibility that the highest degrees of PTG may be reserved for those with higher levels of privilege (particularly intersecting privilege) that contribute to both recovery and growth[56]. It is possible these dissimilarities may represent genuine culturally unique experiences by APs within each study. However, it is not possible to determine this given the infancy of the literature base. These dissimilarities could be artifices of the different measurement scales used, or due to confounding factors. For example, Fonseca et al.[65] found the strongest relationships between coping and PTG in Portuguese APs compared to all other included countries (Slovakia[66], Poland[46], and Australia[67,85]). Whilst this may indicate something culturally specific to Portuguese APs, this may represent differences due to the date research was conducted. Fonseca et al.[65] surveyed APs between August-September 2020 and was the only included study to explore APs employed during the COVID-19 pandemic. As previously noted, a threshold of psychological distress that shakes one's core beliefs is needed to initiate the developmental process for PTG[39,40,44]. It is possible the differences between Fonseca et al.[65] and other studies were related to increased exposure to trauma that affects core beliefs due to COVID-19[112] and may represent the curvilinear relationship with distress (moderate distress was associated with greatest levels of PTG)[56,57,113].

Furthermore, these differences may highlight that despite the shared professional titles and work context, these are otherwise disparate samples. PHEMS can be heterogenous from the recruitment of APs, in the qualifications and continued professional development necessary to be an AP, through to organisational structure and governance[80,81,83]. However, paramedicine is undergoing professionalisation, which is the process of paramedicine becoming a globally and locally recognised occupation with practices and policies becoming regulated and standardised[114,115]. This is leading to PHEMS and routes to becoming an AP beoming homogenised. As such, a reduction in some of the sources of cross-cultural

differences and heterogeneity in findings due to the profession could be anticipated. As this process continues, this may enable a clearer understanding of PTG within APs. However, this is ongoing, and the suitability of internationally standardised procedures and practices is not yet clear.

2.6.2 Interventions

Unfortunately, none of the included studies explored possible intervention strategies. Moreover, due to the infancy of the literature base and need for the findings herein to be substantiated within APs, it is not appropriate to offer concrete recommendations at this time. However, as the findings map on to existing research within other populations, it is possible that adapting existing interventions may be efficacious for enhancing PTG for APs and the associated benefits without resulting in increasing distress nor PTSD [34-39]. Given the likely sensitivity of PTG to cultural differences[43,82,111], as possibly indicated in the present review, it is important to consider how applicable interventions may be to each country included herein. Various intervention strategies have been developed and recommended for enhancing PTG[39,52,64], mostly in populations suffering with/surviving cancer[116]. The literature base for interventions in cancer patients is well developed, demonstrating a multitude of standardised intervention strategies and an approach to aspire to when considering interventions to enhance PTG in APs[116]. Both group-based interventions (i.e., mindfulness-based stress reduction[p] (MBSR)[117], cognitive behavioural stress management[q] (CBSM)[116], resiliency-based[118], psychoeducational[119], support groups[120]) and individual[r] formulation-based psychotherapy[121-124] have all been shown to be efficacious in increasing PTG[48,117-124].

[p] An eight-week programme designed to improve quality of life and well-being, whilst reducing stress using various techniques such as yoga and mindfulness mediation.
[q] Designed to address the emotional, cognitive, and physiological facets of stress through relaxation techniques (alongside daily home-based activities).
[r] i.e. psychodynamic, counselling, emotion-focused, cognitive and/or behavioural, and psychoeducational therapies and reflective writing.

Notably, a systematic review and meta-analysis[116] found that the most efficacious interventions were group-based CBSM, followed by MBSR, and then educational/peer support-based approaches[116,125,126]. There were also no significant differences between shorter and longer interventions (eight hours to 30 hours), suggesting other factors rather than volume affected PTG enhancement. Although its applicability to APs would need to be explored, training providing a group-based approach using CBSM/MBSR/educational/peer support for as little as one eight-hour day would be beneficial to pursue. Given the associated benefits to APs and their host organisations, time and monetary investments would be recuperated[93].

Another fruitful avenue for intervention would be coaching regarding coping strategies. Based on the findings herein, it would be highly beneficial for APs to be offered support to learn and use adaptive coping strategies. Particularly planning, suppression of competing activities, seeking social support, mental disengagement and religious coping if applicable. Coaching could be through peer support and mentoring programs where coping strategies can be modelled and learnt. This has been found to be an effective way to learn new ways of coping, reduce psychological distress and increase wellbeing[127-129]. This style of learning can also support an individual to learn and develop resiliency[52,130] and translate one's resources to resiliency[64], which was found to increase PTG with the use of adaptive coping. Multiple researchers have highlighted the need for organisational support and processes to enable these to occur[39,52,64]. This may involve cultivating a workplace culture of collective efficacy[64] and psychological safety[131] involving trust, empathy, patience, respect, fairness, making the time, and justice. As well as encouraging noticing, approaching and dealing with problems rather than avoiding them (if appropriate to do so) and establishing policies and procedures to support seeking help from outside of PHEMS as necessary[39,64].

2.6.3 Future research

The present review offers preliminary evidence indicating that differences in the ways APs cope with trauma can predict the development of PTG, however, this is tentative and requires corroboration. Moreover, it is possible that the findings of the included studies may have been affected by confounding factors (i.e., culture) and the direction of causality in the association between coping style and PTG development needs substantiation. It would be recommended that any future research adopts a realist approach[132] utilising longitudinal designs. This would enable a better understanding of the causality of relationships between PTG and coping specifically within APs, whilst mitigating the accentuating effect of cross-sectional research on cross-cultural factors. This review has identified two substantive areas that warrant exploration: 1) the standardisation and exploration of the validity and clinical utility of how the level of PTG derived from the PTGI is interpreted, and 2) exploration of work-related and vicarious PTG.

2.6.3.1 Clinical interpretation of the degree of PTG

Although the guide to interpretation offered by Wu et al[43] was used herein, this has not been validated within APs and it may be arbitrary with little clinical significance. The PTGI[41] enables assessment of the presence or absence of PTG (prevalence), as well as the level of PTG experienced. As noted within the literature base[43,110], the results of this review also highlight the significance of the level of PTG. Further emphasizing the clear need to better understand what degree of PTG may be necessary or sufficient to result in meaningful differences for APs. Being able to interpret differing levels of PTG and how positive changes following a traumatic event impact APs would also enable a deeper understanding of their experience. Wu et al's. [43] preliminary interpretive guide did not appear effective at meaningfully interpreting the degree of PTG reported herein. Additionally, whilst some

studies did offer an interpretation of the degree of growth [42, 49], this appeared to be arbitrary. It would be recommended that realist research[132] employing a longitudinal design be conducted, considering PTG specifically within APs working in PHEMS across a wide range of cultures and countries. This should explore PTG alongside measures of wellbeing, known work-related factors, as well as psychological maladjustment and distress. Such research would enable standardisation of interpreting the level of PTG as measured on the PTGI for APs within the specific cultures it is employed within.

2.6.3.2 Work-related and vicarious PTG

Work-related PTG emanating from a traumatic event that affects one's work[39] is theorised to develop after a process of regulating ones emotions and meaning-making occurs. Whereby employees are able to draw on work relationships (i.e., occupational support and workplace companionships) to do so[39]. Despite this, only two studies explicitly reported asking participants to consider a work-related trauma as the triggering event[66,67], yet none explored additional factors or ways of coping specific to the work-context. Moreover, none focused on nor appeared to consider the impact from vicarious PTG (VPTG), which is distinct from PTG[70], and occurs due to witnessing the PTG of those directly exposure to trauma[39,70]. VPTG is less integrated with one's self-concept and linked to a wider application of a broader understanding of personal strength and spirituality (i.e., increased resiliency within humanity and acceptance of spirituality in the absence of any changes to personal beliefs)[70]. As well as appreciation for life/new possibilities being applied within the workplace context, i.e., they were able to make a difference and their work was of inherent value, and their professional capabilities were enhanced due to this exposure.

It is possible the present research tapped into work-related PTG and VPTG unwittingly and the findings of this review highlight multiple work-related areas that warrant

further exploration, especially given the unique working environments that APs face[133-135]. However, research is currently limited by the infancy of validated instruments to assess work-related/VPTG[39,136]. Notably, Ogińska-Bulik and Juczyński[136] recently developed a PTGI specifically measuring secondary (vicarious) PTG among HCPs, including paramedics, that showed strong internal and convergent validity as well as good retest validity. It would be recommended that future research begin by cross-validating this questionnaire and developing valid measures of work-related PTG for APs. This would then enable the exploration of work-related and vicarious PTG alongside typical PTG, establishing if these are divergent constructs with differing developmental processes for APs working in PHEMS.

2.6.4 Strengths and Limitations

This review's strengths lie in its design and the resultant synthesis of the quantitative understanding of how coping may affect PTG for APs internationally. Through a thorough *a priori* search strategy across multiple databases that also utilised upwards and downwards citation tracking, the present review was able to offer a comprehensive coverage of the relevant literature. One primary research paper[137] and one meta-analysis[138] exploring PTG and coping strategies within first responders were excluded as findings were amalgamated across populations and findings specific to APs were not presented. Unfortunately, it was outside the scope of the present review to delay synthesis whilst any additional relevant findings could be sought from the lead authors. Future reviews would benefit from being able to explore and seek out novel insights that might otherwise be missed due to findings being derived from amalgamated datasets in the published articles.

The review provides novel insights into the factors related to PTG whilst attending to and navigating the difficulties of integrating and interpreting such findings across cultures and heterogenous measures. The findings enable a greater understanding of trauma reactions

that have otherwise been considered an occupational hazard for APs. However, the research identified was mostly Eurocentric and no studies were identified from Africa or North/South America. This may be due to the English language restriction and inherent bias towards an Anglo-centric search strategy. This potential source of bias, the heterogeneity of PHEMS, and sensitivity of PTG to cultural differences limits the conclusions of the present review. However, throughout the review possible cross-cultural differences were attended to and the cultures underpinning findings noted throughout and amalgamation of results across cultures limited, offering comparisons instead. The present approach demonstrates the value of considering cross-cultural differences in the synthesis of knowledge in this area.

Additionally, quality appraisal of the included studies indicated issues around reporting and potential non-responder bias, further limiting the generalisability of results. However, these difficulties may emanate from the infancy of the literature base and may be overcome with further research. The search strategy, although Eurocentric, may have been sensitive to identify relevant articles. This is supported by the thoroughness of the search strategy, the identification of lack of research from the USA or Canada, and a brief grey-literature search targeting these countries not yielding additional results. Furthermore, PTG literature in relation to other first responder populations (i.e., firefighters and police) was easily identifiable in North America from a brief confirmatory grey literature search[51,139].

2.7 CONCLUSION

This review has contributed novel insights into the experiences of PTG in APs and how coping may be related to this. There has been an increasing interest in PTG of APs, with the exploration of this gaining traction over the past decade. It was observed that the majority of APs experienced some form of growth after trauma and that coping was consistently related to PTG across all included papers. Differences in coping styles appeared associated with

differing positive changes following trauma and may also affect the relationship between other factors and PTG, such as personality traits and resiliency. There is preliminary evidence to suggest the impact of coping on PTG may be moderated by other factors such as self-efficacy and affectivity. Although the literature base is still within its infancy, the findings of the present review highlight that coaching regarding coping strategies could be beneficial. Further research is warranted to validate the findings of this review, particularly longitudinal research.

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2.9 TABLES AND FIGURES

2.9.1 Table 2-1: *Characteristics of included studies*

Publication details	Aim/scope of the paper	Context	Participant information	PTG scale and coping scale (*α*)	Other outcomes explored	PTG specific results and results related to the relationship with coping	Key PTG and coping conclusions

Fonseca et al. (2022)[65]	To study 1) the impact of COVID-19 on coping and emotion regulation strategies; 2) the prevalence of burnout, trauma, and PTG; 3) how coping and emotion regulation strategies relate to burnout, trauma, and PTG.	Portugal	111 APs (50 women), age range 25-55 (*M*=38.54 years; SD=5.37); 77 APs were in a relationship; 73 were a parent. Job title: pre-hospital emergency technicians (*n*=89) or pre-hospital emergency nurses (*n*=22).	PTGI-Portuguese version[87] (*α*=.97).
				
				The Portuguese version of the Brief COPE[62,90] (*α* reported for subscales only; dysfunctional coping *α*=.80, problem focused strategies *α*=.77, emotion focused *α*=.77)
					Primary factors
					• PTSS,
					• Probable PTSD,
					• Burnout,
					• Emotion regulation strategies.
					
					Socio- demographic factors
					• Sex,
					• Years of experience,
					• Age,
					• Being a parent,
					• Job role,
					• Time since traumatic event.
						PTG following the most traumatic incident (home/work not specified): Overall sample, M=44.2% (SD=24.6%); personal strength M=51.8% (SD=28.8%); new possibilities and appreciation of life, M=46.2% (SD=25.2%); relations to others, M=43.6% (SD=27.6%); spiritual changes, M=35.2% (SD=26.6%). †
						
						Coping and PTG: significant positive correlations:
						• Problem focused strategies
						  ○ Overall PTG: *r*=.57, *p*<.001; strong relationship
						  ○ All four subscales: r=0.41-0.57, p<0.001; moderate-strong relationship
						• Emotion focused strategies
						  ○ Overall PTG: *r*=.47, *p*<.001; moderate relationship
						  ○ All four subscales: r=0.40-0.44, p<0.001; moderate relationship
						• Dysfunction coping strategies
						  ○ All significant relationships became insignificant when age and years of experience were controlled for.
						
						Regression model: R^2=.336, F(5, 105)=12.11, *p*<.001)
						• Problem and emotion focused coping strategies (β=0.45, *p*<.001; β=0.23, *p*<.05).
							Having a focus on solving the problem rather than dealing with the arising emotions of a situations had a greater impact on PTG. The results highlight the importance of cognitive mechanisms on PTG.

Publication details	Aim/scope of the paper	Context	Participant information	PTG scale and coping scale (α)	Other outcomes explored	PTG specific results and results related to the relationship with coping	Key PTG and coping conclusions
Jurišová (2016)[66]	To explore coping strategies and PTG, and its moderation by self-efficacy and positive/negative affectivity.	Slovakia	62 participants (32 women), aged 21-53 years old (*M*=35.91 years; SD=8.97), all paramedics, working as a paramedic 1-34 years (*M*=7.54; SD=5.79).	Work-related PTGI[41] (α not reported). The Slovakian version of COPE[62,89] (α not reported).	**Primary factors** • Self-efficacy, • Negative and positive affectivity. **Socio- demographic factors** • Sex, • Age, • Job role, • Length of service, • Type of traumatic event, • Level of strain of the traumatic situation, • Time elapsed since the traumatic event.	**PTG following one specific extremely stressful event at work 6+ months ago:** Overall sample, M=53.21% (SD=17.83%); personal strength, M=59.40% (SD=21.25%); new possibilities, M=49.08% (SD=20.28%); appreciation for life, M=63.73% (SD= 29.13%); relating to others, M=51.06% (SD=21.09%); spiritual change, M=42.70% (SD=24.30%).† **Coping:** Significant weak to moderate positive correlations • Overall WR-PTG with: Active coping, planning, suppression of competing activities, seeking social support, use of emotional social support, focus on and venting of emotions, and behavioural disengagement (*r*=0.26-0.40, *p*<0.01). • Relating to others with the same strategies as overall WR-PTG noted above (*r*=0.26-0.39, *p*<0.01). • New possibilities with: active coping, planning, suppression of competing activities, restraint coping, and seeking social support (*r*=0.46-0.26, *p*<0.01). • Personal strength with: seeking social support and focus on and venting emotions (*r*=0.26-0.36, *p*<0.01). A weak negative with mental disengagement (*r*=-0.26, *p*<0.01). • Spiritual change with: planning, suppression of competing activities, religious coping, behavioural disengagement, and substance abuse (*r*=0.53-0.25, *p*<0.01). • Appreciation for life with active coping and planning (*r*=0.273, *p*<0.01).	WR-PTG was significantly associated with 11 different coping strategies. High levels of self-efficacy and moderate and high levels of positive affectivity moderated the potential for WR-PTG in those who coped through smoking or by focusing on the problem through the suppression of other competing activities.

Publication details	Aim/scope of the paper	Context	Participant information	PTG scale and coping scale (α)	Other outcomes explored	PTG specific results and results related to the relationship with coping	Key PTG and coping conclusions
						• Coping strategies of positive reinterpretation and growth, acceptance, denial, and humour were unrelated. **Moderation of coping-PTG relationship:** • Self-Efficacy o Coping through substance abuse positively predicting WR-PTG at high levels of self-efficacy only (β=6.75, p<.05); explained 9.3% of variance (small effect size[140]). • Positive affectivity o Coping through suppression of competing activities positively predicted WR-PTG at high (β=4.68, p<.01) and moderate levels (β=2.22, p<.05) of positive affect only; explaining 7.6% of the variance (small effect size[140]). • Negative affectivity o No significant impact on the relationship between coping and PTG	
Kirby, Shakespeare-Finch & Palk (2011)[67]	To explore positive and negative reactions to trauma, if this was different for those who had experienced personal trauma as well as work-related trauma, and the role of specific coping strategies on this.	Australia	118 paramedics (40 women) aged 18-61 years (M=37; SD=10.49). Paramedic profession: new recruits (n=26), officers with 4+ years-experience (n=33), peer support officers (n=59). Average service length was 10 years (SD=9.32 years, range six weeks to 39 years).	Work-related PTGI[41] (α=.95). Revised COPE[62,91] (α reported for subscales only; adaptive coping α=.91, maladaptive α=.78).	**Primary** • If they had experienced trauma in their personal lives, • PTSS. **Socio-demographic factors** • Sex, • Age, • Length of tenure, • Nature of work-related trauma,	**PTG following the most distressing event that occurred at work:** rates were not reported for the whole sample and were grouped into those who had experienced trauma personally and professionally (M=50.30%, SD=2.26%) and those who endured vicarious trauma only (M=37.59%, SD=3.42%).† • This was a significant difference (F(1,116)=9.58, p<.01). **Coping:** • No significant relationships with maladaptive coping.	Using adaptive coping more frequently was associated with higher scores of WR-PTG.

