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Literature review

Barriers to, and enablers of, paramedics responding to suspected or confirmed COVID-19 cases: An integrative review

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ABSTRACT

Background: The coronavirus pandemic (COVID-19) has focused attention on healthcare workers' concerns about working during a pandemic, yet research on the effect of the pandemic specifically on paramedics is lacking. This literature review aims to critically examine the current knowledge of paramedics' experience of barriers to, and enablers of, responding to suspected or confirmed COVID-19 cases.

Methods: An integrative review was undertaken using articles found by a systematic search of four research databases. Inclusion criteria included paramedics or emergency medical technicians who had experience of barriers or enablers responding to patients during the coronavirus pandemic.

Results: Nine articles met the inclusion and exclusion criteria. Barriers included communication and poor leadership, fear of infection to self and family, frequent changes in guidelines and inconsistencies across agencies, stress/burnout, and concerns with personal protective equipment. Enablers included job security, perceived social support, solidarity with other paramedics, and use of modern technologies for communication.

Conclusions: There are unique experiences of working during the COVID-19 pandemic in the prehospital environment. Particular challenges occurred with leadership, communication within the organisation and between agencies, and working in an unpredictable environment.

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Introduction

Healthcare workers work in physically and emotionally demanding environments; commonly cited stressors include shift work, burnout, low morale, and workload [1–3]. De Cieri et al. [4] indicate such stressors increase healthcare workers' risk of deteriorating mental and physical health. Public health emergencies, such as pandemics, create an additional stress burden on healthcare workers, during the community's greatest time of need [5].

Throughout history, infectious diseases with pandemic potential have regularly emerged and spread [6]. There have been increasing documented threats of infectious disease. Six public health emergencies of international concern (PHEIC) have been declared by the World Health Organization (WHO) since 2009 [7,8]. In Queensland on January 29, 2020, a public health emergency was declared [9] due to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which causes coronavirus disease (COVID-19). On March 11, 2020, the World Health Organization (WHO) declared a global COVID-19 pandemic [10]. More than two years since the first detected case of COVID-19, on March 23rd, 2022, the WHO had reported 476,374,234 confirmed COVID-19 positive cases and 6,108,976 deaths globally [11]. The COVID-19 pandemic has disrupted global health care provision, increased pressure on health delivery models, and significantly impacted lives, including those of paramedics who perform essential frontline health care [12–14].

Studies on healthcare workers more broadly working during a pandemic (either previous, or potential pandemics) found potential issues such as anxiety, an elevated level of perceived threat to themselves and loved ones, lack of availability of personal protective equipment (PPE) and vaccines, and significant staff shortages from sickness, quarantine and absences due to concerns about working during a pandemic [15,16]. Staff shortage may cause serious disruption to health services during a pandemic [16].

Sultan et al. [5], identified the need to address healthcare workers' perceived concerns while working during disasters and public health emergencies to ensure disaster preparedness is successful. While health-related studies on emergency care during pandemics have been conducted with nurses and doctors in health care settings, the lessons have been extrapolated to prehospital care, despite the different environment offering unique challenges [16,17]. Prehospital care in Australia is provided by a variety of people from volunteer first responders to nurses, paramedics, and physicians, with a variety of educational backgrounds. In Australia, ambulance services are run by the state or territory and most qualified paramedics have a diploma or degree in paramedicine and can provide advanced life support [18]. In other countries, Emergency Medical Technicians (EMTs) may provide prehospital care, however they are less qualified than a paramedic [19].

A recent integrative review paper by Murray et al. [15] included 40 research papers on factors that influenced health care workers' willingness to respond during infectious disease outbreaks and bioterrorist events. However, none of these studies included Australian paramedics, although they did examine American emergency medical services (EMS) or EMTs experiences. Considering the service paramedics provide during public health emergencies, the unique challenges created by delivery of prehospital care in the context of a pandemic, and the lack of studies examining their experiences, more detailed information is required on the experiences of paramedics and EMTs and how to better support them in this situation [20–22].

Aim

The aim of this integrative review was to critically examine current knowledge of paramedics' experiences of barriers to, and enablers of, responding to suspected or confirmed COVID-19 cases.

