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Main text files and figures:

I. Title, Abstract and Key words:

Title: Nurses contribution during pandemic conditions: A synthesis of qualitative literature.

Abstract:

Background:

Pandemics are known for their abrupt and contagious nature, as well as their impact on individuals and society. Nurses are more likely to work closely with patients experiencing illness and disease during pandemics and studies on the role of the profession have mainly focused on the challenges, barriers and shortfalls in nursing care provision. The nursing role in service delivery and their contribution in improving patient wellbeing has received far less attention.

Objectives:

To synthesize the evidence relating to the contribution nurses make during respiratory infectious disease pandemics.

Methods:

In May 2020, three review registers, grey literature and the following databases were searched: Medline via Ovid, Web of Science, CINAHL via EBSCO and Cochrane Library. The specific focus was on qualitative literature that considered the experiences and perceptions of nurses providing care during several respiratory pandemics. Selected papers were appraised using CASP checklist. ENTREQ checklist was used to inform stages associated with the synthesis of selected papers.

Findings:

From 5553 retrieved citations, the analysis of 24 eligible papers resulted in three key themes: the implications of working during pandemics on nurses' personal and family life, nursing contribution in challenging conditions, and working above and beyond. Considering nurses role in healthcare system, research on their contribution found to have received little appreciation in peer-reviewed journals.

Conclusion:

This review pertains to nurses' work in global context and highlights the huge contribution made by the profession in the context of respiratory pandemics. It confirms that nurses' experiences outweighed economic, social and psychological implications of providing care during the pandemic crisis. Acknowledging nurses' resilience and professional motivations, we also argue that the nurse contribution during pandemics can be enhanced when resources, support and training is provided. Further research on contexts and conditions which mitigate nurses the potential for sustained contribution is needed.

Keywords: Nursing, experiences, pandemics

II. Main Text:

Introduction:

The term pandemic is understood and addressed here as a global phenomenon and defined as "an epidemic occurring worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people"(Porta, 2014). Although the quantitative and mathematical parameters of the definition are developing (Singer et al. (2021), pandemics are identified by geographic scale, the unknown or rapidly changing nature of a virus, cross immunity and heterogeneous transmission (Porta, 2014, Singer et al. (2021). In the last 20 years the world has seen multiple global epidemics resulting in large scale morbidity and mortality. Severe Acute Respiratory Syndrome (SARS), the Avian influenza A/H5N1, the Influenza A/H1N1, Middle East Respiratory Syndrome (MERS), and recent Coronavirus disease 2019 (COVID-19), are some of the major respiratory infectious pandemics transmitted through droplets and person-to-person contact. People infected often present with mild to severe symptoms including; fever, cough, shortness of breath, and hypoxemia. Cases with severe Acute Respiratory Distress Syndrome (ARDS) require intensive care admission, ventilator and sometimes Extracorporeal Membrane Oxygenation (ECMO) support (Honey & Wang, 2013; Liu et al., 2020).

The unpredictability and rapid spread of these viral respiratory diseases are noted to challenge the healthcare systems (Bernstein, 2003; Liu et al., 2020). In Wuhan, China, when the COVID-19 outbreak was declared in Hubei province, 42,000 healthcare workers, including 28,000 nurses came from different parts of the country to support and save the local healthcare systems (Liu et al., 2020). The number and complexity of the patients presented with epidemic disease also challenges the skills, capacities and patience of individual professionals. In addition, the preparedness of healthcare institutions and the support they provide through clear guidelines, resources and training, are important determinants in strengthening the workforce (Liu et al., 2020). At the time of writing, the Covid-19 pandemic continues and as such the evidence relating to nurse experiences is evolving. This paper concerns itself, in the main, with data relating to pre-Covid 19 pandemics.

As a consequence of its close and prolonged contact with patients, the nursing profession is considered a vital asset to health systems during pandemic conditions. However, this is not without its problems. Compared to other health care workers, nurses extended contact with patients has been linked to greater risk of disease contraction and death (Shih et al., 2007). Furthermore, fear of becoming infected and contagious, and of transmitting the disease to family, friends and others are noted as major challenges associated with nursing in pandemic conditions (Corley et al., 2010; Holroyd & McNaught, 2008). Add to this the risk of infection, admission and death of colleagues with the virus, alongside the high number of death of patients and significant questions emerge about moral decisions, distress and about the longer term retention of nursing staff.