Publication details	Aim/scope of the paper	Context	Participant information	PTG scale and coping scale (α)	Other outcomes explored	PTG specific results and results related to the relationship with coping	Key PTG and coping conclusions
					• Severity of the incident (mild to extremely severe).	• No significant relationships with WR-PTGI subscales of new possibilities and appreciation of life. • Adaptive strategies (self-help and approach) significantly positively predictive of o Relating to others (β=.28, p<.006, R^2=.08), ▪ Self-help (r=.29, p<.01) ▪ Approach (r=.23, p<.05) o Spiritual change (β=.37, p<.001, R^2=.12), ▪ Self-help (r=.28, p<.01) ▪ Approach (r=.26, p<.01) o Personal strength (β=.22, p=.03, R^2=.05). ▪ Approach (r=.25, p<.05)	
Ogińska-Bulik & Kobylarczyk (2015)[46]	To assess the possible mediation of resiliency and PTG by coping strategies used	Poland, Łódź.	80 paramedics (men only), aged 21-67 years (M=35.47, SD=10.21).	PTGI-Polish[88] (α not reported). The Polish version of the Mini-COPE[62,141]	**Primary** • Resiliency. **Socio-demographic factors** • Age, • Sex, • If they had experienced a work-related trauma in the past five years.	**PTG following a work-related traumatic event in the last 5 years (more than one event were excluded):** Overall sample, M=65.26% (SD=17.13%); changes in self-perception, M=68.60% (SD=17.02%); changes in relations to others, M=64.57% (SD=20.11%); appreciation of life M=68.66% (SD=23.46%); spiritual changes M=51.10% (SD=29.10%).† • The majority of APs experienced high PTG (n=37, 46.2%), with 33.7% (n=27) experiencing average levels and 20% (n=16) low levels. • Significantly greater change (p<.01) experienced in self-perception and appreciation of life than in spiritual changes (t statistic not provided). **Mediation/suppression by coping on resiliency and PTG:** • All 14 coping strategies were examined as possible mediators, only the strategies of venting and denial were significant.	Avoidance and problem focused coping strategies were significantly related to PTG. A reduction in the use of coping through venting and denial may increase PTG. The relationship between resiliency and PTG was mediated or supressed by specific coping strategies.

Publication details	Aim/scope of the paper	Context	Participant information	PTG scale and coping scale (α)	Other outcomes explored	PTG specific results and results related to the relationship with coping	Key PTG and coping conclusions
						• Coping strategies of venting supressed the direct relationship between total resiliency and total PTG. o Total effect resiliency to PTG (β1= 0.15, p>.05), direct effect resiliency to PTG (β2= 0.21, p<.05), indirect effect resiliency and denial (βa= -0.03, p<.05), indirect effect denial and PTG (βb=0.21, p<.01). • Venting supressed resiliency subscale of 'openness to new experiences and a sense of humour' and the direct relationship with overall PTG. o Total effect resiliency subscale to PTG (β1= 0.15, p>.05), direct effect resiliency subscale to PTG (β2= 0.22, p<.05), indirect effect resiliency subscale to PTG (βa= -0.14, p<.01), indirect effect resiliency subscale to PTG (βb=0.22, p<.05). • Denial supressed resiliency subscale of 'openness to new experiences and a sense of humour' and the direct relationship with overall PTG. o Total effect resiliency subscale to PTG (β1= 0.15, p>.05), direct effect resiliency subscale to PTG (β2= 0.20, p<.05), indirect effect resiliency subscale to PTG (βa= -0.14, p<.05), indirect effect resiliency subscale to PTG (βb=0.21, p<.05). • Denial supressed the direct relationship between Resiliency and PTG subscale of spiritual changes. o Total effect resiliency to spiritual changes (β1= -0.14, p>.05), direct effect resiliency to spiritual changes (β2= -0.07, p>.05), indirect effect resiliency and denial (βa= -0.03,	

Publication details	Aim/scope of the paper	Context	Participant information	PTG scale and coping scale (*α*)	Other outcomes explored	PTG specific results and results related to the relationship with coping	Key PTG and coping conclusions
						p<.05), indirect effect denial and spiritual changes (*β*b=0.32, *p*<.01). • Coping strategy of planning partially mediated: resiliency factor of 'competencies to cope and tolerance of a negative affect' with overall PTG. o Total effect resiliency subscale to PTG (*β*1= 0.04, *p*>.05), direct effect resiliency subscale to PTG (*β*2= -0.06, *p*>.05), indirect effect resiliency subscale to PTG (*β*a=0.18, *p*<.001), indirect effect resiliency subscale to PTG (*β*b=0.28, *p*<.05). • Planning partially mediated: the resiliency factors of 'optimistic life attitude and ability to mobilize in difficult situations' with overall PTG. o Total effect resiliency subscale to PTG (*β*1= 0.06, *p*>.05), direct effect resiliency subscale to PTG (*β*2= -0.04, *p*>.05), indirect effect resiliency subscale to PTG (*β*a=0.17, *p*<.001), indirect effect resiliency subscale to PTG (*β*b=0.27, *p*<.05). • Planning partially mediated: overall resiliency and the PTG subscale of appreciation of life. o Total effect resiliency subscale to PTG (*β*1=0.15, *p*>.05), direct effect resiliency subscale to PTG (*β*2=0.01, *p*>.05), indirect effect resiliency subscale to PTG (*β*a=0.05, *p*<.001), indirect effect resiliency subscale to PTG (*β*b=0.34, *p*<.001). • No other coping strategy had a significant mediating/ suppressing effect on overall PTG and overall resiliency.	

Publication details	Aim/scope of the paper	Context	Participant information	PTG scale and coping scale (α)	Other outcomes explored	PTG specific results and results related to the relationship with coping	Key PTG and coping conclusions
Shakespeare-Finch, Gow & Smith (2005)[85]	To explore how the five-factor model of personality[73] and levels of coping relate to PTG.	Australia	526 APs (103 women), aged 21-63 years (*M*=39.84, SD=9.41 years), length of tenure between 1-43 years (*M*=11.58, SD=8.17 years). APs were in a relationship (*n*=418), divorced (*n*=47), single (*n*=56), or widowed (*n*=2).	PTGI[41] (α=.90). CRRWI (total only)[92] (α not reported)	**Primary** • Five factors of personality (neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness). **Socio-demographic factors** • Sex, • Age, • Length of tenure, • Relationship status.	**PTG (trauma event type information not given):** Average score for the total sample was not reported, but those by sex were provided. Men overall PTG, M=31.83% (SD=20.43%); women overall PTG, M=52.04% (SD=20.26%)† • This was a significant difference ($t(502)=-2.86$, $p<.01$) **Coping:** • Significant ($p<.001$) moderate positive relationships with PTGI ($r=.44$) and weak to moderate relationships with all five subscales ($r=.27$ to $.43$). • Coping significantly predicted PTG ($F(1, 503)=119.34$, $p<.001$) • Coping significantly mediated the relationship between personality and PTG, suppressing the direct effect of four personality traits (neuroticism, openness to experience, agreeableness, and conscientiousness). However, extraversion had a significant direct relationship that was not mediated by coping ($F(1, 502)=5.37$, $p<.05$; $\beta=.10$, $p<.05$).	Coping and personality were significantly related to PTG. Coping was found to moderate the relationship between personality and PTG, except for the factor of extraversion which had a direct and indirect effect on PTG.

Note. PTG, posttraumatic growth; COVID-19, the SARS-COVID 2019 pandemic; APs, Ambulance personnel; COPE, multidimensional coping inventory; M, mean; SD, standard deviation; PTGI, Posttraumatic Growth Inventory; PTSS, Posttraumatic stress symptoms; PTSD, posttraumatic stress disorder; WR-PTG, work related posttraumatic growth; CRRWI, Coping responses in rescue workers inventory.

† Mean scores have been converted to a percentage of the total score to enable comparison across the different versions of the PTGI used (see Table 3)

2.9.2 Table 2-2: *Appraisal tool for cross-sectional studies (AXIS)[78] for the included studies*

AXIS criteria	Paper				
	Fonseca et al[65]	**Jurišová[66]**	**Kirby, Shakespeare-Finch & Palk[67]**	**Ogińska-Bulik & Kobylarczyk[46]**	**Shakespeare-Finch, Gow & Smith[85]**
Introduction					
1. Were the aims/objectives of the study clear?	Yes	Yes	Yes	Yes	Yes
Methods					
2. Was the study design appropriate for the stated aim(s)?	Yes	Yes	Yes	Yes	Yes
3. Was the sample size justified?	No	No	Yes	No	No
4. Was the target/reference population clearly defined? (Is it clear who the research was about?)	Yes	Yes	Yes	Yes	Yes
5. Was the sample frame taken from an appropriate population base so that it closely represented the target/reference population under investigation?	Don't know	Don't know	Yes	Don't know	Don't know
6. Was the selection process likely to select subjects/participants that were representative of the target/reference population under investigation?	Yes	Yes	Yes	Don't know	Don't know
7. Were measures undertaken to address and categorise non-responders?	No	Don't know	Don't know	Don't know	Don't know
8. Were the risk factor and outcome variables measured appropriate to the aims of the study?	Yes	Yes	Yes	Yes	Yes
9. Were the risk factor and outcome variables measured correctly using instruments/ measurements that had been trialled, piloted or published previously?	Yes	Yes	Yes	Yes	Yes
10. Is it clear what was used to determined statistical significance and/or precision estimates? (eg, p values, CIs)	Yes	Yes	Yes	Yes	Yes
11. Were the methods (including statistical methods) sufficiently described to enable them to be repeated?	Yes	Yes	Yes	Yes	Yes
Results					

AXIS criteria	Paper				
	Fonseca et al[65]	**Jurišová[66]**	**Kirby, Shakespeare-Finch & Palk[67]**	**Ogińska-Bulik & Kobylarczyk[46]**	**Shakespeare-Finch, Gow & Smith[85]**
12. Does the response rate raise concerns about non-response bias?	Yes	Don't know	Don't know	Don't know	Don't know
13. If appropriate, was information about non-responders described?	No	No	No	No	No
14. Were the results internally consistent?	Yes	Yes	Yes	Yes	Yes
15. Were the results for the analyses described in the methods, presented?	Yes	Yes	Yes	Yes	Yes
Discussion					
16. Were the authors' discussions and conclusions justified by the results?	Yes	Yes	Yes	Yes	Yes
17. Were the limitations of the study discussed?	Yes	Yes	Yes	Yes	Yes
Other					
18. Were there any funding sources or conflicts of interest that may affect the authors' interpretation of the results?	No	Don't know	No	Don't know	Don't know
19. Was ethical approval or consent of participants attained?	Yes	Yes	Yes	Yes	Yes

Note. Each criterion elicits a "yes", "no", or "don't know/comment" response.

2.9.3 Table 2-3: *The various versions of the Posttraumatic Growth Inventory[41] and their characteristics used by the included studies.*

Version	Description	Items (score range)	Subscale titles (number of items)	The papers that used respective version
Original[41]	NA	21 (0-105)	Relating to others (7) New possibilities (5) Personal strength (4) Spiritual changes (2) Appreciation of life (3)	Shakespeare-Finch, Gow & Smith[85]
Work-related[41]	Original version used with instructions adjusted to specify a work-related trauma.	21 (0-105)	Same as original	Jurišová[66]; Kirby, Shakespeare-Finch & Palk[67];
Portuguese[87]	For use in Portuguese populations.	21 (0-105)	Relation to others (6) New possibilities, appreciation of life (6) Personal strength (6) Spiritual change (3)	Fonseca et al.[65]
Polish[88]	For use in Polish populations.	21 (0-105)	Changes relating to others (7) Changes in self-perception (9) Spiritual changes (2) Greater appreciation of life (3)	Ogińska-Bulik & Kobylarczyk[46]

Note. Likert scale, 0="I did not experience this change as a result of my crisis" to 5="I experienced this change to a very great degree as a result of my crisis".

2.9.4 Table 2-4: *The degree of posttraumatic growth experienced*

Paper	Sample size (*n*)	Sample characteristics	Average PTG score and standard deviation	As a percentage of the total possible score	Interpretation of change
Fonseca et al.[65]	111	-	46.41 (*SD*=25.83)*	44.20% (*SD*=24.60%)	Low
Jurišová[66]	62	-	55.87 (*SD*=18.72)	53.21% (*SD*=17.78%)	Low
Kirby, Shakespeare-Finch & Palk[67]	125	-	Not reported	-	-
Ogińska-Bulik & Kobylarczyk[46]	80	-	68.52 (*SD*=17.99)	65.26% (*SD*=17.13%)	Moderate
Shakespeare-Finch, Gow & Smith[85]	103	Women	54.64 (*SD*=21.28)	52.04% (*SD*=20.26%)	Low
	423	Men	47.72 (*SD*=21.45)	45.45% (*SD*=20.43%)	Low

Note. PTG, Posttraumatic growth. Full possible range of scores 0-105. Interpretation of change based on cut off of 60%[43].

* Fonseca et al.[65] reported the average score on each item (*M*=2.21, *SD*=1.23), this was transformed to the same scale as other PTGI measures.

2.9.5 Table 2-5: *Average degree of posttraumatic growth experienced on each subscale of the different versions of the Post Traumatic Growth Inventory*[41]

Paper and PTGI version used	Subscale titles (number of items)	Raw scores	Scores as a percentage of the total possible score (%)	Interpretation of change
Jurišová[66]* using the Original PTGI[41]	Relating to others (7)	2.55 (*SD*=1.05)	51.06% (*SD*=21.09%)	Low
	New possibilities (5)	2.54 (*SD*=1.01)	49.08% (*SD*=20.28%)	Low
	Appreciation of life (3)	3.19 (*SD*=1.46)	63.73% (*SD*=29.13%)	Moderate
	Personal strength (4)	2.97 (*SD*=1.06)	59.40% (*SD*=21.25%)	Low
	Spiritual changes (2)	2.14 (*SD*=1.22)	42.70% (*SD*=24.30%)	Low
Fonseca et al.[65] using the Portuguese PTGI[87]	Relation to others (6)	2.18 (*SD*=1.38)	43.60% (*SD*=27.60%)	Low
	New possibilities, appreciation of life (6)	2.31 (*SD*=1.26)	46.20% (*SD*=25.20%)	Low
	Personal strength (6)	2.59 (*SD*=1.44)	51.80% (*SD*=28.80%)	Low
	Spiritual change (3)	1.76 (*SD*=1.33)	35.20% (*SD*=26.60%)	Low
Ogińska-Bulik & Kobylarczyk[46] using the Polish PTGI[88]	Changes relating to others (7)	3.23 (*SD*=1.01)*	64.57% (*SD*=20.11%)	Moderate
	Changes in self-perception (9)	3.43 (*SD*=0.85)	68.60% (*SD*=17.02%)	Moderate
	Greater appreciation of life (3)	3.43 (*SD*=1.17)	68.66% (*SD*=23.46%)	Moderate
	Spiritual changes (2)	2.55 (*SD*=1.45)	51.10% (*SD*=29.10%)	Low

Note. SD, Standard deviation. Full possible range of score on each item 0-5. Interpretation of change based on cut off of 60%[43].

Kirby, Shakespeare-Finch & Palk[67] and Shakespeare-Finch, Gow & Smith[85] did not report the subscale scores and as such were not included in this table.

* Where the average total score on a subscale was given, this was transformed to the average score per item on a scale to enable comparison across subscales and versions of the PTGI measures.

2.9.6 Table 2-6: An overview of the findings related to coping and PTG and the five† areas of change measured on the various PTGI used (relating to others, new possibilities, appreciation for life, personal strength, and spiritual change).

Coping strategies	Findings of the review			
	Associations	Predictive ability	Mediation/suppression effects	Moderation effects
Adaptive				
Problem-focused	Significant weak-to-strong positive associations with total PTG and all areas of change.	Weakly predictive of overall PTG (34% of variance) and of the three areas of change relating to others (8%), personal strength (5%), and spiritual change (12%).	Specific strategy of Planning partially mediation the significant positive relationship between resiliency and PTG.	Specific strategy of Suppressing Competing Activities explained 7.6% of variance at high and moderate levels of positive affectivity.
Emotion-focused	Significant moderate positive associations with total PTG and three areas of change (relating to others, personal strength, and spiritual change)‡.		Specific strategy of Denial supressed the positive relationship between resiliency and PTG.	Non significant.
Dysfunctional (Avoidance)	Inconsistently related, either unrelated/ non-significant, or significant weak-to-moderate positive associations with PTG and all areas of change.	Not predictive, non-significant in predictive models.	Specific strategy of Venting supressed the positive relationship between resiliency and PTG.	Coping through smoking explained 9.3% of variance at high levels of self-efficacy only.
Overall coping	-	-	Mediated four of the five personality characteristics§ relationship with PTG. Extraversion uniquely contributed to the development of PTG.	NA

Note. Overall coping has only been included to enable inclusion of unique results pertaining mediation effects from Shakespeare-Finch, Gow, and Smith[85]. Due to reliability and validity concerns regarding the coping scale they used and to avoid inadvertently giving their results greater weight, other findings are not presented separately.

†Fonseca et al[65] used the Portuguese PTGI[87] which collapses the two areas of new possibilities and appreciation for life into one category.

‡ Jurišová[66] found a significant weak negative association between emotion-focused coping and personal strength.

§ Openness, agreeableness, conscientiousness, and neuroticism.

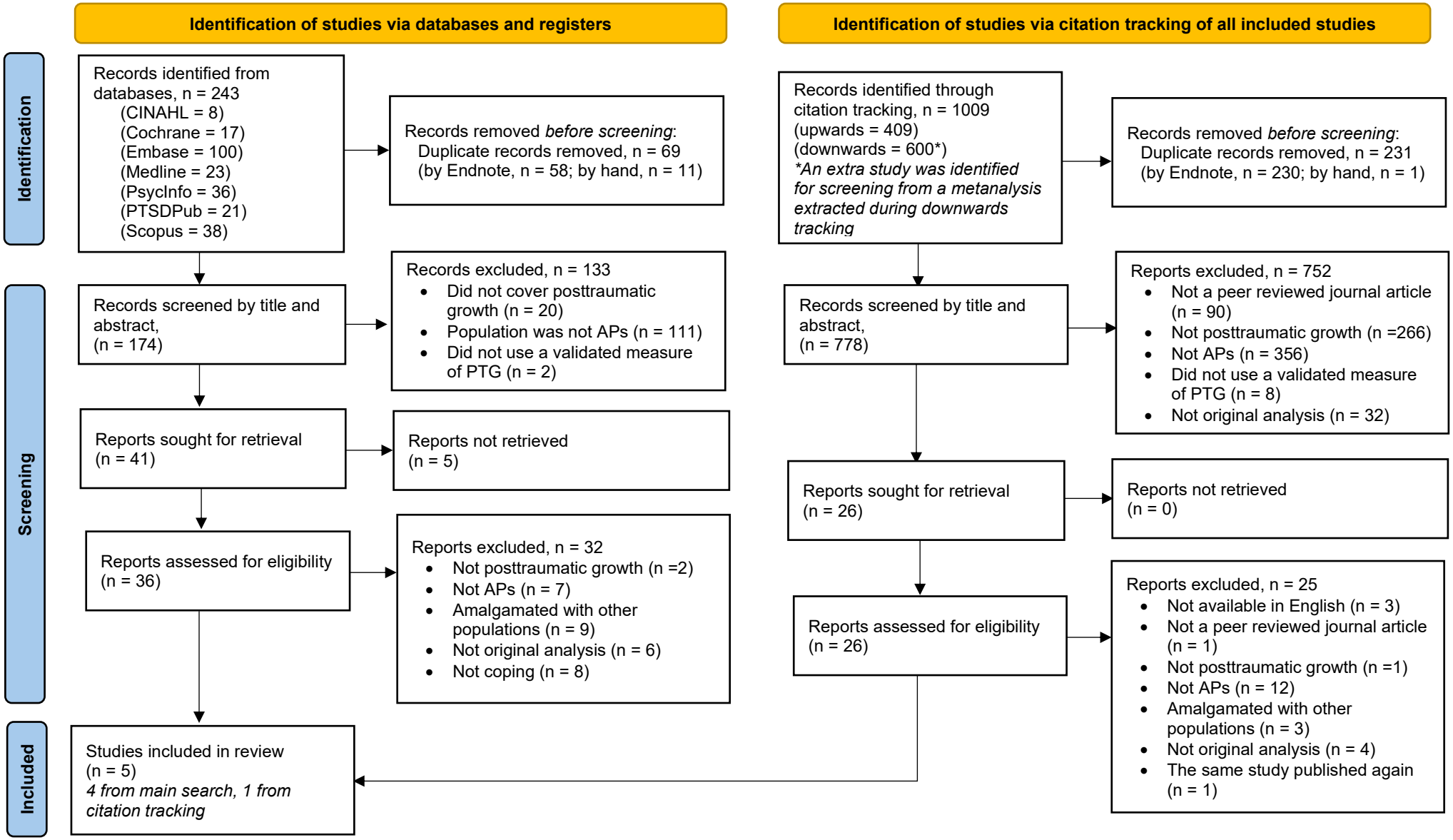
2.9.7 Table 2-7*: Correlation coefficients (r) found between coping strategies used by APs and total posttraumatic growth as well as the five areas of positive growth.*

Paper	Domain of coping strategies	Total PTG	Subscale of posttraumatic growth				
			Relating to Others	New possibilities	Appreciation for life	Personal Strength	Spiritual change
Jurišová[66]	Problem-focused	.29* to .40**	.26* to .34**	.26* to .46**	.27*	.26*	.31* to .35**
	Emotion-focused	.30*	.32*			-.26*	.52**
	Dysfunctional	.26* to .37**	.33** to .39**			.36**	.25*
Fonseca et al.[65]	Problem-focused	.57***	.55***	.53***		.57***	.41***
	Emotion-focused	.47***	.43***	.40***		.44***	.44***
	Dysfunctional			.33***			
Kirby, Shakespeare-Finch & Palk[67]	Self-Help	NA	.29**				
	Approach		.23*			.25*	.26**
	Accommodation						
	Avoidance						
	Self-punishment						
Shakespeare-Finch, Gow & Smith[85]	Total coping	.44***	.43***	.36***	.31***	.27***	.37***

** p<.05, ** p<.01, *** p<.001.*

Note. Weak effect sizes, .1 to .3; moderate effect sizes, .3 to .5; strong effect sizes .5 to 1.