Method

An integrative review methodology was used as it is the broadest type of research review method, allowing a comprehensive portrayal of healthcare problems that are of importance to the industry [23]. Whittemore and Knafl [23] explain that an integrative review allows the use of experimental and non-experimental research, as well as data from theoretical and empirical literature. Given Petrie et al. [24] identified that paramedics are underrepresented in research on the impacts of COVID-19, the ability to access and incorporate findings from a wide range of studies is useful. Whittemore and Knafl's [23] integrative review framework, was used to construct this review including the steps of: problem identification, literature search, data evaluation, data analysis, and presentation of the data.

Search methods

Four electronic databases were systematically searched: Cumulative Index for Nursing and Allied Health Literature (CINAHL), Embase, Pubmed, and Psychinfo. Only peer reviewed, English text articles published between 2020 and 2022 (relevant to COVID-19) were included. Articles that included reports on paramedics' experiences of barriers to, and enablers of, attending suspected or confirmed COVID-19 cases were sought, using the search terms listed in Table 1 and applying the inclusion and exclusion criteria in Table 2.

Table 1
Search terms.

Category	Search terms
1	paramed* OR EMT or "emergency medical technician" OR prehospital OR pre-hospital OR ambulance OR EMS OR "emergency medical service" OR "first responder" OR "out of hospital" OR HEMS OR "field triage" OR "emergency workers" OR "helicopter emergency medical service" OR medic OR "frontline healthcare worker" OR "public safety personnel"
2	COVID-19 OR coronavirus OR 2019-ncov OR sars-cov-2 OR cov-19 OR pandemic OR "2019 novel coronavirus" OR "coronavirus disease"
3	Barriers OR obstacles OR challeng* OR difficult* OR issues OR problems OR enablers OR facilitat* OR motivat* OR feelings OR perception OR attitude OR experience OR "willingness to respond" OR "willingness to work"
4	Work OR respond* OR attend* or "call out" OR mission

Table 2
Inclusion and exclusion criteria.

Inclusion	Exclusion
• Peer reviewed journals • English language • Population of paramedics • Population of emergency medical technicians • Published since January 2020 • COVID-19 • Experience of responding to suspected or confirmed COVID-19 cases	• Articles without paramedics/emergency medical technicians • Students only • Articles that include multiple healthcare professionals and do not specify all paramedic responses • Languages other than English • Professions that do not clearly relate to paramedicine roles • Dissertation abstract • Not primary research • Articles that did not refer to COVID-19 or experiences of responding to COVID-19 cases • Conference abstracts or oral presentations

Data quality, extraction, and synthesis

To assess the quality of the articles, the Mixed Methods Appraisal Tool (MMAT) [26] was utilised. The MMAT is used to critically appraise the articles as it allows articles with quantitative, qualitative, and mixed methods approaches to be appraised using one tool. The MMAT was completed separately by three of the four authors and the results were compared, discussed, and the final outcomes agreed upon.

A data extraction table (Table 3) was completed with information on the author, year, location, study design and methods, study sample, findings, recommendations, limitations, MMAT results and identified barriers and enablers. The data extraction table was reviewed by the authors and themes were identified. All articles were kept in the integrative review despite varying quality of the MMAT results as there were limited articles to include.

Results

The literature search found 361 articles in total, with 136 duplicates, leaving 225 articles to screen as per the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart [25] (Fig. 1). A title and abstract screen undertaken using the inclusion and exclusion criteria (Table 2), removed a further 111 articles. The first screen of the full text articles removed 76 articles as they did not directly relate to COVID-19, paramedics or EMTs, or the experience of responding to COVID-19 cases. The second full text screen removed a further 19 as they reported on a combination of healthcare professions and either did not report the results for paramedics or EMTs separately, or only reported some of the results separately. Five articles were removed as the full text was not in English or they were conference proceedings. One article was included that used physicians, nurses, and paramedics, as the results were clearly separated by professions, and these data could be extracted and related to paramedics. Fourteen articles were then reviewed by three researchers and a further five were removed as they were deemed not to be primary research. A manual search conducted from the references of the final articles did not result in any new articles, leaving nine for final inclusions.