Research on pandemics has mainly focused on the epidemiology of disease, failures of healthcare systems, or morbidity and mortality among patients presenting with infection. Most of the research with healthcare workers, on the other hand, tends to focus on the role of doctors and allied healthcare workers; the risk perception and contribution of nurse's is less frequently a research focus. In contrast, the media has paid considerable attention to nurses. However,

such work is often based on assumptions and anecdotal stories; as a result, the positive contribution of nurses can be minimalised when the portrayal of negative image elicits more interest (Shih et al., 2007). Where appreciation the nursing contribution during pandemics is recognised, it has been found to increase nurse's willingness to work (role satisfaction) (Shih et al., 2009). The social and personal dilemmas nurses face, the psychological and physical stresses they experience, and how nurses can mobilise coping strategies to keep themselves resilient through these occupationally hazardous times, remain important questions. Most studies on the topic of caregiving during respiratory pandemics have looked at the experiences of nurses, but the focus often remained on the psychological impact of their work (Sun et al., 2020; Yin & Zeng, 2020) or on the resources available to nurses to address the infection.

Aims

This review aims to highlight contribution nurses make and challenges they face during respiratory infectious disease pandemics.

Methods:

A review was undertaken to synthesize the evidence on the challenges nurses face, and the contribution they make during infectious respiratory disease pandemics. The review was guided by the SALSA (Search, AppraisaL, Synthesis and Analysis) framework. ENTREQ (Enhancing transparency in reporting the synthesis of qualitative research) checklist was used to inform stages associated with the synthesis of selected papers (Appendix 2. Supplementary file 2).

Inclusion and exclusion criteria

We included primary studies based on qualitative approaches, limited to those that explored the experiences and perspectives of nursing staff providing care during respiratory infectious disease pandemics. Mixed methods studies, where it was possible to extract the qualitative data, were included. Papers where other health professionals were also participants were included only if the majority of participants were nursing staff (e.g. the paper by Corley et al (2010) included a small number of medics as participants). By nursing staff, we mean senior nurses, registered nurses, post graduating student nurses (who have previous experiences of nursing), nurses in different roles (e.g., management, research), and auxiliary nursing staff. This included nursing staff who looked after patients/residents/clients in acute settings (e.g., hospitals), long term institutions (e.g., nursing or care homes), and community or primary care services. We excluded studies focusing on non-respiratory tract infectious outbreaks, such as Ebola, that have very different modes of transmission. We also excluded studies using quantitative approaches and those involving expert opinion, conference papers, and dissertations.

Search strategy

We searched PROSPERO (International prospective register of systematic review), the Cochrane Library, and Scopus databases to find previous reviews conducted on the specific topic; no previous reviews were identified. AAT designed and conducted all searches, however, other authors regularly liaised and checked the detail and progress of searches. Due to time constraints, the search strategy only considered primary research studies published in the last 20 years (from 2000 to 2020) and published in English. We choose these search periods because major infectious respiratory disease epidemics/outbreak of Global scale (as defined by the

WHO) started at that time. Systematic searches were then conducted of relevant electronic databases: Medline via Ovid, Web of Science, CINAHL via EBSCO and Cochrane Library. In addition to this, a supplementary Google Scholar and OpenGrey search was conducted to identify further potential papers. The reference lists of all included articles were hand searched to identify any further relevant studies. Search terms included the following key words singly and in combination using the PEO (Population/participants, Exposure, Outcome) framework (Table 1).

For the purpose of this review, the WHO definition and declaration of pandemic or endemic respiratory tract infections of viral pathogens were considered/selected and included. In total, 5553 studies were returned in initial searches and were imported on the reference manager software Endnote X9 (see figure 1). Duplicates were identified applying Author, Title, Year and Reference Type of the papers and were removed. AAT scanned the titles and abstracts (using inclusion and exclusion criteria) to evaluate eligibility. The 86 full text papers remaining were then independently assessed by all three authors. Disagreements regarding inclusion/exclusion of these full text papers were discussed and resolved by reaching consensus.