2.9.8 Figure 2-1: *PRISMA[76] flow chart indicating study selection process*



2.10 APPENDICES

2.10.1 Appendix 2-A: Additional information to meet journal requirements for publication

Key messages

Experiencing a traumatic event can result in both negative and positive changes. Positive changes, known as posttraumatic growth (PTG), can occur in five different areas: a person's perception of their own internal strength (resilience), relationships with others, appreciation of life, recognition of new possibilities for life, and, for some, spirituality[44]. PTG can occur for anyone and can also occur alongside distress and negative changes after a trauma, such as posttraumatic stress disorder.

What this study adds

The present review has synthesised the current knowledge surrounding the PTG of ambulance personnel (APs) who work in prehospital emergency medical services and how coping may be related. The majority of APs experience PTG to some degree following a traumatic event, with most positive changes occurring in appreciation for life and the least in spiritual changes. PTG could be enhanced through the use of problem and emotion focused (or adaptive) coping strategies. A person's way of coping after a traumatic event could also affect how other factors might enhance or hinder PTG.

How this study might affect research, practice or policy

The PTG of APs was sensitive to cross-cultural influence and findings regarding this topic from one country need validation across cultures before applying learning to other contexts by policymakers and practitioners. Services should consider integrating knowledge of the

positive changes following trauma found herein into psychoeducation and training in preparation for what APs may experience if and when exposed to a trauma. Research should integrate the findings of this review into designs of studies. Furthermore, this review has highlighted the need for validation and exploration of the clinical utility of measurement scales assessing the degree of PTG experienced.

2.10.2 Appendix 2-B: Full search strategy for each database searched

The search strategy for each databases was conducted in one day on 11/03/23.

2.10.2.1 Embase via Ovid (1974-11/03/23)

11. exp "posttraumatic growth (psychology)"/ OR exp posttraumatic growth inventory/
12. (“post trauma* growth” OR PTG OR “posttrauma* growth” OR “post-trauma* growth” OR “positive personal growth” OR “benefit finding” OR “adversarial growth” OR “personal growth” OR “stress related growth”).af.
13. 2 OR 3
14. exp emergency health service/ or exp psychiatric emergency service/ or exp emergency care/ or exp psychiatric emergency/ or exp emergency psychiatry/ or exp pediatric emergency medicine/ or exp emergency medicine/ or ambulance/ or ambulance transportation/ or exp rescue personnel/ or paramedical personnel/ or exp paramedical profession/ or exp paramedical student/ or exp "first responder (person)"/
15. (emergency medical technician or Ambulance or paramedic or EMT or clinical advisor or emergency care assistant or emergency practitioner or MedSTAR or emergency responder* or first responder*).af.
16. 4 OR 5
17. 3 AND 6
18. Limit 7 to English language
19. Limit 8 to article

2.10.2.2 PsycINFO via EBSCOhost (1806-11/03/23)

13. Ambulance OR paramedic OR “emergency medical technician” OR EMT OR “clinical advisor” OR “emergency care assistant” OR “emergency practitioner” OR

"emergency care practitioner" OR MedSTAR OR "emergency responder*" OR "first responder*"

14. DE "Emergency Services" OR DE "Emergency Medicine"
15. S1 OR S2
16. "post trauma* growth" OR PTG OR "posttrauma* growth" OR "post-trauma* growth" OR "positive personal growth" OR "benefit finding" OR "adversarial growth" OR "personal growth" OR "stress related growth"
17. DE "Posttraumatic Growth"[s]
18. S4 OR S5
19. S3 AND S6
20. Limiters – English Language
21. Limiters - Peer Reviewed
22. Limiters – Document Type: Journal Article
23. S9 AND S10
24. S8 AND S11

2.10.2.3 MEDLINE via EBSCOhost (1916-11/03/23)

13. (MH "Pediatric Emergency Medicine") OR (MH "Emergency Services, Psychiatric") OR (MH "Emergency Medicine") OR (MH "Emergency Responders") OR (MH "Emergency Medical Services") OR (MH "Ambulances+") OR (MH "Emergency Medical Technicians")
14. Ambulance OR paramedic OR "emergency medical technician" OR EMT OR "clinical advisor" OR "emergency care assistant" OR "emergency practitioner" OR

[s] This was not exploded as the terms included within this made the search non-specific to posttraumatic growth. Included MeSH terms were Trauma, Adversity (which could also be exploded), posttraumatic stress, and resilience (psychological).

"emergency care practitioner" OR MedSTAR OR "emergency responder*" OR "first responder*"

15. S1 OR S2
16. (MH "Posttraumatic Growth, Psychological")
17. "post trauma* growth" OR PTG OR "posttrauma* growth" OR "post-trauma* growth" OR "positive personal growth" OR "benefit finding" OR "adversarial growth" OR "personal growth" OR "stress related growth"
18. S4 OR S5
19. S3 AND S6
20. Limiters – English Language
21. Limiters - Publication Type: Journal Article
22. Limiters - Scholarly (Peer Reviewed) Journals
23. S9 AND S10
24. S8 AND S11

2.10.2.4 CINAHL via EBSCOhost (1937-11/03/23)

13. (MH "Emergency Medical Technicians") OR (MH "Prehospital Care") OR (MH "Emergency Medical Services") OR (MH "Ambulances")
14. Ambulance OR paramedic OR "emergency medical technician" OR EMT OR "clinical advisor" OR "emergency care assistant" OR "emergency practitioner" OR "emergency care practitioner" OR MedSTAR OR "emergency responder*" OR "first responder*"
15. S1 OR S2
16. (MH "Posttraumatic Growth, Psychological")

17. “post trauma* growth” OR PTG OR “posttrauma* growth” OR “post-trauma* growth” OR “positive personal growth” OR “benefit finding” OR “adversarial growth” OR “personal growth” OR “stress related growth”
18. S4 OR S5
19. S3 AND S6
20. Limiters – English Language
21. Limiters - Publication Type: Journal Article
22. Limiters - Scholarly (Peer Reviewed) Journals
23. S9 AND S10
24. S8 AND S11

2.10.2.5 The Cochrane Library (1995-11/03/23)

15. MeSH descriptor: [Emergency Responders] this term only
16. MeSH descriptor: [Ambulances] 1 tree(s) exploded
    a. Tree number 2 only: [Health Care facilities, Manpower, and Services]
17. MeSH descriptor: [Emergency Medicine] this term only
18. MeSH descriptor: [Emergency Medical Services] this term only
19. MeSH descriptor: [Emergency Medical Technicians] this term only
20. MeSH descriptor: [Emergency Services, Psychiatric] explode all trees
    a. Tree 1: Behavioral disciplines and Activities
    b. Tree 2: Health Care Facilities, Manpower, and Sevices
21. MeSH descriptor: [Pediatric Emergency Medicine] explode all trees
    a. Tree 1: Health Occupations
    b. Tree 2: Health Occupations
22. S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7

23. Ambulance OR paramedic OR “emergency medical technician” OR EMT OR “clinical advisor” OR “emergency care assistant” Or “emergency practitioner” OR “emergency care practitioner” OR MedSTAR OR “emergency responder*” OR “first responder*”
24. S8 or S9
25. MeSH descriptor: [Posttraumatic Growth, Psychological] explode all trees
    a. Tree number 1: [Behavior and Behavior Mechanisms]
    b. Tree number 2: [Psychological Phenomena]
26. “post trauma* growth” OR PTG OR “posttrauma* growth” OR “post-trauma* growth” OR “positive personal growth” OR “benefit finding” OR “adversarial growth” OR “personal growth” OR “stress related growth”
27. S11 or S12
28. S10 AND S13

2.10.2.6 Scopus (1788-11/03/23)

10. TITLE-ABS-KEY (ambulance OR paramedic OR "emergency medical technician" OR emt OR "clinical advisor" OR "emergency care assistant" OR "emergency practitioner" OR "emergency care practitioner" OR medstar OR "emergency responder*" OR "first responder*")
11. TITLE-ABS-KEY (“post trauma* growth” OR PTG OR “posttrauma* growth” OR “post-trauma* growth” OR “positive personal growth” OR “benefit finding” OR “adversarial growth” OR “personal growth” OR “stress related growth”)
12. S2 AND S3
13. S3 AND (LIMIT-TO (DOCTYPE , "ar"))
14. S4 AND (LIMIT-TO (SRCTYPE , "j"))

15. S5 AND (LIMIT-TO (LANGUAGE , "English"))

2.10.2.7 PTSDpubs (formerly PILOTS) via ProQuest (1871-11/03/23)

11. Ambulance OR paramedic OR "emergency medical technician" OR EMT OR "clinical advisor" OR "emergency care assistant" OR "emergency practitioner" OR "emergency care practitioner" OR MedSTAR OR "emergency responder*" OR "first responder*"
12. MAINSUBJECT.EXACT("Emergency Personnel")
13. MAINSUBJECT.EXACT.EXPLODE("Paramedical Personnel")
14. #2 OR #3
15. #1 OR #4
16. MAINSUBJECT.EXACT.EXPLODE("Positive Effects")
17. “post trauma* growth” OR PTG OR “posttrauma* growth” OR “post-trauma* growth” OR “positive personal growth” OR “benefit finding” OR “adversarial growth” OR “personal growth” OR “stress related growth”
18. #6 OR #7
19. #8 AND #5
20. #9 AND PEER(yes)

2.10.3 Appendix 2-C: A blank copy of the AXIS critical appraisal score sheet

Question		Yes	No	Don't know/comment
Introduction				
1	Were the aims/objectives of the study clear?			
Methods				
2	Was the study design appropriate for the stated aim(s)?			
3	Was the sample size justified?			
4	Was the target/reference population clearly defined? (Is it clear who the research was about?)			
5	Was the sample frame taken from an appropriate population base so that it closely represented the target/reference population under investigation?			
6	Was the selection process likely to select subjects/participants that were representative of the target/reference population under investigation?			
7	Were measures undertaken to address and categorise non-responders?			
8	Were the risk factor and outcome variables measured appropriate to the aims of the study?			
9	Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or published previously?			
10	Is it clear what was used to determined statistical significance and/or precision estimates? (eg, p values, CIs)			
11	Were the methods (including statistical methods) sufficiently described to enable them to be repeated?			
Results				
12	Were the basic data adequately described?			
13	Does the response rate raise concerns about non-response bias?			
14	If appropriate, was information about non-responders described?			
15	Were the results internally consistent?			
16	Were the results for the analyses described in the methods, presented?			
Discussion				
17	Were the authors' discussions and conclusions justified by the results?			
18	Were the limitations of the study discussed?			
Other				
19	Were there any funding sources or conflicts of interest that may affect the authors' interpretation of the results?			
20	Was ethical approval or consent of participants attained?			

2.10.4 Appendix 2-D: The data extraction proformas

Table D-1: *The initial data extraction form.*

Date published	Authors	Aim/ scope of the paper	Definition of PTG used	Context	Sample information	Study design	PTG measurement scale	Other outcomes and the respective measurement scales used	Details of statistical analysis	PTG related results	Other Results	Key conclusions	Misc.
				i.e., location, urban/ rural									

Note. PTG, post traumatic growth.

Table D-2: *Final data extraction form.*

Date published	Authors	Aim/ scope of the paper	Definition of PTG used	Context	Sample	Study design	PTG scale	Coping scale	Other scales of factors used in PTG-coping analysis	Details of PTG and coping statistical analysis	PTG prevalence rates	Results related to the relationship between PTG and coping	Key PTG and coping conclusions	Other PTG / coping results	Misc.
				i.e., location, urban/ rural											

Note. PTG, post traumatic growth.

Rationale

Specific factors were added and others clarified to ensure only information pertaining to posttraumatic growth and coping were extracted. The previously broader categories (e.g. “Other outcomes and the respective measurement scales used”) were incredibly labour intensive whilst extracting substantial superfluous information due to the wider remit of included studies. The refining of categories enabled greater specificity of information to the research question. No other changes were deemed necessary.

2.10.5 Appendix 2-E: Further information regarding the versions of the multidimensional coping inventory (COPE) used by included studies

2.10.5.1 Slovakian COPE[89] used by Jurišová[66]

This was 60 items encompassing 15 types of coping strategies and is the cross-validated version of the full COPE[62] for use in Slovakia. Thirteen types of coping strategies fall into three domains of:

- Problem focused strategies (*n*=5),
    - Active coping, planning, suppression of competing activities, restraint coping, and seeking instrumental social support.
- Emotion focused (*n*=5),
    - Use of emotional social support, positive reinterpretation and growth, acceptance, religious coping, and mental disengagement.
- Maladaptive strategies (*n*=3),
    - Behavioural disengagement, focus on venting of emotions, and denial*.

The remaining two strategies, substance abuse (i.e. smoking) and humour, were kept separate. This was the situational COPE as participants were asked to focused on the singular stressful event they had previously detailed.

*Denial was originally grouped within emotion focused strategies by Jurišová[66]. As Jurišová[66] did not group strategies for analysis, denial has been grouped with maladaptive strategies to bring this more in line with the dominant conceptualisation[91,142-144].

2.10.5.2 Portuguese Brief-COPE[90] used by Fonseca et al.[65]

This was 28 items that assessed the frequency certain coping strategies were used on 4-point Likert scale from zero (“I did not do this at all”) to three (“I did this a lot”). This had three subscales of problem-focused coping strategies (6 items), emotion-focused strategies (10 items), and dysfunctional or avoidance coping (12 items). Problem-focused strategies attempt to deal with the problem itself through planning, problem solving, seeking help from others with the issue and putting other problems to one side. Whilst emotion-focused strategies attempt to regulate an emotional reaction and the subsequent expression, and dysfunctional strategies attempt to disengage, ignore, or remove ones accountability from a problem. These map on to the same domains as described in the Slovakian COPE[89].

2.10.5.3 Revised-COPE[91] used by Kirby, Shakespeare-Finch & Palk[67]

This had 40 items that measured the frequency coping strategies were used on a 4-point Likert scale ("I don’t normally do this at all through" to "I normally do this a lot"). This assessed five factors of:

- Self-help
    - Encompasses seeking support, understanding emotional reactions, and expressing said emotions.
- Approach,
    - Problem solving strategies attempting to alleviate/remove the stressor.
- Accommodation,
    - Includes acceptance of a possible lack of resolution to a stressor, yet its impact may be mitigated through optimism and positive reframing.
- Avoidance,

    - Encompasses ways to avoid facing the stressor, i.e. denial, blaming others, and disengagement.

- Self-punishment,
    - Blaming others (regarding of fault), pessimism, and rumination.

Kirby, Shakespeare-Finch & Palk[67] collapsed the original subscales noted above into two domains of Adaptive (self-help, approach, and accommodation; α=.91) and Maladaptive (avoidance and self-punishment, α=.78) strategies based on the correlations between the five subscales (r=.32-.57, p<.01). These two domains mapped on to the problem/emotion focused and dysfunctional domains of other versions of the Slovakian COPE[89] and the Portuguese Brief-COPE[90].

Polish Mini-COPE[88] used by Ogińska-Bulik & Kobylarczyk[46]

This was 28 statements measuring the frequency a person uses 14 different coping strategies on a 4-point likert scale from zero ("I almost never do it") to three ("I almost always do it"). The 14 strategies were not grouped and included: active coping, planning, positive reframing, acceptance, sense of humour, turning to religion, seeking emotional support, seeking instrumental support, self-destruction, denial, venting, substance use, behavioural disengagement, and self-blame.

Section 3: Critical Appraisal

Word count (excluding references, tables, and appendices): 3,993

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This thesis comprised two original reviews, a meta-synthesis and a systematic literature review. Although, to me, this seems to be worthwhile and potentially important, it is not what I initially envisioned. The original project became unfeasible due to the SARS-COVID-19 pandemic (pandemic hereafter) and personal factors. This resulted in many unsuccessful attempts to find alternative ways to complete a novel piece of primary research, before the present thesis was accepted as an appropriate alternative[1] under the guidance from the British Psychological Society[2]. This critical appraisal briefly summarises the findings of the present thesis and aims to a) expand and reflect upon the journey taken to the final project, b) discuss the motivation and potential biases for pursuing the concepts of moral distress and posttraumatic growth, c) focus on structural causes of moral-constraint distress, and d) considers the conceptual links between the two constructs.

3.1 SUMMARY OF THE FINAL THESIS

Both reviews explored the experiences of ambulance personnel (APs[t]) who worked within prehospital emergency medical services (PHEMS). The meta-synthesis and mixed methods review focused on moral distress (MD), defined as the psychological distress caused by a moral event[3]. While the systematic review focused on posttraumatic growth (PTG), defined as the positive changes that occur following a trauma[4,5].