Five articles included paramedics only; these studies were conducted in Canada, Australia, Poland, Pakistan, and Wales. Three studied EMTs and paramedics from Saudi Arabia, Taiwan, or Germany. One article reported results from Australian paramedics, nurses, and emergency physicians. As data from all disciplines were reported separately, paramedic responses only are reported in this review. The reporting of the results in this review uses the term 'paramedics' for brevity, but the term includes EMTs and paramedics. From the review clear barriers and enablers were identified as detailed below.

Barriers

Communication and poor leadership

The studies reported on the challenge of communication through the COVID-19 pandemic and the effects of leadership styles. Li et al. [21] found that the most common source of information for health professionals was the state or territory Department of Health website, and paramedics' second most common source of information was their organisations' emails. Paramedics had concerns that the volume of communication, which may have been warranted due to the rapidly changing environment, quickly became overwhelming and contributed to information overload [24,27].

Boechler et al. [28] identified the need for concise, stream-lined information from trusted sources as people were inundated by information from multiple sources. Throughout the pandemic, ambulance services found more effective communication strategies, such as regular updates, as this was seen as strategic and relevant to their needs [28]. The forced change to more modern styles of communication was welcomed by paramedics as it showed the effort of managers to communicate with staff, although it only allowed for one-way communication [27,28]. This one-way communication then created a barrier as it was perceived as decreasing transparency and limiting the provision of feedback about staff concerns [28]. Meanwhile, Li et al. [21] reported that 74.5% of paramedics 'somewhat or strongly agreed' that their organisation provided clear, timely, and authoritative COVID-19 information, including daily updates.

While discussing communication, both Boechler et al. [28] and Petrie et al. [24], found leadership challenges during the COVID-19 pandemic. A common theme related to a disconnect between management and staff, resulting in lower morale and resilience. When some managers moved to remote work due to social distancing or quarantine needs, some paramedics perceived this change as fear-driven rather than a necessity [28]. Some paramedics found the physical distance from managers, and difficulty in contacting them due to manager workload, further exacerbated the lack of connection during a time where so many changes in paramedics' work and personal life were causing increased stress and isolation [28].

Fear of infection

Fear of infection to self and family was a recurring theme as most paramedics perceived the risk of contracting SARS-CoV-2 was higher for them than for the general population and the perceived threat increased when colleagues contracted SARS-CoV-2 infection [13,27,29,30]. Piotrowski et al. [13] reported that paramedics who had known contact with COVID-19 positive patients had higher levels of stress than those who had not, and stress in itself can increase the perceived threat to a person's health and life. In other countries, paramedics responding to community cases could never be certain if the case they were attending had SARS-CoV-2, meaning the perceived risk was ever present and made their job more unpredictable than usual [24,27].

Table 3
Data extraction table MMAT [32].

Author, year (Location)	Aim	Study design, methods, study sample	Study findings	Recommendations	Limitations	MMAT	Barriers (B) or enablers (E)
Alqahtani et al. (2021) (Saudi Arabia)	To determine the psychological and social wellbeing of paramedics during the COVID 19 pandemic. Assess the therapeutic assistance provided to paramedics during the pandemic.	Cross-sectional survey. Convenience sampling. Paramedics and EMTs. N = 106	Paramedics suffered from social and psychological depression. Social assistance contributes to improved psychological results.	Paramedics should be given psychological support and social counselling services.	Population limited to Riyadh City in Saudi Arabia. Majority of respondents were men (95.3%). Results not generalisable.	Criteria 4.4 for quantitative descriptive studies not met.	B: Social and psychological depression. High levels of stress when caring for infected patients. Stigma and discrimination from family and friends. Fear of contracting the virus. Shortage of PPE. Adherence to other containment measures and distanced from family and friends. E: Social support.
Boechler et al. (2021) (Canada)	Explore the lived experience of paramedics in Canada during COVID-19- focusing on impactful leadership, differentiating between successful and failed strategies.	Qualitative. Online survey. Open-ended questions. Convenience sampling. Paramedics. N = 428	Communication, engagement, transparency and follow-up are important. Leadership styles can help reduce chronic stress in paramedics, especially in prolonged emergent situations.	Engage with staff, ask for feedback with a system in place for responses, filter out irrelevant information, give meaningful recognition, have visible and available leaders on the frontline.	Survey questions not supplied, nor an in-depth description.	All criteria for qualitative studies met.	B: Overwhelming email updates- not always relevant and some overlapping with other sources.Frequently changing guidelines and did not always align with receiving hospital guidelines. Deteriorating relationships with other HCW's. Lack of confidence in leaders. E: Using different communication strategies to stay engaged with staff. Public support.
Chang et al. (2021) (Taiwan)	To measure factors related to physical and mental health among EMTs and paramedics in Taiwan Fire Departments. Investigate the association among these factors during a spike in COVID-19 case numbers.	Mixed methods. Cross sectional study. Paramedics and EMTs. N = 187	An increase in perceived pressure, burnout, and health burden.	The result of increased physical and mental health conditions might result in a public health concern. Should be considered as part of the healthcare system so they have access to more resources.	Narrow sample. Majority male (92.5%)	All criteria mixed methods studies met.	B: The increase in workload was associated with burnout and perceived pressure. Revaluation of roles and meaning of being an EMT/ paramedic. Not considered healthcare professionals so have less access to support and resources Response time pressure and inadequate cleaning/PPE donning
Dreher et al. (2021) (Germany)	Aim to investigate attitudes and stressors related to the SARS-CoV-2 outbreak among emergency medical services workers. Also aimed to detect changes within a 5- week period and potential	Quantitative. Cross-sectional survey, repeated at 5wks. Convenience sample Paramedics/EMTs N = 1124 (1st) N = 413 (2nd)	The identified key COVID-19 related stressor levels generally decreased within a 5wk period. EMS workers are less affected by existential fears and rather worry about their personal infection risk.	Childcare needs to be addressed by political decision makers. Stock PPE supplies for future outbreaks. Pandemic training for staff preparation.	No exact response rate could be calculated. Fewer females (16.7% vs. 27.0%). Age group of 25–54 years overrepresented. Cannot detect regional differences. No causal relationships A self-devised	Criteria 3.1 for quantitative non-randomised studies not met.	B: Risk of infection to themselves Childcare issues E: Less than 20% felt burdened by financial situation.

(*continued on next page*)

Table 3 (*continued*)