The mixed-methods review and meta-synthesis was the larger of the two reviews. A sensitive search strategy and a conceptual-based approach to MD (whereby primary and secondary data were reinterpreted[6] under the lens of MD) was employed due to the infancy of the literature base. The screening of 8,264 unique records identified 19 papers for inclusion. The author had a critical realist epistemological stance throughout and completed a critical

[t] e.g. paramedics, emergency medical technicians, and physicians

interpretative synthesis[7] and content analysis for the meta-synthesis. The findings suggested there may be substantial nuance to APs experience of MD, with variation in its onset, duration, intensity, expression, and the originating moral event. Content analysis identified 83 distinct experiences of morally related psychological distress, with the most common being feelings of frustration, guilt, shame, helplessness, and fear. The thematic analysis revealed six sources of MD: underlying conditions that led to MD regardless of the actual situation the AP encountered and the differences between the actualities of APs day-to-day role and the APs expectations of themselves, the type of work they expected to do, and their performance on the scene. Other sources were specific situations and service user presentations, and external constraints stopping APs from taking the morally correct course of action. The findings mapped onto the literature base and shed light on the conceptualisation of MD. This review supports a broader conceptualisation of MD encompassing various subtypes and facets (see Table 1-1) and challenges the widely adopted narrow conceptualisation of MD (moral-constraint distress)[8]. Moreover, the meta-synthesis emphasised the nuanced and individual experiences of MD by APs, highlighted potential preventative strategies and possible interventions, and showed the need for further research exploring this topic. Significantly contributing to the research base and clinical practice.

The second chapter detailed a more specific systematic literature review focussing on the PTG of APs and how this may be influenced by coping. Five papers were included out of 952 unique records, encompassing 904 APs across four countries. Prevalence of PTG (however nominal) varied substantially from the entire sample[9] to some APs not experiencing PTG at all[10]. Moreover, the overall degree of PTG was low across studies, with only Ogińska-Bulik & Kobylarczyk[11] reporting a moderate degree of change. Greatest area of growth varied between studies, with this being appreciation for life and personal strength. A relationship between PTG and coping was consistently found, however the nature of this

varied greatly across studies with indications these may be cultural sensitivity. Adaptive coping[u] were consistently significantly positively associated with PTG and mediated and moderated other factors associated with greater PTG (i.e., resilience, self-efficacy and certain personality traits). Maladaptive/dysfunctional styles of coping (e.g. smoking, venting, avoidance, or self-punishment) were significantly positively correlated directly with PTG. However maladaptive coping styles were more likely to hinder the development of PTG through the suppression of enhancing factors such as self-efficacy or resilience. Through collation of the evidence base, this review was able to identify potential intervention strategies to enhance the likelihood of APs developing PTG and consider confounding factors that may affect this. The need to establish standardised interpretation and clinical utility of differing degrees of PTG was also highlighted, with clinical implications and recommendations around future research discussed.

3.2 THE ORIGINAL PRIMARY RESEARCH PROJECT

The initial aim was to complete a quantitative study evaluating the utility of the job demands-resources model[12] in a UK ambulance workforce in terms of understanding workplace wellbeing and psychological health (see Figure 3-1). It was hypothesised that APs' individual resources may mediate the relationship between work demands/resources and compassion satisfaction and compassion fatigue in the workplace. Scales were chosen for their brevity and rigorous development and applicability to APs and as they had clearer boundaries between each aspect of the J-DR model[12] than other similar measures (see Appendix 3-A).

Two UK NHS trusts specialising in the provision of PHEMS were recruited. Through liaison and consultation with relevant stakeholders and gatekeepers of one NHS ambulance

[u] e.g. self-help, approaching the difficulty, or accommodating the experience

trust, the project was presented at the National Ambulance Research Steering Group[13] (covering 13 UK Ambulance NHS Trusts) and another forum for promotion of research to UK ambulance services (details have not been included to ensure anonymity). From this, two other trusts expressed interest, with one recruited. Participating trusts agreed to share co-developed posters through their services and social media, as well as sending out two emails to all employees inviting them to participate. A power analysis (with expected effect sizes of 0.15 derived from the literature and level of significance set to 0.05 and power at .8) specified a minimum sample of 178 participants. This would have enabled inclusion of demographic variables and to establish the stability of the model across the two trusts. It was felt this was achievable given the size of the NHS trusts recruited and based on their average response rates (10%), resulting in a potential sample pool of almost 950 staff working in PHEMS.

The above project was approved by both trusts and the Faculty of Health and Medicine Research Ethics Committee (FHMREC) at Lancaster University. By the end of February 2020, I had completed the NHS Integrated Research Application System form and collated all relevant paperwork and signatures. See Section Four for documentation.

3.3 THE PANDEMIC, PREGNANCY AND THE IMPACT ON THE THESIS

I found out I was pregnant in December 2019, went part-time to a 30-hour work week contract and was placed on a ‘bespoke’ pathway for the Doctorate in Clinical Psychology (DClinPsy). I was already facing delays to the thesis due to physical and mental ill health and union strikes so the thesis completion date was adjusted from August 2020 to August 2021. To maximise data collection, we moved the launch of the study back to just before initiating maternity leave in August 2020. Then, as data collection was an online automated process, this could occur whilst I was away. The project was finalised for NHS ethics review by February 2020 and I was due to begin work on the systematic literature review. However, my

supervisors and I held off submitting for review with the rising concerns around the pandemic. It felt inappropriate and unethical to pursue a potential additional burden on the ambulance workforce at this point.

I began shielding at home in March 2020 as the potential risks to expectant mothers and their unborn children were unknown. The UK entered its first lockdown a week later. During this time, I liaised with the Lancaster DClinPsy team, my supervisors, and the gatekeepers for the relevant trusts via email and videoconferencing. By the end of March both trusts had withdrawn from the study.

Between March and June 2020, the British Psychological Society released guidance on what could be considered a thesis given the circumstances surrounding the pandemic[2]. The Lancaster DClinPsy then released their own guidance[1] clarifying their position based on this. Through discussions with course staff, my supervisors, and the gatekeepers of both trusts it became apparent that the project was no longer feasible as a primary research project. We explored ways to retain primary research through:

- Altering the project to include a measure related to the pandemic,
- Delaying the planned project until I returned from maternity leave,
- Changing populations and/or changing the research questions,
- Keeping the focus on the UK ambulance workforce and their well-being but using existing datasets.

However, these were unachievable within the context of the pandemic, initiation of maternity leave, and the confines of the DClinPsy. Consequently, the present thesis was agreed.

3.4 THE CHOICE OF TOPICS AND IMPLICATIONS FOR BIASES

The choice to pursue MD and PTG came from my own personal encounters of these experiences due to work-related trauma. Whilst a motivating force for completing the thesis, this personal relationship with the topics was also a source of potential bias. I reflected on my own experiences of MD and PTG in order to understand the standpoint I approached these from and consider potential biases and how to mitigate their impact. To provide additional context to the potential bias, a summary of my personal history with these two concepts and how I arrived at the decision to pursue these within the present thesis is contained within Appendix 3-B.

In an attempt to mitigate the potential for bias I mapped out my expectations of these constructs before beginning each review, as this would enable me to be mindful of pulls to force data into these assumptions. This also enabled me to reflect on similarities and divergence between my own experiences and the literature base.

3.4.1 My pre-existing assumptions of MD and PTG

My assumptions regarding MD were it:

- Was an incredibly intense experience,
- Could last many years,
- Could be cumulative,
- Might be exacerbated by firmly held beliefs such as a strong sense of justice,
- Might occur in many circumstances, i.e. from both action and inaction, and
- May share some characteristics to fear-based trauma responses (i.e., hyperarousal, such as hypervigilance, reliving the experience such as intrusive thoughts /memories, and avoidance/numbing; PTSS), but these were divergent constructs.

In terms of PTG, I expected it to be:

- Something that occurred after recovery from distress, and
- associated with greater resilience, support, coping and sense of self, as reflected in my own journey.

3.4.2 Divergence in findings from the review in comparison to my own experiences

A much broader experience of MD and PTG than my own have been elucidated by both reviews. MD was found to be short lived and mild for some APs, which was a surprise given my assumptions. Additionally, my dominating feelings were of shame, guilt, and fear of being found out, whereas frustration was the most commonly used expression found. Furthermore, some sources of distress were completely novel compared to my own experiences (e.g. expectations regarding the outcome of a patient or working with elderly persons who had fallen). The most notable difference for PTG was my expectation this occurred only after recovery from distressing experiences. This review and the literature base for other populations demonstrated that PTG for APs and others can coexist with negative psychological sequalae following trauma (e.g. PTSS). Moreover, PTG could occur whilst some APs experienced significant psychological distress to a level indicative of posttraumatic stress disorder (PTSD).

Although divergent, I shared some commonalities with APs and others. For instance, for some APs MD can be an intense experience that may occur over a number of years. My experiences of PTG were also similar in the fact that as my PTG increased, so did my level of resilience, self-efficacy and skills at coping. This suggests that MD and PTG may be a construct that transcends populations and settings. However, there may be significant nuances within this based on the individual, the profession, and the setting.

3.4.3 Multipronged approach to mitigating personal biases

I carried out an extensive appraisal of the background literature for both constructs, discussed plans critically with my supervisors and colleagues, and substantiated the search strategies with a specialist subject librarian. I used existing reviews for the basis of *a priori* inclusion/exclusion criteria and data extraction proforma for both reviews. I also kept a reflective log of any pulls during the search process and syntheses of findings, which I regularly reviewed against my own expectations of these constructs. I also explicitly documented each stage of the reviews and synthesis of results so this could be reviewed with another researcher (if this became possible). During synthesis, I took time away from the analyses in an attempt to adopt a more objective and open-minded perspective. Additionally, although my personal experiences had a substantial impact on the choice of thesis topic, a significant amount of time elapsed from choosing the topics to completing the thesis. I have since lost loved ones in the pandemic, had two children, moved across the country, and started working as a clinical psychologist in training in the NHS whilst I finished my thesis. The significance of these constructs has lessened, and my world has been broadened since being on the course. Furthermore, whilst I have personal experiences of MD and PTG, I have no experience of working with PHEMS and am not an AP.

The steps taken and change in circumstances described above have enabled me to approach these reviews with more objectivity. Subsequently, in combination with the above, the differences between expectations and conclusions drawn suggests that the potential biases from my own assumptions have been sufficiently mitigated.

3.5 THE STRUCTURAL IMPACTS THAT CAN CAUSE MD

As shown in Chapter One, MD can be caused by wide array of factors. Some sources of MD may be down to internal factors to an individual such as how the job role is perceived[14] (also

found within the meta-synthesis), from perceived powerlessness[15], a lack of knowledge[16], or socialisation to following orders[3]. Conversely, the most widely recognised sources of MD emanate from structural and systemic issues, receiving substantial empirical support across healthcare populations[17] and found within the present review (Chapter One, theme six, *External Constraints*). The focus on structural causes of MD is partly due to the original conceptualisations of MD conforming to moral-constraint distress (M-CD)[18-20]. Moral-constraint distress explicitly pertains to the external, structural and systemic constraints that stop healthcare professionals from acting in line with what they believe to be the morally correct course of action[8,21]. External constraints leading to M-CD have been comprehensively reviewed elsewhere[14,17,22-24], despite this there remains a dearth of systemic intervention for MD as the majority focus on individual factors[15]. Applying the bioecological model[25] of holistic wellbeing in the workplace, which draws from the systems theory framework[26], enables a richer and more meaningful understanding of sources of external constraints and the potential interventions for these. Examples of sources of M-CD at each stage in Bone's[25] model have been provided in Appendix 3-C.

When applied to M-CD, there are four systems at different levels of proximity and tangibility to the individual[25], each with unique constraints that may be sources of MD[v]. The most proximal level (microsystem) contains sources of M-CD that arise due to an individual's community (e.g. colleagues, friends, or family). Interaction between any two microsystems and the subsequent influence on an individual is considered the mesosystem. Slightly further removed is the exosystem. For APs this would include sources of M-CD from PHEMS, their governing bodies (e.g., the health and care professions council in the UK[27]), through to the wider healthcare systems PHEMS are situated within (e.g., the NHS in the

[v] These four levels also map onto theme six, *External Constraints,* from Chapter One.

UK). Lastly, sources of M-CD may come from macrosystems such as cultural ideologies (e.g. the economy, mass media, or politics).

As I am not an AP and do not work in PHEMS, it feels inappropriate for me to explicitly recommend interventions for APs by PHEMS or wider healthcare organisations. Instead I would advocate that those in the position of authority within PHEMS could use Bone's[25] model as I have done so above. Considering each of the different levels of the systems and identify how these create structural constraints for APs to carry out their roles efficiently and easily. Using this model in this way would also enable consideration of barriers implementing any change that may prevent MD. Bone's[25] application of Bronfenbrenner's[26] ecological model to the workplace clarifies top-down influences on healthcare, such as neoliberal list policies, and subsequently offers insights in how to navigate these. For example, some PHEMS may be struggling with depleted resources that are a clear cause of structural constraints (i.e. unsafe staffing levels, limited training opportunities, lack of appropriate equipment) whilst situated in healthcare systems with neoliberalist policies governed by political systems believing in fiscal conservatism. In such circumstances it may prove fruitful to contract health economists to consider the substantial long-term monitory implications surrounding MD. This could take the form of considering the health economic benefits that would occur as a result of preventing MD for APs (e.g. resource provision enabling resolution of ethical concerns and structural constraints). As opposed to petitioning for resources via presenting the ethical or personal implications or impact on care, which may be ineffective in such climates. This fiscal-focused approach is advocated elsewhere[28-30] and has been adopted for other related occupational hazards such as burnout[31,32].

3.6 THE TWO REVIEWS AND THEIR CONCEPTUAL LINKS

Both reviews may appear to be exploring disparate concepts within the occupational wellbeing of APs. However, during my recovery from moral distress, I experienced posttraumatic growth (see Appendix 3-B) and for me personally they seemed connected. As I've learnt more about each concept and related constructs within the wider moral and trauma landscapes, their parallels yet uniqueness became more apparent. Consideration of how these two concepts may be related yet divergent enables a deeper understanding of the range of possible reactions to occupational stressors that healthcare professionals may experience. Furthermore, there is greater recognition that MD/MI (moral suffering) and PTSS (and PTG) may stem from the same stressful event[33]. However, it is the individual's belief of a transgression of ones moral integrity that can lead to moral suffering alongside the personal threat to safety that can lead to trauma reactions[33,34]. It is of great importance that APs, the organisations/systems they work within, and the professionals trying to mitigate and manage any resultant psychological distress can effectively distinguish between moral and trauma reactions. There is often misunderstanding of moral suffering and misattribution of distress to trauma, which inhibits effective treatment for moral suffering[33,34]. Misunderstanding and confusion of these two concepts may also reduce effective enhancement strategies for PTG.

Therefore, the similarities and differences between MD and PTG are discussed below to facilitate APs, those supporting APs, and others working with these concepts in differentiating the two. This would enable appropriate treatment of MD and enhance of PTG. However, it is necessary to situate these concepts within the wider nosological landscape from inception (i.e. moral stressor/trauma) through to recovery (i.e. moral resilience/PTG). The wider landscape discussing both negative and positive psychological sequelae following a traumatic event has been described in detail in Chapter Two, with a brief summary provided

in Appendix 3-D. Given the substantial conceptual contentions surrounding MD and the wider moral landscape[18,19,23,35], a more detailed account presenting a preliminary theoretical nosology of the moral landscape is presented in Appendix 3-E (see also Chapter One, Table 1-1).

3.6.1 A shared language to distinguish the inception of MD and PTG

The language surrounding the initiating event for both the moral and trauma landscapes would benefit from transformation. This would begin the process of highlighting that the same stressor can result in moral/trauma reactions for some[33], yet enable the developmental pathways to be distinguished. These initiating stressors are now being discussed in terms of a Danger-Based Stressors (DBS) and Non-Danger-Based Stressors (NDBS)[w] [33,36,37]. DBS are equivalent with a traumatic event and could be considered the initiating event within the developmental pathway for PTG[5,33]. This type of stressor involves a personal threat to physical safety[33,37] and, for some, hyperarousal symptoms and increased risk of PTSS/PTSD[37]. NDBS pertain to situations where one's core beliefs were transgressed due to the action or inaction, either perpetrated or witnessed by oneself, including the perceived betrayal by others[36,38]. NDBS align with what are known as potentially morally injurious events[x] and, for some, lead to psychological distress and may then follow the developmental pathway for MD through to MI and possible moral recovery[33,37]. Unlike DBS, they do not involve threat to self NDBS have been associated with depressive symptomology clusters and

[w] It should be noted that exposure to a danger-based or non-danger-based stressors does not denote that one will experience negative psychological sequalae nor growth or need recovery from such events.

[x] Potentially morally injurious events were originally derived from war zones and can include events such as being unable to protect civilians or other service members, harming civilians or enemy combatants, and betrayal by someone in a position or power[37]. Potentially morally injurious events have been identified for other populations, such as public safety personnel (similar roles to APs)[39]. However, there is a dearth of literature exploring potentially morally injurious events in other populations and the knowledge base is in its infancy.

although not considered a mental health condition in of itself, it has been associated with psychopathology such as depression and increased risk of harm to self[33,37].

3.6.2 Commonalities and similarities between MD and PTG

Trauma and moral-based difficulties emanate from exposure to a stressful situation(s) whereby a person's core beliefs are transgressed. For those who then have difficulties, the presence of threat to personal safety highlights a divergence in reactions as trauma or moral based. However, the developmental pathways follow similar progressional phases:

- Triggering event,
- Resources are overwhelmed,
- Psychological distress ensues (e.g., moral suffering and PTSS), and,
- For some, this may result in psychopathology (e.g., hyperarousal i.e. PTSD or depression symptomology[37]),
- For some, they may recover from the psychological distress (e.g., meaning making and repairing/rebuilding core beliefs)[5,14,15,40,41],
- This may result in positive changes in comparison to before the triggering event (e.g., moral resilience, moral harmony[y] or PTG)[40-43].

3.6.2.1 Dissimilarities

Although, broadly speaking they may share commonalities, the nature of the stressful event appears to lead to divergent developmental pathways resulting in different manifestations of psychological distress, the processes necessary for recovery, and/or any positive changes

[y] Moral resilience maps on to the PTG area of greater internal strength to handle traumatic situations. Whilst moral harmony is thought to be achieved through various processes, some of which map onto PTG, such as committed actions to live in line with one's values (mapping onto a greater appreciation for life) and working towards greater connection with others (mapping onto closer and more compassionate relationships with others).

(growth) that may occur[37,44]. Once exposed to these different types of stressors, it is theorised that the brain processes DBS and NDBS differently[33,45]. Brain imaging studies have found exposure to DBS was associated with metabolic activation within the amygdala and fear-based mechanisms in the brain, compared to NDBS which activated parts of the brain associated with self-processing and episodic memory[46,47]. As noted above, DBS were associated with hyperarousal/fear-based symptoms whereas NDBS were associated with depressive symptomology such as anger, shame, guilt and social withdrawal[33,37,48,49]. Interestingly, NDBS have been associated with higher levels of posttraumatic distress when compared to DBS[33,38,50]. Further differentiating DBS responses from NDBS responses, some authors have suggested that intense moral suffering, such as MI, may be a precursor to the development of PTSD[51-53]. Additionally, co-occurrence may result in increased severity and comorbidity of PTSD with other mental health disorders[37,54].