Author, year (Location)	Aim	Study design, methods, study sample	Study findings	Recommendations	Limitations	MMAT	Barriers (B) or enablers (E)
	determinants of attitudes and stressors				questionnaire with unknown psychometric properties was used.		
Li et al. (2021) Australia	Examine the knowledge, preparedness and experiences of Australian emergency nurses, emergency physicians and paramedics in managing COVID-19.	Mixed methods. A cross-sectional online survey (MCQ and free text responses). Nurses, paramedics, and emergency physicians. Conducted between June-September 2020. 430 (161 paramedics)	Generally felt prepared and able to respond, however there were significant challenges with communication from management, messaging, PPE, and risk of transmission to family members.	The significant challenges in inconsistent messaging, unclear communication from management, quality and availability of PPE, and fear of infection mean adequate support services need to be available to improve safety and wellbeing of staff.	Low response rates. Does not capture changing experiences during the pandemic. Scale reliability was not undertaken.	Criteria 4.1, 4.2, 4.4 for quantitative descriptive studies not met.	Barriers: Ambulance emails were the second most common way of accessing information with daily communication. Communication could have been timelier and more clarified. Difficult to keep up to date with changing guidelines. Individual preparedness for COVID-19 on an individual level was most commonly 'not prepared at all'. 20.5% said they had not received PPE training.49.1% mostly confident in using PPE. Availability and quality of PPE. Transmission to family members.
Petrie et al. (2022) (Australia)	To report on mental health symptoms and the working environment among paramedics during the COVID-19 pandemic and explore their experiences of work and wellbeing during this time.	Quantitative. Cross-sectional survey. Convenience sample. Paramedics. Australia. N = 95	The COVID-19 pandemic resulted in considerable occupational disruption for paramedics and was associated with significant negative impacts on mental health.	Paramedics want a safe, consistent, prepared, and adaptive workforce. Support mental health and quality patient care.	Small sample size, cross-sectional survey design and potential for self-selection and response bias. Self-reported mental health issues.	Criteria 4.1, 4.2, 4.4. for quantitative descriptive studies not met.	B: Four themes. 'The pervasiveness of COVID-19 disruptions across all life domains' 'The challenges of widespread disruption at work' 'Risk, uncertainty and feeling unsafe at work' 'The challenges of pandemic (un)preparedness across the health system.'
Piotrowski et al. (2021) (Poland)	To examine the role of resilience in the subjective experience of stress among paramedics during the COVID-19 pandemic.	Quantitative. Questionnaires 6mths apart. Paramedics. Poland. N = 75 (1st) N = 84 (2nd)	Paramedics' subjectively experienced stress was lower during the COVID-19 pandemic. Paramedics who were in direct contact with patients with COVID-19 experienced higher stress.	Monitor paramedics psychological condition after the pandemic ends. Raise awareness of personal resources.	Sample size is small. Mostly male respondents. Not all were from pre and post questionnaire.	Criteria 3.1, 3.4 for quantitative for non-randomised studies not met	Barriers: Direct contact with COVID-19 patients resulted in greater stress in paramedics. Long term stress can deplete coping resources. Enablers: Have resilience and personal resources to draw on.
Rees et al. (2021) (Wales)	To explore paramedic experiences of providing care during the COVID-19 pandemic and develop theory to inform future policy and practice.	Qualitative. One-to-one semi structured interviews. Purposive sampling. Paramedics. N = 20	Emergent categories included: Protect me to protect you, Rapid disruption and adaptation, Trust in communication and information and United in hardship.	Future preparations should focus on PPE, utilisation and resourcing of healthcare, communication, and staff well-being.	Paramedics from one ambulance service. Small sample size.	All criteria for qualitative studies met	Barrier: Risk of infection to themselves and family. Fear and mental health. Changes in work practices. Losing the 'human side' of the job- (unable to take family member escorts, wearing PPE, no touching etc). Training, quality, and access to PPE.

(*continued on next page*)

Table 3 (*continued*)

Author, year (Location)	Aim	Study design, methods, study sample	Study findings	Recommendations	Limitations	MMAT	Barriers (B) or enablers (E)
							Enabler- secure employment. Sense of solidarity with other paramedics. Public support.
Shahzad et al. (2020) (Pakistan)	To investigate the impact among paramedics treating patients with COVID-19- the perceived threat and agonistic behaviour.	Quantitative. Based on the stressor–strain–outcome paradigm, a structured questionnaire. Paramedics. N = 345	The perceived threat of COVID-19 on predicting greater levels of physiological anxiety, depression, and emotional exhaustion, may lead toward agonistic behaviour. Perceived social support had a positive effect.	Support paramedics as they are at high risk of psychological stress, identify high risk groups early and provide counselling and support.	Differences between age and sex not captured.	Criteria 4.2, 4.4 for quantitative descriptive studies not met	Barriers: Perceived threat of COVID led to emotional exhaustion. Cognitive and emotional stress led to behavioural changes. Enabler: Perceived social support reduced the effect of anxiety, depression, and emotional exhaustion on agonistic behaviour.