Recovery from MD/MI is not as well explored as the pathway to PTG, but it is theorised that moral recovery is a linear process from a moral stressor[55-59], which is in contrast to PTG[60-63].

3.7 CONCLUSION

The process of undertaking this thesis has been long and complex, with substantial practical and emotional difficulties to overcome. Whilst the original intended thesis was not possible due to the pandemic and personal factors, I am proud of what I have managed to complete. The ability to focus on topics which resonated professionally as well as personally enabled me to maintain motivation and apply myself in incredibly uncertain times as I underwent significant period of transformation and change. Gaining a greater understanding of MD and PTG professionally has also helped me to extricate personal from professional interest in these topics, which has and will continue to benefit my abilities as a clinician.

I believe the meta-synthesis and systematic literature review add value to their respective bodies of literature, will be clinically useful, promote awareness of MD and PTG, and provide a solid foundation for future research and intervention strategies. I believe that the knowledge and expertise of psychologists would be of great use within populations not typically served by this discipline and hope this thesis attests to that. I have already begun applying the knowledge gained from this thesis in my practice and will maintain the moral resilience I have developed as part of this and continue to pursue positive systemic change for both colleagues and service users.

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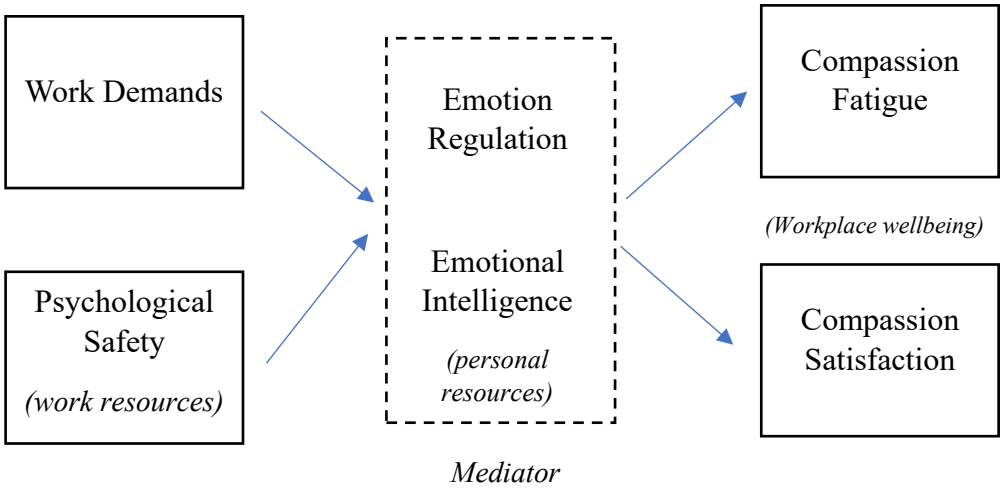
3.9 TABLES AND FIGURES

3.9.1 Figure 3-1: *A conceptual model of the proposed relationship between ambulance clinicians' work demands/resources and workplace wellbeing as mediated by their personal resources.*



3.10 APPENDICES

3.10.1 Appendix 3-A: The proposed scales that were going to be used in the original primary project that became unfeasible

Individual resources:

- Emotion Regulation Questionnaire[64]; 10 questions,
- The Short Profile of Emotional Competence[65] measuring emotional intelligence; 20 questions.

Work demands:

- Quantitative Workload Inventory[66]; five questions covering speed, effort, volume, efficacy, and volume of work.

Work resources:

- Psychological Safety[67]; seven questions.

Compassionate wellbeing in the workplace (compassion fatigue and satisfaction):

- Professional Quality of Life[68]; 21 questions.

Eight demographic questions chosen for their links with compassion fatigue/satisfaction and stakeholder interest.

- Which NHS Trust they were working within, their job title, if they had direct contact with patients, their length of tenure, gender, age, if they were part time/full time hours, and if they worked a 24-hour rotational shift pattern.

3.10.2 Appendix 3-B: A summary of my personal history with, and the pathway to choosing, the topics covered in this thesis

3.10.2.1 Personal history

My first healthcare role was as a support worker in a locked inpatient unit for those with intellectual disabilities, autism, and developmental disabilities. This was run by Castlebeck Care and was similar to Winterbourne view[69]. I witnessed the substandard care and abuse of service users, took part in repeated physical restraints, witnessed severe overmedication (i.e., medical restraint[70]), and was physically assaulted daily. There was no psychology provision and limited daytime activities for the "favoured" few service users. I sought advice from a senior colleague about how to raise concerns in line with policy and was demeaned and ostracised by multiple colleagues for fear of loss of employment. The manager initiated the formal process for terminating my employment in response and told me this would be on my record if I attempted to change jobs (it was not). I was financially dependent on the role, inadequately trained, bullied by those I worked with, and felt extremely powerless to change the system or to just leave. I focused on surviving until I managed to find another job (which took over a year) and attempted to change the lives of the patients I worked directly with on a day-to-day basis. The atrocities of Winterbourne View were exposed whilst I was still working there, and some positive changes were immediately implemented. The care providers have since been taken over and the facility no longer operates in the same manner.

In the short time I worked there, I was traumatised by the physical assaults, as well as what I had witnessed and took part in and experienced PTSS. However, the most painful debilitating aspect was the deep wound to my sense of self, who I thought I was as a person, and what I stand for. I experienced overwhelming guilt, shame, and disgust over what I witnessed, was unable to stop, and what I took part in. I spent many years trying to hide what

I had been through as I believed others would be appalled that I was complicit in such poor treatment of others. That I would be ostracized from healthcare services for my actions (or lack thereof) and, though painful to admit, I may have deserved to be.

Over the past decade I have attempted to heal the trauma response, recover from the wound to my self-concept, and actively sought out knowledge and experiences that would help myself or others if I ever encountered that situation again. This has taken the form of enhancing my knowledge and experience of working with staff groups, supporting staff well-being, promoting staff voices to be heard, and facilitating change within systems for the benefit of service users and staff. Subsequently, I pursued a thesis exploring the occupational well-being of APs, whom may not be the typical focus of but may benefit from psychological input. The final thesis retained the focus on two interrelated areas of wellbeing in APs working in PHEMS.

3.10.2.2 Choice of topics

During my second year on the DClinPsy I completed a clinical placement with an intellectual disability community mental health team, unfortunately this resulted in re-emergence of PTSS, see Appendix 3-B. However, I had the revelation that the feelings of shame, guilt, disgust and fear of being "found out" were due to MD. That the wound to my sense of self emanated from violation of my values and disruption of my core beliefs[3,8,71], not because I was "broken" or "bad". Moreover, I had substantially more experience, knowledge, and coping strategies to manage this and overcame the difficulties I faced on placement. I re-evaluated what I went through 13 years ago, was able to share with others my experiences, and reappraised my culpability and the fear of being ostracized. I thus experienced substantial posttraumatic growth. The recovery from MD and subsequent PTG enabled me to approach

MD without being re-traumatised, which led to MD becoming the focus of the systematic literature review herein.

I made the decision to focus on PTG in the midst of the pandemic, after the multiple attempts to retain a primary research project had failed, and I was facing having a child without the presence of significant loved ones. The desire to consider the positive outcomes following traumatic experiences and what might facilitate PTG development felt highly significant for myself, and I felt for APs working on the front line of the pandemic. APs were facing unprecedented traumatic scenes[72,73] and I hoped focusing on PTG would provide an alternative to the dominant negative post-trauma narrative whilst highlighting AP's experiences of PTG and possible enhancement strategies.

3.10.3 Appendix 3-C: Sources of Moral-Constraint Distress at each stage in Bone's[25] bioecological model of workplace wellbeing

It should be noted the below list is not exhaustive and offered to give further information on how to apply the model to MD. Additionally, many of these sources were also found within the meta-synthesis.

3.10.3.1 Microsystem level examples

Interference from laypeople at the scene (found herein), a colleague undermining or ignoring ones professional opinion[3], incompetent caregivers[24], or one's/colleagues' lack of knowledge of how to resolve ethical issues[14].

3.10.3.2 Mesosystem examples

The distress arising from a colleague disregarding their opinion, combined with the fact the AC lacked the confidence to defend their position and advocate for the correct course of action. The combined effects of these two factors would be different from either one source individually (e.g. frustration at the first factor, shame at the second, and combined the feelings of self-disgust, contempt, or humiliated fury[74]) .

3.10.3.3 Exosystem level examples

A lack of resources (e.g., PPE shortages)[15], unsafe or low staffing levels[14], focus on efficiency rather than quality of care[20], lack of support around decision-making[14], inadequate protocols/policies[23], lack of appropriate services to meet patient's needs[20], structural stigma[75] (whereby discrimination towards certain groups are enacted through policies/practice), structural racism[76], and systemic barriers access to health care[77].

3.10.3.4 Macrosystem examples

The influence of neoliberalist policies (cost efficiency culture) and the culture of capitalism[78-80], which are associated with a climate of austerity measures that can lead to deleterious effects and loss of life[81]. This could include moral distress by association (see Table 1-1, Chapter One).

3.10.4 Appendix 3-D: A brief summary of the positive and negative reactions to trauma

The wider landscape discussing both negative and positive psychological sequelae following a traumatic event/incident has been described in detail in Chapter Two. Briefly, an individual experiences a situation where their core beliefs are transgressed alongside a personal threat to physical safety, their adaptive resources are challenged, and then experience significant psychological distress[4,5]. For some individuals this may result in negatively psychological sequalae such as PTSS, which may manifest as PTSD when prolonged[82,33]. Recovery depends upon a process of meaning making and repair/rebuilding of core beliefs (e.g., through deliberate rumination/self-reflection and sharing their experiences with others[4,5]). This process can result in positive changes to a person's sense of identity, beliefs, life-goals, and their relationships with others[4,5,83].

3.10.5 Appendix 3-E: A detailed summary of the moral landscape

The moral landscape includes all aspects from moral suffering, moral decline, moral healing and recovery, through to moral resilience and equilibrium. Initially, a moral event must occur, whereby one faces "a situation necessitating a moral decision that challenges, threatens or violates one's core-beliefs and values that underpin one's personal and/or profession integrity" (Chapter One, p1-23)[15,35,40,84,85]. When an individual experiences this initial transgression of moral integrity, there is thought to be an immediate physical reaction to and the recognition of the transgression; termed moral stress[40,84]. If moral stress is unresolved and a person's capacity to "remain grounded and whole" (p120)[40] is overwhelmed, this may lead to moral suffering. Moral suffering (or pain) is the umbrella term encapsulating any psychological distress in response to the moral event and is theorised as a continuum of the severity of said distress[15,40,86]. Moral outrage (MO; associated with exhaustive frustration, disgust, and powerlessness[87]) and MD are thought to be the lower end of this continuum, with MI denoting the highest severity of psychological distress[15,35,40]. MI is thought to occur due to perpetrating, failing to prevent, bearing witness to, learning about, and/or betrayal around, acts that transgress deeply held moral beliefs and expectations[38,88]. It is experienced as a deep emotional wound with intense suffering and internal dissonance[15,35,40,54,84]. Moral suffering is not in of itself a mental health condition and moral pain is thought to be a normal part of human existence[41].

There is the possibility that differing levels of transgressions to a person's moral integrity (i.e. challenges, threats, or violations[71]) may result in differing levels of moral suffering along said scale (MO, MD through to MI respectively)[71,89]. A recent paper highlighted complex MI (C-MI) as the most severe form of moral suffering[41]. Fleming[41] proposed this is caused by a person's core beliefs surrounding the morality of the world and

the governing systems being shattered beyond repair, rather than transgressed. There is also evidence to suggest that differences in the nature of the moral event and the surrounding situation may lead to different types of MD[18,19]. For example, those experiencing MD because they were constrained from acting in line with what they believe to be the morally correct course of action would be termed moral-constraint distress[8]. Whereas those who were unable to identify the course of action may experience moral-uncertainty distress[19], those struggling to differentiate between acting in line with two moral values may experience moral-conflict distress[18]. See Chapter One, Table 1, for the various subtypes of MD. Whilst these may represent differences in the moral event, theoretically the subtypes of MD may emanate from differences within the stages ethical decision-making process itself. For example, Jones'[90] four stage model of ethical decision-making [91] whereby one recognises there is a moral issue, makes a moral judgement[92], develops the resolve to place moral concerns ahead of other concerns, and then acts on the decision made. Moral-uncertainty distress may fall under the second stage, whereas moral-dilemma distress, come under the third stage and moral-constraint distress fall under the fourth stage. Additionally, some authors have posited that repeated exposure to MD may have a crescendo effect; as the psychological distress builds in intensity, the moral wound increases in severity and can become MI[15,86].

Should moral suffering remain unresolved for some individuals this may result in moral decline/disrepair, the normalisation of impaired and maladaptive moral values that are associated with habitual distorted moral decision making[85,93]. Successful resolution of moral suffering occurs through moral healing and repair, which can lead to moral resilience and restore moral integrity[15,40]. Which in turn leads to moral equilibrium and harmony[41]. This process of moral recovery is thought to begin with an individual assigning blame, appraising one's moral identity, and meaning making of their experiences[41]. As they continue to recover,

individuals make deliberate efforts to make amends and engage with others (e.g., giving and receiving forgiveness, seeking restitution/reparations), and purposefully live life in line with their values[36,41]. For those experiencing C-MI, Fleming[41] suggests the above process of repair may actually be harmful in such cases. He highlights that moral recovery in those with C-MI may occur when individuals are able to grieve the loss of previously held beliefs, are supported to repair/rebuild foundational moral beliefs that are more tenable and nuanced, and able to accept the unsolvable moral conflict.

Section 4: Ethics section

Word count (excluding references, tables, and appendices): 6,821

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4.1 APPROVAL LETTER FROM FACULTY OF HEALTH AND MEDICINE RESEARCH ETHICS COMMITTEE AT LANCASTER UNIVERSITY

Lancaster University

Applicant: Suzy Berry
Supervisor: Ian Fletcher
Department: Health Research
FHMREC Reference: FHMREC19038

22 January 2020

Dear Suzy

Re: Psychological health and workplace wellbeing of the ambulance workforce

Thank you for submitting your research ethics application for the above project for review by the Faculty of Health and Medicine Research Ethics Committee (FHMREC). The application was recommended for approval by FHMREC, and on behalf of the Chair of the Committee, I can confirm that approval has been granted for this research project.

As principal investigator your responsibilities include:

- ensuring that (where applicable) all the necessary legal and regulatory requirements in order to conduct the research are met, and the necessary licenses and approvals have been obtained;
- reporting any ethics-related issues that occur during the course of the research or arising from the research to the Research Ethics Officer at the email address below (e.g. unforeseen ethical issues, complaints about the conduct of the research, adverse reactions such as extreme distress);
- submitting details of proposed substantive amendments to the protocol to the Research Ethics Officer for approval.

Please contact me if you have any queries or require further information.

Tel:- 01542 593987
Email:- fhmresearchsupport@lancaster.ac.uk

Yours sincerely,

R E Case

Becky Case
Research Ethics Officer, Secretary to FHMREC.

4.2 THE NHS INTEGRATED RESEARCH APPLICATION SYSTEM FORM

Welcome to the Integrated Research Application System

IRAS Project Filter

The integrated dataset required for your project will be created from the answers you give to the following questions. The system will generate only those questions and sections which (a) apply to your study type and (b) are required by the bodies reviewing your study. Please ensure you answer all the questions before proceeding with your applications.

Please complete the questions in order. If you change the response to a question, please select 'Save' and review all the questions as your change may have affected subsequent questions.

Please enter a short title for this project (maximum 70 characters)
The ambulance workforce: Psychological health and workplace wellbeing

1. Is your project research?

(●) Yes ( ) No

2. Select one category from the list below:

( ) Clinical trial of an investigational medicinal product

( ) Clinical investigation or other study of a medical device

( ) Combined trial of an investigational medicinal product and an investigational medical device

( ) Other clinical trial to study a novel intervention or randomised clinical trial to compare interventions in clinical practice

( ) Basic science study involving procedures with human participants

(●) Study administering questionnaires/interviews for quantitative analysis, or using mixed quantitative/qualitative methodology

( ) Study involving qualitative methods only

( ) Study limited to working with human tissue samples (or other human biological samples) and data (specific project only)

( ) Study limited to working with data (specific project only)

( ) Research tissue bank

( ) Research database

If your work does not fit any of these categories, select the option below:

( ) Other study

2a. Please answer the following question(s):

a) Does the study involve the use of any ionising radiation?	Yes	(●) No
b) Will you be taking new human tissue samples (or other human biological samples)?	Yes	(●) No
c) Will you be using existing human tissue samples (or other human biological samples)?	Yes	(●) No

3. In which countries of the UK will the research sites be located? *(Tick all that apply)*

[x] England
[ ] Scotland

☐ Wales
☐ Northern Ireland

3a. In which country of the UK will the lead NHS R&D office be located:

◉ England
○ Scotland
○ Wales
○ Northern Ireland
○ This study does not involve the NHS

4. Which applications do you require?

☑ IRAS Form
☐ Confidentiality Advisory Group (CAG)
☐ Her Majesty's Prison and Probation Service (HMPPS)

Most research projects require review by a REC within the UK Health Departments' Research Ethics Service. Is your study exempt from REC review?

◉ Yes ○ No

4b. Please confirm the reason(s) why the project does not require review by a REC within the UK Health Departments Research Ethics Service:

☐ Projects limited to the use of samples/data samples provided by a Research Tissue Bank (RTB) with generic ethical approval from a REC, in accordance with the conditions of approval.
☐ Projects limited to the use of data provided by a Research Database with generic ethical approval from a REC, in accordance with the conditions of approval.
☐ Research limited to use of previously collected, non-identifiable information
☐ Research limited to use of previously collected, non-identifiable tissue samples within terms of donor consent
☐ Research limited to use of acellular material
☐ Research limited to use of the premises or facilities of care organisations (no involvement of patients/service users as participants)
☑ Research limited to involvement of staff as participants (no involvement of patients/service users as participants)

5. Will any research sites in this study be NHS organisations?

◉ Yes ○ No

5a. Are all the research costs and infrastructure costs (funding for the support and facilities needed to carry out research e.g. NHS Support costs) for this study provided by a NIHR Biomedical Research Centre, NIHR Collaboration for Leadership in Health Research and Care (CLAHRC), NIHR Patient Safety Translational Research Centre or Medtech and In Vitro Diagnostic Cooperative in all study sites?

Please see information button for further details.

○ Yes ◉ No

Please see information button for further details.

5b. Do you wish to make an application for the study to be considered for NIHR Clinical Research Network (CRN) Support and inclusion in the NIHR Clinical Research Network Portfolio?

Please see information button for further details.

○ Yes ◉ No

The NIHR Clinical Research Network provides researchers with the practical support they need to make clinical studies happen in the NHS e.g. by providing access to the people and facilities needed to carry out research "on the ground".

If you select yes to this question, you must complete a NIHR Clinical Research Network (CRN) Portfolio Application Form (PAF) immediately after completing this project filter question and before submitting other applications. Failing to complete the PAF ahead of other applications e.g. HRA Approval, may mean that you will be unable to access NIHR CRN Support for your study.

6. Do you plan to include any participants who are children?

○ Yes ◉ No

7. Do you plan at any stage of the project to undertake intrusive research involving adults lacking capacity to consent for themselves?

○ Yes ◉ No

Answer Yes if you plan to recruit living participants aged 16 or over who lack capacity, or to retain them in the study following loss of capacity. Intrusive research means any research with the living requiring consent in law. This includes use of identifiable tissue samples or personal information, except where application is being made to the Confidentiality Advisory Group to set aside the common law duty of confidentiality in England and Wales. Please consult the guidance notes for further information on the legal frameworks for research involving adults lacking capacity in the UK.

8. Do you plan to include any participants who are prisoners or young offenders in the custody of HM Prison Service or who are offenders supervised by the probation service in England or Wales?

○ Yes ◉ No

9. Is the study or any part of it being undertaken as an educational project?

◉ Yes ○ No

Please describe briefly the involvement of the student(s):
This research will be used as part fulfillment of the Doctorate in Clinical Psychology from Lancaster University.

9a. Is the project being undertaken in part fulfilment of a PhD or other doctorate?

◉ Yes ○ No

10. Will this research be financially supported by the United States Department of Health and Human Services or any of its divisions, agencies or programs?

○ Yes ◉ No

11. Will identifiable patient data be accessed outside the care team without prior consent at any stage of the project (including identification of potential participants)?

○ Yes ◉ No

Integrated Research Application System
Application Form for Research administering questionnaires/interviews for quantitative analysis or mixed methodology study

The Chief Investigator should complete this form. Guidance on the questions is available wherever you see this symbol displayed. We recommend reading the guidance first. The complete guidance and a glossary are available by selecting Help.

Please define any terms or acronyms that might not be familar to lay reviewers of the application.

Short title and version number: (maximum 70 characters - this will be inserted as header on all forms)
The ambulance workforce: Psychological health and workplace wellbeing

PART A: Core study information

1. ADMINISTRATIVE DETAILS

A1. Full title of the research:

Psychological health and workplace wellbeing of the ambulance workforce

A2-1. Educational projects

Name and contact details of student(s):

Student 1

Title	Forename/Initials	Surname
Miss	[redacted]	[redacted]

Address [redacted]

Post Code [redacted]
E-mail [redacted]
Telephone [redacted]
Fax

Give details of the educational course or degree for which this research is being undertaken:

Name and level of course/ degree:
Doctorate in Clinical Psychology

Name of educational establishment:
Lancaster University

Name and contact details of academic supervisor(s):

Academic supervisor 1

Title	Forename/Initials	Surname
[redacted]		

Address [redacted]
Post Code [redacted]
E-mail [redacted]
Telephone [redacted]
Fax

Academic supervisor 2

Title Forename/Initials Surname [redacted]
Address [redacted]
Post Code [redacted]
E-mail [redacted]
Telephone [redacted]
Fax

Academic supervisor 3

Title Forename/Initials Surname [redacted]
Address [redacted]
Post Code [redacted]
E-mail [redacted]
Telephone [redacted]
Fax

Please state which academic supervisor(s) has responsibility for which student(s):
Please click "Save now" before completing this table. This will ensure that all of the student and academic supervisor details are shown correctly.

Student(s)	Academic supervisor(s)
Student 1 Miss Suzanne Berry	☑ [redacted] ☐ [redacted] ☐ [redacted]

A copy of a current CV for the student and the academic supervisor (maximum 2 pages of A4) must be submitted with the application.

A2-2. Who will act as Chief Investigator for this study?

- ○ Student
- ◉ Academic supervisor
- ○ Other

A3-1. Chief Investigator:

	Title Forename/Initials Surname
	[redacted]
Post	[redacted]
Qualifications	[redacted]
ORCID ID	[redacted]
Employer	[redacted]
Work Address	[redacted]
	[redacted]
	[redacted]
Post Code	[redacted]
Work E-mail	[redacted]
* Personal E-mail	[redacted]
Work Telephone	[redacted]
* Personal Telephone/Mobile	[redacted]
Fax	

** This information is optional. It will not be placed in the public domain or disclosed to any other third party without prior consent.*
A copy of a current CV (maximum 2 pages of A4) for the Chief Investigator must be submitted with the application.

A4. Who is the contact on behalf of the sponsor for all correspondence relating to applications for this project?
This contact will receive copies of all correspondence from REC and HRA/R&D reviewers that is sent to the CI.

	Title Forename/Initials Surname
	Ms Becky Gordon
Address	Head of Research Quality and Policy
	Lancaster University
	Lancaster
Post Code	LA1 4YW
E-mail	sponsorship@lancaster.ac.uk
Telephone	01524 592981
Fax	

A5-1. Research reference numbers. *Please give any relevant references for your study:*

Applicant's/organisation's own reference number, e.g. R & D (if available):	
Sponsor's/protocol number:	
Protocol Version:	4
Protocol Date:	11/02/2020
Funder's reference number (enter the reference number or state not applicable):	N/A
Project website:	

Additional reference number(s):

Ref.Number Description	Reference Number
University ethical approval	FHMREC19038

Sponsorship insurance	NHE-07CA04-0013

Registration of research studies is encouraged wherever possible. You may be able to register your study through your NHS organisation or a register run by a medical research charity, or publish your protocol through an open access publisher. If you have registered your study please give details in the "Additional reference number(s)" section.

A5-2. Is this application linked to a previous study or another current application?

○ Yes ◉ No

Please give brief details and reference numbers.

2. OVERVIEW OF THE RESEARCH

To provide all the information required by review bodies and research information systems, we ask a number of specific questions. This section invites you to give an overview using language comprehensible to lay reviewers and members of the public. Please read the guidance notes for advice on this section.

A6-1. Summary of the study. *Please provide a brief summary of the research (maximum 300 words) using language easily understood by lay reviewers and members of the public. Where the research is reviewed by a REC within the UK Health Departments' Research Ethics Service, this summary will be published on the Health Research Authority (HRA) website following the ethical review. Please refer to the question specific guidance for this question.*

This study will investigate the wellbeing of ambulance staff and how the workplace and individual factors can influence this. Many healthcare workers find giving care to service users positive and feel joy or that they are of value; called compassion satisfaction. However, sometimes working in healthcare services can lead to negative feelings like anger, frustration, and sometimes fear; called compassion fatigue. This is more likely for those working in emergency services because of their job roles. For those experiencing compassion fatigue, this can have detrimental effects on their physical and mental wellbeing, a negative impact on the organisation they work for, and negatively affect patient care.
The current literature base has linked increased compassion fatigue with demands and resources in the workplace (like not having enough time to do a task, feeling safe with colleagues), individual differences (like a person's job role, where they work, how long they have worked there, age and gender), and individual factors (like how someone understands and tries to manage their emotions).
Whilst these aspects have been linked to compassionate wellbeing, the nature of the relationship between these factors and their impact on compassionate wellbeing is not well understood. This study aims to explore all those employed by an ambulance service [redacted] to better understand the relationship between work demands and resources, individual differences and individual factors.

A6-2. Summary of main issues. *Please summarise the main ethical, legal, or management issues arising from your study and say how you have addressed them.*

Not all studies raise significant issues. Some studies may have straightforward ethical or other issues that can be identified and managed routinely. Others may present significant issues requiring further consideration by a REC, R&D office or other review body (as appropriate to the issue). Studies that present a minimal risk to participants may raise complex organisational or legal issues. You should try to consider all the types of issues that the different reviewers may need to consider.

It is unlikely that the present study will raise significant ethical, legal, or management issues and the risk of harm to participants is low. Input from NHS site stakeholders[redacted], and experienced researchers (named as the academic supervisors) has been sought in assessing any potential issues and how to manage these.

Informed consent - For low risk on-line anonymous surveys such as this, the completion and submission of the survey/questionnaire implies that consent for the use of the questionnaire data has been given. An information sheet will be provided to participants as the first page on the online questionnaire which they will be required to read before progressing with the study. Research team contact details will be provided on this so that a potential participant can ask any questions.

Data withdrawal - As this study is an anonymous survey it is not possible to identify participants. Therefore, participants are unable to withdraw from this study.

Confidentiality and anonymity - As this study is an anonymous survey it is not possible to identify participants. No directly identifiable data will be collected which could breach the confidentiality of participants, all data will be anonymous from point of data collection. Participants may be concerned their individual results may be fed back to their employers or they may be identifiable through completion of this study. This concern is specifically addressed within the information sheet.

Participant Distress - It is unlikely participants will experience significant distress during/after completing the questionnaires. However, completion of the questionnaire may prompt a participant to take action to resolve possible ongoing work related issues. The likelihood of this occurring and staff incurring harm is low. Staff are signposted to sources of support both within and outside of the NHS Trusts they are employed by in the information sheet and again in the debrief provided at the end of the questionnaires.

Recruitment - All staff of the [redacted] will be invited to take part in the study via an email invitation. [redacted] will recruit staff through a trust specific poster that will be part of their weekly newsletter, which is received by all staff. Once the online questionnaire goes live, staff will be sent an initial email invitation in [redacted] and [redacted] will send out the Poster. A follow up reminder email will be sent within [redacted] one week later, and [redacted] will send the Poster for a second time. To maximise recruitment in [redacted], there will also be posters displayed in work bases displaying the link to the online questionnaire and social media on Trust twitter and facebook accounts will be used to send an initial invitation (with a link to the questionnaires) as the questionnaires open and then one week later. This will maximise visibility of the study in [redacted] (as staff are not given protected time to complete research and may not always access their email accounts) and due to clicking the link to participate being optional reduces possible coercion to participate.

3. PURPOSE AND DESIGN OF THE RESEARCH

A7. Select the appropriate methodology description for this research. *Please tick all that apply*:

- ☐ Case series/ case note review
- ☐ Case control
- ☐ Cohort observation
- ☐ Controlled trial without randomisation
- ☑ Cross-sectional study
- ☐ Database analysis
- ☐ Epidemiology
- ☐ Feasibility/ pilot study
- ☐ Laboratory study
- ☐ Metanalysis
- ☐ Qualitative research
- ☑ Questionnaire, interview or observation study
- ☐ Randomised controlled trial
- ☐ Other (please specify)

A10. What is the principal research question/objective? *Please put this in language comprehensible to a lay person.*

Do ambulance staff's awareness of emotions and their ability to manage these change how the demands of their workplace affect their wellbeing?

A11. What are the secondary research questions/objectives if applicable? *Please put this in language comprehensible to a lay person.*

N/A

A12. What is the scientific justification for the research? *Please put this in language comprehensible to a lay person.*

People employed to help others (i.e. healthcare professionals) regularly face stressful situations in fast-paced, unpredictable and demanding environments. Despite this, they are committed to providing high-quality compassionate care for others. The satisfaction from helping others (called compassion satisfaction) likely drives this commitment. However, sometimes, healthcare staff can become distressed when helping others and be burnt out (feel exhausted, lack of empathy) or fear from facing traumatic experiences (referred to as compassion fatigue). Compassion fatigue has been found to have a negative impact on: the individual (such as increased mental health problems); the service provided (poorer job performance); monetary cost (through increased sickness/staff leaving). All of which can have negative effects on those patients. This is a significant problem for healthcare workers, especially for those working in emergency services. Healthcare professionals working in emergency services are more likely to be involved in traumatic experiences and therefore more likely to develop compassion fatigue.
There is a lot of research looking at what might lead to healthcare workers getting compassion fatigue or compassion satisfaction (compassionate wellbeing). Compassionate wellbeing likely arises from a) the home life of the healthcare professional, b) the work environment, and c) the environment of the person helped. Most research focuses on b) and c) as these are most accessible and easiest to target by the employer, with models such as the Job Demands Resources Model (JD-R) applying to the work environment, c), only. The JD-R suggests that the work environment can be split into positive (job resources) and negative (job demands) aspects.
Examples of job resources include the level of safety staff feel with colleagues, or the support they gain from colleagues. High levels of resources (i.e. lots of support) are associated with compassion satisfaction and positive outcomes, such as staff wellbeing. Examples of a job demands include having to work fast or not being able to finish all of your work in the time given. When a person experiences a high level of job demands, alongside low levels of job resources, then they are likely to experience compassion fatigue. It has also been found that internal factors of a person, such as someone's ability to understand and manage their emotions (called personal resources), can affect the way job demands and resources might impact compassionate wellbeing.
There is substantial literature exploring the relationships between compassionate wellbeing and personal resources such as emotions, job demands and job resources separately. However, there is a lack of research exploring the impact of the combination of these factors on compassionate wellbeing, and a lack of research looking at how these factors might relate to each other.

A13. Please summarise your design and methodology. *It should be clear exactly what will happen to the research participant, how many times and in what order. Please complete this section in language comprehensible to the lay person. Do not simply reproduce or refer to the protocol. Further guidance is available in the guidance notes.*

The design of this study will be a cross sectional design, with participants completing the questionnaires once.

Potential participants will be recruited from the [redacted] and [redacted] All staff currently employed by [redacted] will be invited to take part in the study by an email to their work email accounts when the study opens, and then one week later. [redacted] will also advertise the study using posters in workspaces and through social media (facebook and twitter Trust accounts). All staff currently employed by [redacted] will be invited to take part in the study by a Poster (specific to [redacted]) included in the Trust newsletters to all staff, this will be repeated one week later. People can take part for up to one month once the initial emails/poster via newsletters have been sent out. There are no exclusion criteria, inclusion criteria are that participants are employed by either [redacted].

If a member of staff wants to take part, they can go to the website address provided in the email/poster/facebook post/tweet. This will take them to the online survey where they will first see the participant information sheet. If they agree to continue, they will then complete the questionnaires detailed below. Once complete they will be presented with the debrief form. It will take participants 30 minutes to complete this study.

The questions are taken from the following questionnaires:
Demographic questions (chosen for their relevance and links to compassion fatigue): which ambulance trust they are employed by ([redacted]), if they have direct contact with patients (Yes or No), job title (drop down all job titles), gender (male, female, other), age, length of tenure within any ambulance service, full/part time hours, if they work a 24 hour rotational shift pattern (Yes or No). The Revised Professional Quality of Life measure, 21 questions to measure compassion satisfaction and compassion fatigue, these are two subscales of one measure. The Quantitative Workload Inventory, 5 questions measuring how fast and hard people work, the volume of work, enough time to complete work tasks and being unable to complete tasks well. Psychological Safety, 7 questions measuring the level of interpersonal risk people are willing to take in the workplace (i.e. to gain support/raise concerns). The Short Profile of Emotional Competence, 20 questions measuring a person's ability to identify, understand express and regulate their own emotions and those of others. Emotion Regulation Questionnaire, 10 questions assessing an individual's strategies they use to regulate emotions.

These questionnaires have all been chosen because they are the most relevant to the research question, are appropriate for ambulance staff, and are good questionnaires (strong internal and external rigor).

The model we will be investigating is if an individual's resources impacts the way workplace demands and workplace resources affects compassionate wellbeing and mental.

A14-1. In which aspects of the research process have you actively involved, or will you involve, patients, service users, and/or their carers, or members of the public?

- [x] Design of the research
- [x] Management of the research
- [x] Undertaking the research
- [x] Analysis of results
- [x] Dissemination of findings
- [ ] None of the above

Give details of involvement, or if none please justify the absence of involvement.
The ambulance services have been involved in the research process from the beginning and through to the dissemination of findings. They have helped to design the project and frame the research questions, provided comments and contributed to the relevant ethical applications, supported the management and implementation of the project, they have offered comments and contribution to the understanding of the results and their implication on the services, as well as supporting and being involved in the dissemination of results. The ambulance service have and will continue to provide unique managerial and front line perspectives across the whole of this project that otherwise would not have been accessible.

4. RISKS AND ETHICAL ISSUES

RESEARCH PARTICIPANTS

A15. What is the sample group or cohort to be studied in this research?

Select all that apply:

- [ ] Blood
- [ ] Cancer
- [ ] Cardiovascular
- [ ] Congenital Disorders
- [ ] Dementias and Neurodegenerative Diseases
- [ ] Diabetes
- [ ] Ear
- [ ] Eye
- [x] Generic Health Relevance
- [ ] Infection
- [ ] Inflammatory and Immune System
- [ ] Injuries and Accidents
- [ ] Mental Health
- [ ] Metabolic and Endocrine
- [ ] Musculoskeletal
- [ ] Neurological

- ☐ Oral and Gastrointestinal
- ☐ Paediatrics
- ☐ Renal and Urogenital
- ☐ Reproductive Health and Childbirth
- ☐ Respiratory
- ☐ Skin
- ☐ Stroke

Gender:	Male and female participants
Lower age limit: 18	Years
Upper age limit:	No upper age limit

A17-1. Please list the principal inclusion criteria (list the most important, max 5000 characters).

Inclusion criteria:
- Currently employed by either the [redacted] The survey will be distributed to all employees of [redacted]

No others.

A17-2. Please list the principal exclusion criteria (list the most important, max 5000 characters).

Must be employed by [redacted].

RESEARCH PROCEDURES, RISKS AND BENEFITS

A18. Give details of all non-clinical intervention(s) or procedure(s) that will be received by participants as part of the research protocol. *These include seeking consent, interviews, non-clinical observations and use of questionnaires.*

Please complete the columns for each intervention/procedure as follows:

1. Total number of interventions/procedures to be received by each participant as part of the research protocol.
2. If this intervention/procedure would be routinely given to participants as part of their care outside the research, how many of the total would be routine?
3. Average time taken per intervention/procedure (minutes, hours or days)
4. Details of who will conduct the intervention/procedure, and where it will take place.

Intervention or procedure	1	2	3	4
Dissemination of the project through local collaborators at NHS host site to work emails/on Trust newsletters.	2	0	5 minutes	Local collaborators [redacted]
Posting adverts for the project on Social Media (facebook, twitter) from [redacted]	1	0	5 minutes	Local collaborator ([redacted]).
Online survey.	1	0	30 minutes	Participants will complete online surveys on their own.

A21. How long do you expect each participant to be in the study in total?

The total maximum length for completion of the study will be 30 minutes.

A22. What are the potential risks and burdens for research participants and how will you minimise them?

For all studies, describe any potential adverse effects, pain, discomfort, distress, intrusion, inconvenience or changes to lifestyle. Only describe risks or burdens that could occur as a result of participation in the research. Say what steps would be taken to minimise risks and burdens as far as possible.

It is unlikely that the present study will raise significant risks or burdens for participants and the risk of harm to participants is low. Completion of the questionnaire may prompt a participant to take action to resolve possible ongoing work related issues. The likelihood of this occurring and staff incurring harm is low. This possibility is stated in the information sheet before participating (to ensure staff can give informed consent) and staff are signposted to sources of support both within and outside of the NHS trusts they are employed by in the information sheet again debrief provided at the end of the questionnaires.