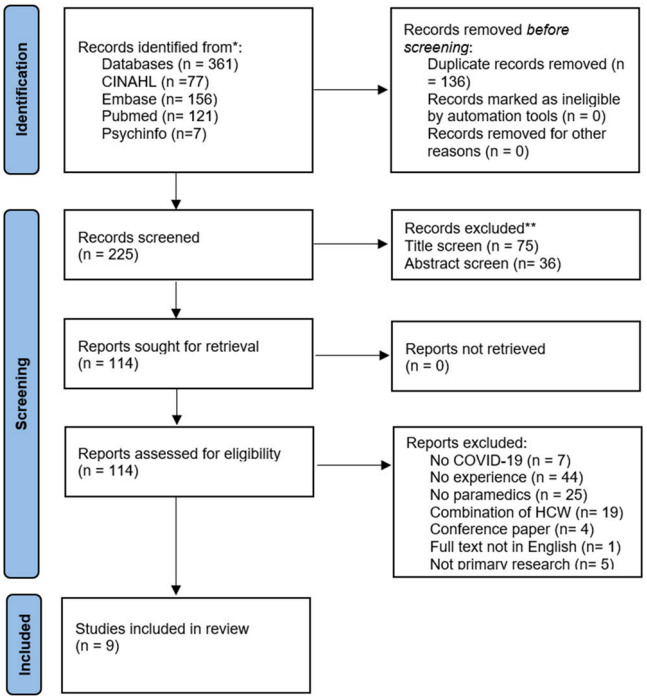

Fig. 1. PRISMA flowchart [25].

Paramedics were also concerned about transmitting infection to their family and friends, and at times this contributed to increasing isolation, either self-imposed or because family and friends were also concerned about contracting the virus from the paramedic [21,29]. Both Rees et al. [27] and Petrie et al. [24] reported that paramedics expressed concerns about the increased risk of infection due to their workspaces, that is, being unable to socially distance in ambulances, and being close to symptomatic patients in their home, during transport, and while at the hospital. Paramedics reported responding to patients who were very unwell as they were presenting later in their illness because they feared going to hospital and contracting the virus, increasing the stress of attending to highly contagious patients [27].

Frequent changes in guidelines and inconsistencies across agencies

A significant barrier to attending cases during the COVID-19 pandemic was the frequent changes to work practices and clinical guidelines, and inconsistencies between ambulance and other healthcare settings [24]. Paramedics reported on the difficulty of keeping up to date with their own organisations' changes, as rules and guidelines could change during their shift, and be communicated without a notification of high importance [21,24,28]. The speed at which everything was changing led some paramedics to feel these changes were rushed, reactive, and possibly putting patients, and the paramedics' registration, at risk [24,27]. The rapidly changing information also challenged paramedics' ability to learn and assimilate the information quickly, through having to continually adapt during an already stressful period [27]. The inconsistencies in guidelines between healthcare settings previously mentioned, sometimes strained relationships with the receiving facility if paramedics' treatment of the patient did not align with the facility's current guidelines [28], and caused paramedics to feel stressed and exhausted.

Stress/burnout

Significant stressors were reported by paramedics during the COVID-19 pandemic, resulting from fear of infection, insufficient PPE availability, social isolation, stigma due to people seeing paramedics as a potential source of infection, changes in work practices and the extended length of the pandemic [29]. Alqahtani et al. [29], found these stressors affected paramedics' social and psychological well-being, causing psychological anxiety and physical changes such as high or low blood pressure.

Even though Piotrowski et al. [13] found paramedics to be resilient, they suggested the duration of the pandemic could lead to a depletion of their coping resources. Some respondents described the holistic nature of the stress experienced, from the struggle to meet demands at work and home, the invasiveness of the pandemic and being unable to switch off once they left work, being unable to engage in their usual coping strategies due to restrictions and lockdowns, and the loss of social support, particularly if they lived alone [13]. Shahzad et al. [31] concluded that the perceived threat of COVID-19 may contribute to agonistic behaviour, such as defensiveness, avoidance, and aggression.

The changes to work practices added to paramedics' stress, from rapidly changing guidelines, inconsistencies, and an influx of communication, wearing PPE, more physically and emotionally demanding workdays, lack of mental health support, and the constant fear of infection [24,27,28,31]. In conjunction with these changes, paramedics also had to frequently decontaminate their workspaces and were stressed by consequent time constraints and relying on colleagues to clean to the expected standard [19,27].

During their shifts, paramedics experienced frequent emotionally demanding cases as the public feared contracting COVID-19. Patient presentations ranged from patients calling for mild symptoms, not requiring any treatment but scared because they thought they had COVID-19, to patients waiting as long as possible and calling for emergency services when they were very unwell [27]. The extremes in public responses meant that paramedics were often making decisions on whether it would be more dangerous to transport the patient to hospital if they were not acutely unwell, and risk infection to the patient, or having to treat patients with high-risk procedures if very unwell, and risk infection to themselves [27].

In Taiwan, Chang and Hu [19] found paramedics were not adequately resourced because they were not recognised as healthcare professionals or even considered part of the healthcare system, instead classified separately as emergency and rescue responders. Consequently, they did not have access to resources that other healthcare providers did, particularly PPE and priority vaccination, increasing their stress during the pandemic. This disconnect meant Taiwanese paramedics started questioning their roles and the meaning of their profession during the COVID-19 pandemic, expressing feelings of pressure, stress, and anxiety [19]. Chang and Hu [19] concluded Taiwanese paramedics were suffering at least a moderate level of burnout, associated with increased workload, and perceived pressure during the COVID-19 pandemic.

Personal protective equipment (PPE)

Paramedics responding to cases during the COVID-19 pandemic had to wear PPE more frequently than previously, and during this time they had concerns about PPE availability, quality, education on its use, and adequacy of protection [27]. Regarding education on the use of PPE, Li et al. [21] found that only 11.8% of paramedics believed PPE training was 'entirely adequate', while 37.3% said the training was 'mostly adequate.' Only 20.5% of paramedics were 'entirely confident' in using PPE, and 49.1% were 'mostly confident'.

Petrie et al. [24] and Rees et al. [27] reported on the frustration paramedics experienced when PPE advice was conservative earlier in the pandemic, escalating to increased protection later in the pandemic when more information was available, including discrepancies in guidance from different organisations. In addition, paramedics reported feeling unsafe at work due to potential issues with availability and changing supply of PPE, increasing the unpredictability of their working environment [21,24].

Personal protective equipment did not only affect the paramedics. As Rees et al. [27] identified, the change in work practices meant paramedics now had to apply masks to patients as soon as they approached them, making it harder to build rapport and reduce patients' anxiety. A paramedic explained the difficulty in reassuring patients during the pandemic when paramedics were wearing PPE, applying PPE to patients, physical distancing, avoiding unnecessary touch, and being unable to transport family members due to local restrictions, describing these challenges as inhibiting moments of compassion during their day [27].

Enablers

Perceived social support and solidarity

Paramedics expressed the appreciation of public support during the COVID-19 pandemic [27–29]. Rees et al. [27] identified a theme of being united in hardship through community support and a sense of solidarity amongst paramedics in having to work during the pandemic. Social support helped improve morale, particularly when healthcare workers were becoming more isolated due to isolation or quarantine requirements and fear of infecting others [29]. Some paramedics reported how they felt embarrassed when they were referred to as heroes, and had difficulty in accepting employers' attempts at recognition, but the public support helped foster a sense of solidarity [27,28]. Meanwhile, Shahzad et al. [31], concluded that public support is required for paramedics during public health emergencies such as the COVID-19 pandemic, as the social support reduces the effects of anxiety, depression, and emotional exhaustion in triggering agonistic behaviour.

Resilience and secure employment

Although Piotrowski et al. [13] reported that paramedics who had contact with patients who were diagnosed with COVID-19 had higher stress levels than the paramedics who had not, they found that despite the increase in stress, the paramedics who had responded to patients with COVID-19, only had medium stress levels overall. Piotrowski et al. [13] concluded that paramedics were resilient during the pandemic, likely because their job requires them to have perseverance and determination, and they can experience emotional tension and external stress in their everyday duties. In addition to this, paramedics acknowledged that they felt fortunate they had secure employment [27], and less than 20% of paramedics reported being burdened by their financial situation during the pandemic [30].

Organisation adaption to modern technology

Methods of communication were identified as barriers during the COVID-19 pandemic, but because ambulance services had to adapt to the new environment, paramedics were also acknowledged the benefits of the technology being used [27]. These benefits included increased access for patients to telehealth instead of being transported to the emergency department and increased transparency of staff communication within organisations through the provision of more channels to communicate relevant information and feedback [27,28].