A23. Will interviews/ questionnaires or group discussions include topics that might be sensitive, embarrassing or upsetting, or is it possible that criminal or other disclosures requiring action could occur during the study?

○ Yes ◉ No

A24. What is the potential for benefit to research participants?

There are no direct benefits to participants taking part, although they may find it interesting. Indirectly, the results of this study may enable a better understanding of ambulance staff wellbeing and the findings could be used to improve wellbeing in the workplace.

A26. What are the potential risks for the researchers themselves? *(if any)*

There are no potential risks to the researchers themselves. All work completed by the student will be supervised by the academic supervisors.

RECRUITMENT AND INFORMED CONSENT

In this section we ask you to describe the recruitment procedures for the study. Please give separate details for different study groups where appropriate.

A27-1. How will potential participants, records or samples be identified? Who will carry this out and what resources will be used?*For example, identification may involve a disease register, computerised search of social care or GP records, or review of medical records. Indicate whether this will be done by the direct care team or by researchers acting under arrangements with the responsible care organisation(s).*

All potential participants will be invited to the take part in the study via an invitation email to their work accounts [redacted] or through the poster included in the Trust Newsletters [redacted]. The [redacted] will also advertise the study on social media [redacted] trust twitter and facebook accounts) and posters in workplaces with a link to the online questionnaires. Dissemination of the study and recruitment of participants will be through local collaborators at [redacted], [redacted], and [redacted] Trust, [redacted]

One week after the initial email invitation and poster dissemination through weekly newsletters have been sent, a second invitation will be sent to work emails and the poster will be included in the weekly newsletters again.

At no point will the researchers have access to identifying potential participants.

A27-2. Will the identification of potential participants involve reviewing or screening the identifiable personal information of patients, service users or any other person?

○ Yes ◉ No

Please give details below:

A28. Will any participants be recruited by publicity through posters, leaflets, adverts or websites?

◉ Yes ○ No

If Yes, please give details of how and where publicity will be conducted, and enclose copy of all advertising material (with version numbers and dates).

Adverts will be posted on North West Ambulance Service NHS Trust twitter and facebook accounts inviting employees to participate in the study. Posters will be displayed in workplace settings, although workplaces of ambulance personnel are not open to the public.

A29. How and by whom will potential participants first be approached?

Potential participants in [redacted] will first be approached via email invitation to ambulance staff work emails, organised by local collaborators [redacted]. Potential participants in [redacted] will first be recruited via a Poster included as part of their Trust weekly newsletter. [redacted] will also advertise via [redacted] twitter and Facebook accounts.

This will be organised by local collaborators within [redacted] and [redacted]

A30-1. Will you obtain informed consent from or on behalf of research participants?

◉ Yes ○ No

If you will be obtaining consent from adult participants, please give details of who will take consent and how it will be done, with details of any steps to provide information (a written information sheet, videos, or interactive material). Arrangements for adults unable to consent for themselves should be described separately in Part B Section 6, and for children in Part B Section 7.

If you plan to seek informed consent from vulnerable groups, say how you will ensure that consent is voluntary and fully informed.

Informed consent will be obtained from adult participants. An information sheet will be provided to participants as the first page on the online questionnaire and will be attached to the invitation and secondary emails within [redacted]. Participants will be required to read the participant information sheet before progressing with the online survey. Research team contact details will be provided on this so that a potential participant can ask any questions. For low risk on-line anonymous surveys such as this, the completion and submission of the survey/questionnaire implies that consent for the use of the questionnaire data has been given.

If you are not obtaining consent, please explain why not.

Please enclose a copy of the information sheet(s) and consent form(s).

A30-2. Will you record informed consent (or advice from consultees) in writing?

○ Yes ◉ No

If No, how will it be recorded?

For low risk on-line anonymous surveys such as this, the completion and submission of the survey/questionnaire implies that consent for the use of the questionnaire data has been given.

A31. How long will you allow potential participants to decide whether or not to take part?

The online questionnaire will be open for one month after the initial email invitation has been sent and the poster has been included in the weekly newsletters. Whilst there is no direct time limit on deciding whether or not to take part, the closing date of questionnaires will impose an indirect time limit.

A33-1. What arrangements have been made for persons who might not adequately understand verbal explanations or written information given in English, or who have special communication needs? *(e.g. translation, use of interpreters)*

As this project involves healthcare professionals within the NHS, all participants will be able to understand and write adequately in English.

A35. What steps would you take if a participant, who has given informed consent, loses capacity to consent during the study? *Tick one option only.*

- ○ The participant and all identifiable data or tissue collected would be withdrawn from the study. Data or tissue which is not identifiable to the research team may be retained.
- ○ The participant would be withdrawn from the study. Identifiable data or tissue already collected with consent would be retained and used in the study. No further data or tissue would be collected or any other research procedures carried out on or in relation to the participant.
- ○ The participant would continue to be included in the study.
- ○ Not applicable – informed consent will not be sought from any participants in this research.
- ◉ Not applicable – it is not practicable for the research team to monitor capacity and continued capacity will be assumed.

Further details:

CONFIDENTIALITY

In this section, personal data means any data relating to a participant who could potentially be identified. It includes pseudonymised data capable of being linked to a participant through a unique code number.

Storage and use of personal data during the study

A36. Will you be undertaking any of the following activities at any stage (including in the identification of potential participants)? *(Tick as appropriate)*

- ☐ Access to medical records by those outside the direct healthcare team
- ☐ Access to social care records by those outside the direct social care team
- ☐ Electronic transfer by magnetic or optical media, email or computer networks
- ☐ Sharing of personal data with other organisations
- ☐ Export of personal data outside the EEA
- ☐ Use of personal addresses, postcodes, faxes, emails or telephone numbers
- ☐ Publication of direct quotations from respondents
- ☐ Publication of data that might allow identification of individuals
- ☐ Use of audio/visual recording devices
- ☐ Storage of personal data on any of the following:
  - ☐ Manual files (includes paper or film)
  - ☐ NHS computers
  - ☐ Social Care Service computers
  - ☐ Home or other personal computers
  - ☐ University computers
  - ☐ Private company computers
  - ☐ Laptop computers

Further details:
N/A

A37. Please describe the physical security arrangements for storage of personal data during the study?

This is an anonymous on-line survey. No personal data will be collected, and therefore stored, as part of this research.

A38. How will you ensure the confidentiality of personal data? *Please provide a general statement of the policy and procedures for ensuring confidentiality, e.g. anonymisation or pseudonymisation of data.*

N/A - This is an anonymous on-line survey. Therefore no personal data will be collected as part of this research.

A40. Who will have access to participants' personal data during the study? *Where access is by individuals outside the direct care team, please justify and say whether consent will be sought.*

N/A - This is an anonymous on-line survey. No personal data will be collected as part of this research.

Storage and use of data after the end of the study

A41. Where will the data generated by the study be analysed and by whom?

The student ([redacted]) will analyse the data under the supervision of the academic supervisors ([redacted]). The analysis will be completed either at Lancaster University on University computers or at the students home address on a personal laptop through the use of a virtual private network (VPN). At no point will the data be stored on the personal laptop, the VPN allows analysis to be completed whilst the data is stored on University personal files.

A42. Who will have control of and act as the custodian for the data generated by the study?

Title	Forename/Initials	Surname
[redacted]		[redacted]

Post
Qualifications
Work Address
Post Code
Work Email
Work Telephone
Fax

A43. How long will personal data be stored or accessed after the study has ended?

- (●) Less than 3 months
- ( ) 3 – 6 months
- ( ) 6 – 12 months
- ( ) 12 months – 3 years
- ( ) Over 3 years

A44. For how long will you store research data generated by the study?

Years: 10
Months: 0

A45. Please give details of the long term arrangements for storage of research data after the study has ended. *Say where data will be stored, who will have access and the arrangements to ensure security.*

The electronic data will be stored for 10 years on Lancaster University computers in an encrypted folder. This will be done by the research coordinator for the Lancaster University Doctorate in Clinical Psychology, overseen by Dr [redacted] (Chief Investigator). Once this time has elapsed all data will be destroyed.

INCENTIVES AND PAYMENTS

A46. Will research participants receive any payments, reimbursement of expenses or any other benefits or incentives for taking part in this research?

○ Yes ◉ No

A47. Will individual researchers receive any personal payment over and above normal salary, or any other benefits or incentives, for taking part in this research?

○ Yes ◉ No

A48. Does the Chief Investigator or any other investigator/collaborator have any direct personal involvement (e.g. financial, share holding, personal relationship etc.) in the organisations sponsoring or funding the research that may give rise to a possible conflict of interest?

○ Yes ◉ No

NOTIFICATION OF OTHER PROFESSIONALS

A49-1. Will you inform the participants' General Practitioners (and/or any other health or care professional responsible for their care) that they are taking part in the study?

○ Yes ◉ No

If Yes, please enclose a copy of the information sheet/letter for the GP/health professional with a version number and date.

PUBLICATION AND DISSEMINATION

A50-1. Will the research be registered on a public database?

○ Yes ◉ No

Please give details, or justify if not registering the research.

Registration of research studies is encouraged wherever possible.
You may be able to register your study through your NHS organisation or a register run by a medical research charity, or publish your protocol through an open access publisher. If you are aware of a suitable register or other method of publication, please give details. If not, you may indicate that no suitable register exists. Please ensure that you have entered registry reference number(s) in question A5-1.

A51. How do you intend to report and disseminate the results of the study? *Tick as appropriate:*

☑ Peer reviewed scientific journals

- [ ] Internal report
- [x] Conference presentation
- [ ] Publication on website
- [ ] Other publication
- [ ] Submission to regulatory authorities
- [ ] Access to raw data and right to publish freely by all investigators in study or by Independent Steering Committee on behalf of all investigators
- [ ] No plans to report or disseminate the results
- [x] Other (please specify)

Presentation at Lancaster University internal conferences of doctoral level research.

A52. If you will be using identifiable personal data, how will you ensure that anonymity will be maintained when publishing the results?

No identifiable personal data will be collected as part of this study. Only amalgamated data will be used when publishing results.

A53. Will you inform participants of the results?

○ Yes ◉ No

Please give details of how you will inform participants or justify if not doing so.
To be able to provide individual feedback, we would have to collect person identifiable information. Therefore, as the purpose is to remain an anonymous questionnaire participants will not be provided with feedback on their individual results. However, summarized data, which will not allow individual participants to be identified, will be fed back to [redacted] the form of a report, leaflet and presentation (which participants will have access to).

5. Scientific and Statistical Review

A54-1. How has the scientific quality of the research been assessed? *Tick as appropriate:*

- [ ] Independent external review
- [ ] Review within a company
- [ ] Review within a multi−centre research group
- [x] Review within the Chief Investigator's institution or host organisation
- [ ] Review within the research team
- [x] Review by educational supervisor
- [x] Other

Justify and describe the review process and outcome. If the review has been undertaken but not seen by the researcher, give details of the body which has undertaken the review:
Initially, a thesis protocol outlining the proposed study was anonymously reviewed by the DClinPsy programme team. The stakeholders and R&D [redacted] also reviewed this project. As doctoral student research, the scientific quality has been reviewed by the Lancaster University Faculty of Health Medicine Research Ethics Committee (the chief investigator's institution).

For all studies except non-doctoral student research, please enclose a copy of any available scientific critique reports, together with any related correspondence.

For non-doctoral student research, please enclose a copy of the assessment from your educational supervisor/ institution.

A56. How have the statistical aspects of the research been reviewed? *Tick as appropriate:*

☐ Review by independent statistician commissioned by funder or sponsor

☐ Other review by independent statistician

☐ Review by company statistician

☑ Review by a statistician within the Chief Investigator's institution

☐ Review by a statistician within the research team or multi−centre group

☑ Review by educational supervisor

☐ Other review by individual with relevant statistical expertise

☐ No review necessary as only frequencies and associations will be assessed – details of statistical input not required

In all cases please give details below of the individual responsible for reviewing the statistical aspects. If advice has been provided in confidence, give details of the department and institution concerned.

	Title Forename/Initials Surname
	[redacted]
Department	[redacted]
Institution	[redacted]
Work Address	[redacted]
	[redacted]
	[redacted]
Post Code	[redacted]
Telephone	[redacted]
Fax	
Mobile	
E-mail	[redacted]

Please enclose a copy of any available comments or reports from a statistician.

A57. What is the primary outcome measure for the study?

Compassion as measured by the Revised Professional Quality of Life Measure, 21 item version.

A58. What are the secondary outcome measures?*(if any)*

N/A

A59. What is the sample size for the research? *How many participants/samples/data records do you plan to study in total? If there is more than one group, please give further details below.*

Total UK sample size: 950

Total international sample size (including UK): 950

Total in European Economic Area: 0

Further details:
The minimum number of participants needed is 138 (established a priori using G*Power). To be able to compare models across the two ambulance NHS trust and to further compare within samples (e.g. male to female, by job role, area of work) to establish the stability of the model requires a minimum of 178 for comparisons across demographic data and the NHS trusts. Given an average response rate of 10% for the two ambulance trusts, this indicates a potential response rate of 950.

A60. How was the sample size decided upon? *If a formal sample size calculation was used, indicate how this was done,*

giving sufficient information to justify and reproduce the calculation.

G*Power was used for a formal sample size calculation of the minimum required participants:
F tests - Linear multiple regression: Fixed model, R^2 increase
Analysis:
A priori: Compute required sample size
Input: Effect size $f^2 = 0.15$
α err prob = 0.05
Power (1-β err prob) = 0.95 Number
of tested predictors = 11 Total
number of predictors = 11
Output: Noncentrality parameter λ = 26.7000000 Critical
F = 1.8467229
Numerator df = 111
Denominator df = 166
Total sample size = 178
Actual power = 0.9504223

A61-1. Will participants be allocated to groups at random?

○ Yes ◉ No

A62. Please describe the methods of analysis (statistical or other appropriate methods, e.g. for qualitative research) by which the data will be evaluated to meet the study objectives.

Initially, demographic statistics (frequencies, descriptives, explore and crosstabs) will be used. Then the nature of the relationships between variables will be explored using t-tests and correlations. A regression model will then be built and the best predictors of compassion fatigue and compassion satisfaction will be investigated.

If parametric assumptions are not met then transformations may occur if appropriate, if not then alternative non-parametric methods of analysis will be used as appropriate.

6. MANAGEMENT OF THE RESEARCH

A63. Other key investigators/collaborators. *Please include all grant co−applicants, protocol co−authors and other key members of the Chief Investigator's team, including non-doctoral student researchers.*

	Title Forename/Initials Surname
	[redacted]
Post	[redacted]
Qualifications	[redacted]
Employer	[redacted]
Work Address	[redacted]
	[redacted]
	[redacted]
Post Code	[redacted]
Telephone	[redacted]
Fax	
Mobile	
Work Email	[redacted]

A64. Details of research sponsor(s)

A64-1. Sponsor

Lead Sponsor

Status:
- ○ NHS or HSC care organisation
- ◉ Academic
- ○ Pharmaceutical industry
- ○ Medical device industry
- ○ Local Authority
- ○ Other social care provider (including voluntary sector or private organisation)
- ○ Other

Commercial status: Non-Commercial

If Other, please specify:

Contact person

Name of organisation	Lancaster University
Given name	Becky
Family name	Gordon
Address	Head of Research Quality and Policy
Town/city	Lancaster University
Post code	LA1 4YW
Country	United Kingdom
Telephone	01524 592981
Fax	
E-mail	sponsorship@lancaster.ac.uk

A65. Has external funding for the research been secured?

Please tick at least one check box.

- ☐ Funding secured from one or more funders
- ☐ External funding application to one or more funders in progress
- ☑ No application for external funding will be made

What type of research project is this?

- ◉ Standalone project
- ○ Project that is part of a programme grant
- ○ Project that is part of a Centre grant
- ○ Project that is part of a fellowship/ personal award/ research training award
- ○ Other

Other – please state:
N/A

A66. Has responsibility for any specific research activities or procedures been delegated to a subcontractor (other than a co-sponsor listed in A64-1) ? *Please give details of subcontractors if applicable.*

○ Yes ◉ No

A67. Has this or a similar application been previously rejected by a Research Ethics Committee in the UK or another country?

○ Yes ◉ No

Please provide a copy of the unfavourable opinion letter(s). You should explain in your answer to question A6-2 how the reasons for the unfavourable opinion have been addressed in this application.

A68-1. Give details of the lead NHS R&D contact for this research:

	Title Forename/Initials Surname
	[redacted]
Organisation	[redacted]
Address	[redacted]
	[redacted]
	[redacted]
Post Code	[redacted]
Work Email	[redacted]
Telephone	[redacted]
Fax	
Mobile	[redacted]

Details can be obtained from the NHS R&D Forum website: http://www.rdforum.nhs.uk

A69-1. How long do you expect the study to last in the UK?

Planned start date: 10/02/2020
Planned end date: 09/04/2021
Total duration:
Years: 1 Months: 2 Days: 0

A71-1. Is this study?

○ Single centre
◉ Multicentre

A71-2. Where will the research take place? *(Tick as appropriate)*

☑ England
☐ Scotland
☐ Wales
☐ Northern Ireland

☐ Other countries in European Economic Area

Total UK sites in study 2

Does this trial involve countries outside the EU?

○ Yes ◉ No

A72. Which organisations in the UK will host the research? *Please indicate the type of organisation by ticking the box and give approximate numbers if known:*

☑ NHS organisations in England	2
☐ NHS organisations in Wales	
☐ NHS organisations in Scotland	
☐ HSC organisations in Northern Ireland	
☐ GP practices in England	
☐ GP practices in Wales	
☐ GP practices in Scotland	
☐ GP practices in Northern Ireland	
☐ Joint health and social care agencies (eg community mental health teams)	
☐ Local authorities	
☐ Phase 1 trial units	
☐ Prison establishments	
☐ Probation areas	
☐ Independent (private or voluntary sector) organisations	
☐ Educational establishments	
☐ Independent research units	
☐ Other (give details)	

Total UK sites in study: 2

A73-1. Will potential participants be identified through any organisations other than the research sites listed above?

○ Yes ◉ No

A74. What arrangements are in place for monitoring and auditing the conduct of the research?

A planned schedule has been agreed between the chief investigator ([redacted]) and the student. Part of this schedule involves regular meetings with the chief investigator and will cover all aspects of the research from recruitment, data collection, analysis, interpretation, report writing and dissemination of results.

A76. Insurance/ indemnity to meet potential legal liabilities

***Note:** in this question to NHS indemnity schemes include equivalent schemes provided by Health and Social Care (HSC) in Northern Ireland*

A76-1. What arrangements will be made for insurance and/or indemnity to meet the potential legal liability of the

sponsor(s) for harm to participants arising from the management of the research? *Please tick box(es) as applicable.*

Note: Where a NHS organisation has agreed to act as sponsor or co-sponsor, indemnity is provided through NHS schemes. Indicate if this applies (there is no need to provide documentary evidence). For all other sponsors, please describe the arrangements and provide evidence.

☐ NHS indemnity scheme will apply (NHS sponsors only)

☑ Other insurance or indemnity arrangements will apply (give details below)

Lancaster University legal liability cover will apply.

Please enclose a copy of relevant documents.

A76-2. What arrangements will be made for insurance and/ or indemnity to meet the potential legal liability of the sponsor(s) or employer(s) for harm to participants arising from the design of the research? *Please tick box(es) as applicable.*

Note: Where researchers with substantive NHS employment contracts have designed the research, indemnity is provided through NHS schemes. Indicate if this applies (there is no need to provide documentary evidence). For other protocol authors (e.g. company employees, university members), please describe the arrangements and provide evidence.

☐ NHS indemnity scheme will apply (protocol authors with NHS contracts only)

☑ Other insurance or indemnity arrangements will apply (give details below)

Lancaster University legal liability cover will apply.

Please enclose a copy of relevant documents.

A76-3. What arrangements will be made for insurance and/ or indemnity to meet the potential legal liability of investigators/collaborators arising from harm to participants in the conduct of the research?

Note: Where the participants are NHS patients, indemnity is provided through the NHS schemes or through professional indemnity. Indicate if this applies to the whole study (there is no need to provide documentary evidence). Where non-NHS sites are to be included in the research, including private practices, please describe the arrangements which will be made at these sites and provide evidence.

☑ NHS indemnity scheme or professional indemnity will apply (participants recruited at NHS sites only)

☐ Research includes non-NHS sites (give details of insurance/ indemnity arrangements for these sites below)

Please enclose a copy of relevant documents.

A78. Could the research lead to the development of a new product/process or the generation of intellectual property?

○ Yes ◉ No ○ Not sure

PART C: Overview of research sites

Please enter details of the host organisations (Local Authority, NHS or other) in the UK that will be responsible for the research sites. *For further information please refer to guidance.*

Investigator identifier	Research site	Investigator Name

IN1

◉ NHS/HSC Site
○ Non-NHS/HSC Site

Organisation name [redacted]
Address [redacted]
Post Code [redacted]
Country [redacted]

Forename [redacted]
Middle name
Family name [redacted]
Email [redacted]
Qualification (MD...) BSc
Country United Kingdom

IN2

◉ NHS/HSC Site
○ Non-NHS/HSC Site

Organisation name [redacted]
Address [redacted]
Post Code [redacted]
Country [redacted]

Forename [redacted]
Middle name
Family name [redacted]
Email [redacted]
Qualification (MD...) BSc
Country United Kingdom

4.3 PROTOCOL AS PREPARED FOR THE FACULTY OF HEALTH AND MEDICINE RESEARCH ETHICS COMMITTEE AND NHS ETHICS INTEGRATED RESEARCH APPLICATION SYSTEM FORM

4.3.1 Thesis Protocol – Version 4 (17.12.19)

Title	The ambulance workforce: Psychological health and workplace wellbeing
Applicant/Primary Researcher	Suzy Berry (Trainee Clinical Psychologist – Lancaster University)
Primary Academic Supervisor	Dr Ian Fletcher (Senior Lecturer – Lancaster University)
Secondary Academic Supervisor	Dr Sabir Giga (Senior Lecturer – Lancaster University).
Field Supervisor	Steve Bell (Consultant Paramedic, North West Ambulance Service NHS Trust)

4.3.2 Introduction

Healthcare professionals are regularly exposed to stressful situations in fast-paced, unpredictable and demanding environments (Golding et al., 2017). Despite this, health care workers are committed to providing high-quality compassionate care for others (Sacco & Copel, 2018). The satisfaction and resultant multitude of positive feelings such as joy, fulfilment and revitalisation (referred to as compassion satisfaction; Stamm, 2010) likely drive this commitment (Dunn & Rivas, 2014; Sacco & Copel, 2018). However, an adverse quality of life in the workplace can also have a detrimental effect on an individuals' mental and physical wellbeing, referred to as compassion fatigue. Compassion fatigue can be

considered the culmination of feelings typical of burnout, such as anger, frustration and exhaustion, and feelings of fear arising from direct and indirect exposure to trauma in the workplace, secondary traumatic stress (Stamm, 2010).

The detrimental effects of an adverse quality of life in the workplace, such as compassion fatigue, is recognised internationally as a critical problem for healthcare workers (Chang et al., 2007; Drury, Craigie, Francis, Aoun, & Heney, 2014); particularly for those working in emergency services due to the increased likelihood of exposure to direct and indirect trauma (Cieslak et al., 2014). Compassion fatigue (therefore burnout and secondary traumatic stress) has been found to have significant adverse impact on: the individual, i.e increased rates of depression, anxiety, and post-traumatic stress disorder (Drury et al, 2014; Figley, 2002); the service provided, i.e., poorer job performance and quality of care/decision making (Al Enazi & AlEnzie, 2018; Skirrow & Hatton, 2007); monetary cost, i.e., increased absenteeism and staff turnover (Department of Health, 2009; Gil-Monte, 2008; Schaufeli *et al.* 2009); as well as limiting the overall success of an organisation (Edmondson & Lei, 2014). All of which can have deleterious effects for service users.

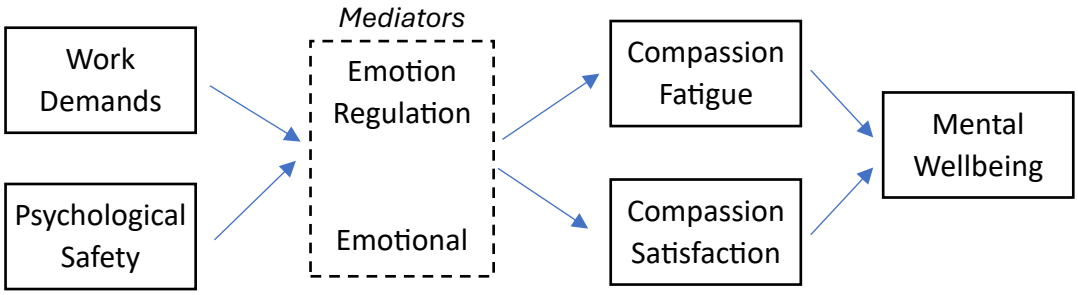
These negative effects have led to a burgeoning evidence base exploring factors associated with the development and alleviation of compassion fatigue. Stamm (2010) proposes compassion satisfaction and compassion fatigue likely arise from the personal environment of the healthcare professional, the environment of the person helped and the work environment. The revised Job Demands Resources Model ([JD-R]; Schaufeli & Bakker, 2004) can be applied to better understand the relationship between these antecedents, compassionate wellbeing and such outcomes noted above. The revised JD-R (Schaufeli & Bakker, 2004) conceptualises quality of life in the workplace into the negative and positive

aspects; job-related strain (i.e., compassion fatigue) and job-related engagement (i.e compassion satisfaction). The revised JD-R (Schaufeli & Bakker, 2004) goes further than Stamm's (2010) model as it posits antecedents can also be split into negatively and positive appraised factors (Shaufeli & Taris, 2014) with differing relationships to the positive and negative aspects of work-place life. The positively appraised antecedents are referred to as job resources (factors such as the support gained from colleagues and how safe staff feel to take interpersonal risks within their teams), with a high level of these is associated with in higher levels of job-related engagement, as such compassion satisfaction, and positive outcomes such as staff wellbeing. The negative antecedents, called job demands, include factors such as having to work fast. The revised JD-R suggests that negative effects from compassion fatigue (discussed above), would arise from a high level of job demands and low levels of job resources. Additionally, as research has advanced Shaufeli and Taris (2014) suggest personal resources may also be related to work-place wellbeing, for instance the relationship between compassionate wellbeing and emotional intelligence or emotion regulation strategies (Cicognani, Pietrantoni, Palestini, & Prati, 2009; West, 2015; Zeidner, Hadar, Matthews, & Roberts, 2013).

There is substantial literature exploring the relationships between compassionate wellbeing and personal resources (Cicognani, Pietrantoni, Palestini, & Prati, 2009; West, 2015; Zeidner, Hadar, Matthews, & Roberts, 2013), job demands (Ståhl, Ståhl, & Smith, 2018) and job resources (Cocker & Joss, 2016; Edmondson & Lei, 2014). However, there is a dearth exploring the nature of the relationships between such job demands, job resources and personal resources and the combination of these factors to compassionate wellbeing and mental wellbeing.

4.3.2.1 Aim of the study

The proposed study aims use the revised JD-R model to investigate the nature of the relationships between an individual's resources, workplace demands, workplace resources and compassionate and mental wellbeing in ambulance personnel. Based on previous literature and the revised JD-R model, one potential model we will be investigating is:



4.3.3 Method

4.3.3.1 Design

This research is quantitative using a cross-sectional design, with online questionnaires.

4.3.3.2 Participants

The sample will consist of staff currently employed by the North West Ambulance Service NHS Trust (NWAS) or the Yorkshire Ambulance Service NHS Trust (YAS). The minimum number of participants needed is 138 (established a priori using G*Power). To be able to compare models across the two ambulance NHS trust and to further compare within samples (e.g. male to female, by job role, area of work) to establish the stability of the model requires a minimum of 178 for comparisons across demographic data and the NHS trusts. Given an

average response rate of 10% for the two ambulance trust, this indicates a potential response rate of 950. Given the length of this questionnaire, ambulance staff do not have protected time to complete research, and that the ambulance workforce (particularly paramedics) are heavily researched it is anticipated that the response rate will be lower. Therefore, offering the research to all maximises the possibility of reaching minimum sample sizes.

Inclusion/exclusion criteria

The only inclusion criteria is that the participant must be currently employed by either the North West Ambulance Service NHS Trust or the Yorkshire Ambulance Service NHS Trust. There are no further inclusion/exclusion criteria.

4.3.3.3 Materials

The following questionnaires have all been selected due to their links with aspects of the Job-Demands Resources Model (see introduction and aims of the study for further information), their internal rigour having been confirmed, appropriateness for ambulance staff, appropriateness for a work setting, and focusing on factors directly related to the research questions.

- The Quantitative Workload Inventory (Spector & Jex, 1998), 5 questions measuring how fast and hard people work, the volume of work, enough time to complete work tasks and being unable to complete tasks well.
- Psychological Safety (Edmondson, 1999), 7 questions measuring the level of interpersonal risk people are willing to take in the workplace (i.e., to gain support/raise concerns).

- The Short Profile of Emotional Competence (Mikolajczak, Brasseur, & Fantini-Hauwel, 2014), 20 questions measuring a person's ability to identify, understand express and regulate their own emotions and those of others.
- Emotion Regulation Questionnaire (Gross & John, 2003), 10 questions assessing an individual's strategies they use to regulate emotions.
- The Revised Professional Quality of Life measure (Stamm, 2009), 21 questions to measure compassion satisfaction and compassion fatigue, these are two subscales of one measure (the dependent variable).

Demographic questions (chosen for their relevance and links to compassion fatigue):

- Which ambulance trust they are employed by (NWAS or YAS),
- If they have direct contact with patients (Yes or No),
- Job title (drop down all job titles),
- Gender (male, female, other),
- Age,
- Length of tenure within any ambulance service,
- Full/part time hours,
- If they work a 24 hour rotational shift pattern (Yes or No).

4.3.3.4 Procedure

Once ethical approval has been gained, an invitation to participate in the study will be sent to prospective participants' work email address (See: email invitation), with the participant information sheet attached (See: participant information sheet). This will be done through liaison with the local collaborators for North West Ambulance Service NHS Trust (NWAS),

Sandra Igbodo, and Yorkshire Ambulance Service NHS Trust (YAS), Fiona Bell. NWAS and YAS will also disseminate the Poster (see: poster) to workplaces to be displayed advertising the study. Alongside this, NWAS will also advertise the project through their social media (trust facebook and twitter accounts) using the Poster and providing the link to the online questionnaires.

One week after the initial email invitation has been sent, the second email invitation (See: Second email invitation) will be sent through liaison with local collaborators at NWAS and YAS.

Prospective participants can click the link on the email invitations/social media adverts, scan the QR code or type in the link on the Poster to begin the questionnaire. The online questionnaire is compatible with desktops as well as smart phones to maximise recruitment. Once the electronic questionnaire is opened, participants will be presented with the participant information sheet. After reading this and clicking “next”, they will then begin the questionnaire. Participants will then be asked to complete the demographic questions and the 5 questionnaires listed in materials above. Once complete they will be presented with the debrief sheet (See: Debrief form). For low risk on-line anonymous surveys such as this, the completion and submission of the survey/questionnaire implies that consent for the use of the questionnaire data has been given.

Participation in this project will take 30 minutes to complete. The questionnaire will be closed 1 month after the initial email invitation has been sent (the exact date will be set after ethical approval has been given).

4.3.3.5 Distress protocol

It is unlikely participants will experience significant distress during/after completing the questionnaires. However, completion of the questionnaire may prompt a participant to take action to resolve possible ongoing work-related issues. The likelihood of this occurring and staff incurring harm is low. Staff are signposted to sources of support both within and outside of the NHS trusts they are employed by in the participant information sheet and again in the debrief provided at the end of the questionnaires.

4.3.3.6 Proposed analysis

The student (S. Berry) will analyse the data under the supervision of the academic supervisors (Dr I. Fletcher and Dr S. Giga). Initially, demographic statistics (frequencies, descriptives, explore and crosstabs) will be used. Then the nature of the relationships between variables will be explored using t-tests and correlations. A regression model will then be built and the best predictors of compassion fatigue and compassion satisfaction will be investigated.

If parametric assumptions are not met then transformations may occur if appropriate, if not then alternative non-parametric methods of analysis will be used as appropriate.

4.3.4 Practical issues

4.3.4.1 Data storage

No identifiable personal data will be collected as part of this study. The anonymous data collected will be stored on Lancaster University personal files in an encrypted folder on password protected computers only. Access to Lancaster University personal files is

restricted. Only the student and the academic supervisors (Dr I. Fletcher and Dr S. Giga) will have access to the data. The applicant will access this data either at Lancaster University or on a personal laptop via a Virtual Private Network (this is a secure network) and no copies of the data will be saved elsewhere (digital nor paper). The student will have guardianship of the data whilst completing the current research. Post completion of the project, the electronic data will be stored for 10 years on Lancaster University computers in an encrypted folder. This will be done by the research coordinator for the Lancaster University Doctorate in Clinical Psychology, overseen by Dr I. Fletcher (Chief Investigator). Once this time has elapsed all data will be destroyed.

4.3.5 Ethical concerns

It is unlikely that the present study will raise significant ethical, legal, or management issues and the risk of harm to participants is low. Input from NHS site stakeholders, North West Ambulance Service NHS trust R&D, and experienced researchers (named as the academic supervisors) has been sought in assessing any potential issues and how to manage these.

4.3.5.1 Informed consent

Informed consent will be obtained from all participants. An information sheet will be provided to participants as the first page on the online questionnaire which they will be required to read before progressing with the study. Research team contact details will be provided on this so that a potential participant can ask any questions. They will then be asked to complete a consent questionnaire before proceeding further. For low risk on-line anonymous surveys such as this, the completion and submission of the survey/questionnaire implies that consent for the use of the questionnaire data has been given.

4.3.5.2 Data withdrawal

Participants are unable to withdraw from this study.

4.3.5.3 Confidentiality and anonymity

As this study is an anonymous survey it is not possible to identify participants. No directly identifiable data will be collected which could breach the confidentiality of participants, all data will be anonymous from point of data collection. To eliminate the possibility of participants being identified through demographic questions, stakeholder input from North West Ambulance Service NHS Trust (NWAS) and Yorkshire Ambulance Service NHS Trust and NWAS R&D has been used to ensure a participant can't be identified from demographic questions. Participants may be concerned their individual results may be fed back to their employers or they may be identifiable through completion of this study. This is specifically addressed within the information sheet

4.3.5.4 Distress

It is unlikely participants will experience significant distress during/after completing the questionnaires. If participants become distressed whilst/after completing the online questionnaire, a distress protocol will be followed. This is detailed in **Distress protocol.**

4.3.6 Timescale

Jan 2019 – March 2019	• Meet with stake holder and R&D department of North West Ambulance Service NHS Trust (NWAS). • Establish NWAS involvement in study. • Gain NWAS' input in design of the project. • Submit thesis proposal form.
March – June 2019	• Address any concerns raised on thesis proposal form. • Receive approval from Exam Board. • Create and send presentation (supervised by Dr I. Fletcher) on this study to NWAS stakeholder (Steve Bell) to present at the National Ambulance Research Steering Group to recruit other trusts to be involved. • Make amendments to presentation as needed.
July – October 2019	• Respond to any potential stakeholders who may be interested in participating in the study. • Keep in contact with stakeholders from NWAS and other trusts (only Yorkshire Ambulance Service NHS Trust [YAS] responded), updating on timeline when the next stage of the project (ethics) will begin.
October – December 2019	• Contact NWAS and YAS to reaffirm involvement in study. • Arrange meeting with supervisors (field and research) to discuss research contract and ethics submission. • Begin HRA form for ethics submission. • Develop research protocol, create supplementary ethics documentation and online questionnaire.
December 2019	• Finalize ethics application and related documentation. • Submit ethics application to Lancaster University Faculty of Health Medicine Research Ethics Committee.
January 2020 – February/March 2020	• Address any concerns raised on the ethics application. • Gain ethical approval from Lancaster University. • Receive sponsorship from Lancaster University. • Submit ethics application to HRA. • Keep NWAS and YAS appraised of progress with ethical application. • Begin writing up introduction and methods section of report.
February/March – April/May 2020	• Submit draft of introduction and methods section of report for supervisor (research and field) feedback. • Address any concerns raised on the ethics application. • Gain ethical approval from HRA. • Upon receipt of ethical approval, send this to NWAS and YAS and they will send the first email invitation to the online questionnaire (exact dates will depend on receipt of ethical approval).

	• NWAS to advertise study on NHS trust social media (facebook and twitter). • Second email invitation to the project to be sent 1 week after initial email. • Closure of study one month after initial email invitation sent. • Continue writing of report.
April/May 2020	• Analysis. • Continue write up of report (including the analysis/discussion sections). • Submit draft report for supervisor (research and field) feedback.
May/June 2020	• Submit thesis.
June/July 2020	• Disseminate results back to NWAS and YAS.

4.3.7 References

Al Enazi, S. K., & AlEnzie, A. N. (2018). Stress and burnout among red crescent paramedic ambulance workers in Riyadh. Retrieved from https://scientonline.org/open-access/stress-and-burnout-among-red-crescent-paramedic-ambulance-workers-in-riyadh.pdf

Brasseur, S., Grégoire, J., Bourdu, R., & Mikolajczak, M. (2013). The Profile of Emotional Competence (PEC): Development and validation of a measure that fits dimensions of Emotional Competence theory. *PLoS ONE,* 8(5): e62635.

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4.3.8 Appendix I

The following is a list of the documents for this project

- Initial email invitation for prospective participants.
- Second email invitation for prospective participants.
- Poster advertising study (NWAS).
- Poster advertising study (YAS).
- Participant information sheet.
- Debrief sheet.
- Organisation information document non commercial.
- IRAS Schedule of Events.
- Chief Investigator CV.
- Student CV.
- Copy of the survey.