Discussion

This literature review confirmed shared barriers and enablers for paramedics and other healthcare workers, while drawing attention to how some barriers were particularly challenging in paramedic care. These barriers need targeted interventions relevant to the prehospital field to create meaningful change.

The effects of leadership and communication were especially evident in this literature compared to other healthcare workers, showing how the prehospital environment is unique in its challenges. Paramedics had explained how the rapidly changing, and overwhelming amount, of information created stress, anxiety, and increased tensions with other healthcare workers [21,24,27,28]. The prehospital environment also affected relationships with managers as managers' move to remote work to increase staff safety made staff feel more isolated and less supported.

These challenges call attention to the need for healthcare stakeholders to continuously share information with each other in a central location as the nature of the paramedic work environment is mobile and unpredictable, involving contact with multiple stakeholders during shifts, and not just relying on their own organisation's guidelines. Paramedics reported on the stress experienced when hospital guidelines did not line up with ambulance guidelines, creating tension between healthcare workers [28]. A shared, central location for communication may ensure healthcare workers remain informed, patient care is not compromised, and there is less disruption to healthcare delivery during public health emergencies.

Concerns about PPE availability and quality were common across healthcare professions. However, paramedics reporting less training and less confidence using PPE compared to nurses and physicians [21]. Paramedics also commented on the difficulty of wearing PPE and communicating with, and reassuring patients when arriving on scene, as PPE limits tactile reassurance and nonverbal communication [27]. Due to restrictions, family members could not always escort patients to hospital, and paramedics felt at times that there was less humanity in their job when having to leave distressed family members behind [27]. Piotrowski et al. [13] identified that paramedics were generally resilient, yet over time these resources could be used up and result in increased stress and burnout and further resiliency training could help prepare for future public health emergencies.

Fear of infection was another common concern for all healthcare workers. As explained by some paramedics, it was made more difficult by having confined workspaces such as ambulances and patient environments [24]. While the fear of infection experienced by healthcare workers may not be surprising, it would appear this is worth investigating further in the prehospital population to understand the effects of working in uncontrolled environments and how best to manage the stress related to this.

Stress and burnout were documented for health care professionals throughout the pandemic, with reasons such as workload, isolation and quarantine, stigma, fear of infection, and childcare issues. Alqahtani et al. [29] concluded that paramedics had increased psychological distress and decreased social wellbeing and so more mental health support would be beneficial to support paramedics and decrease barriers as much as possible. Enablers such as solidarity, job security and organisational adaption should also be focussed on to improve morale as these were seen as enablers throughout the pandemic.

The literature search demonstrated how few studies were focussed on a paramedic population as many studies investigated a combination of healthcare professionals such as doctors, nurses, hospital staff, and sometimes emergency service workers. While many barriers and enablers to treating patients with known or suspected infection were similar across healthcare professions, there are unique challenges in the prehospital environment that are worth investigating in greater depth. To build resilience in the healthcare sector, it is recommended further studies are conducted specifically in the prehospital sector to continue to protect and support paramedics in their frontline role.

Limitations

Given the lack of available literature, all results were included in the literature review despite varying degrees of quality. Cultural differences were not considered in this review, and only English texts were included, potentially limiting experiences from non-English speaking countries.

Recommendations/conclusion

While there were shared barriers and enablers between healthcare workers when responding to COVID-19 cases, the information gathered in these articles shows that paramedics do have unique challenges in the prehospital environment. Factors such as communication strategies for updates and changes in clinical guidelines, improved leadership styles, PPE training, access to managers and mental health support were all identified as needing targeted research into how paramedics are affected and what can be done to reduce these barriers. There were some protective factors identified, including job stability, perceived social support, resilience, personal resources, and solidarity with other paramedics which can be focussed on in future public health emergencies. This review identifies opportunities for future paramedic specific research in effective prehospital leadership during public health emergencies, PPE knowledge, and mental health support during a pandemic. Implications for practice include the need for improved PPE education, leadership styles, and an urgent need for improved mental health support.

Disclosure

There are no conflicts of interest to report for this review.

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