Quality appraisal

The CASP (Critical Appraisal Skills Programme) Qualitative Checklist was used to appraise the quality of selected papers listed in the data extraction table (See appendix 1.0 Data Extraction Table). AAT and TR assessed and rated the quality of selected papers. Where there was still uncertainty, the third reviewer was involved, and agreement reached through consensus.

Data extraction and synthesis

AAT and SR independently performed data extraction from the eligible studies using a standardised data extraction form designed for the review. Qualitative data analysis software, Quirkos, was used to index, sort and synthesise the analysis of selected papers. In total, 72 Quirks containing 501 codes were identified, that were systematically developed into key themes.

Results:

The review included 21 qualitative studies and three mixed method studies. The studies were undertaken in Asia (n=18), Australasia (n=2), Europe (n=2) and North America (n=2). This geographical distribution should not be surprising given that, prior to Covid-19, the majority of respiratory pandemics were situated in Asia. Much of the data therefore refers to nursing experiences pre-Covid-19. Only four papers are concerned directly with Covid-19 (Liu et al., 2020; Sun et al., 2020; Yin & Zeng, 2020 and Zhang et al., 2020) and the specific circumstance and context of the pandemic conditions for each study should be taken into consideration.

Thematic analysis of included papers resulted in three main categories (see Table 2), highlighting the contribution of nurses during pandemics.

1.0. Personal and Family Life

Pandemic conditions impacted enormously on the personal, relational and material lives of nurses. This theme focuses on these issues, affecting nurses in their own workplace but also beyond.

1.1 Living in Isolation

Living in isolation, voluntarily or mandated, from friends, families and loved ones was a key feature in a number of papers and represents an underappreciated/unrecognised contribution of nurses' (Almutairi et al., 2018; Holroyd & McNaught, 2008; Im et al., 2018; Liu et al., 2020; Yin & Zeng, 2020). During the MERS pandemic in South Korea (Im et al., 2018) and COVID-19 in China (Liu et al., 2020), nurses were mandated to live in isolation. Providing care, often around the clock, nurses reported feeling 'trapped' with limited facilities. Uncertainty around the spread of viruses (Lam et al., 2019; Shih et al., 2007), the compromised condition at the work environment (Holroyd & McNaught, 2008; Lee et al., 2020), and the fear of being contagious (Sun et al., 2020), were major concerns when living in isolation. This voluntary strategy was used in order to avoid transmitting the virus to others, particularly vulnerable family members (Lam and Hung, 2013).

1.2 The Financial Cost of Nursing

A number of studies highlighted the financial cost to nurses as a result of pandemics (Aghaizu et al., 2011; Bergeron et al., 2006; Shih et al., 2007). Financial strain was often placed on nurses as a result of paying for additional childcare and elder parent care (Ives et al., 2009). Bergeron et al. (2006) revealed substantial personal implications of SARS for community nurses in Canada, including breaks from study and paying for extra years of tuition. In Taiwan, during the SARS pandemics, Shih et al. (2007) reported that the lack of government support to the private healthcare sector impacted on nursing jobs, with many nurses facing redundancy. Considering the economic impact of the pandemic on their jobs, Aghaizu et al. (2011) reported that nurses who fell sick (in countries like Hungary) felt compelled to continue working as a result of low sick pay entitlement.

1.3 Nursing in the context of fear and uncertainty

Continuing to provide care alongside one's own fears of contracting a deadly disease has been reported (Almutairi et al., 2018; Chiang et al., 2007; Ki & Maria, 2013). During the SARS pandemic, Chung et al (2005) revealed unpredictability, uncertainty and a scarcity of information about treatment, diagnosis and prognosis, as being the most worrying and challenging concerns for nurses. High mortality rates (Shih et al., 2007), lethality of the virus, knowledge of disease and its implications (Almutairi et al., 2018), lack of resource available to address infection (Chung et al., 2005), death of colleagues (Liu et al., 2020), losing patients under their care (Almutairi et al., 2018) and chaotic working environments (Corley et al., 2010) were all also identified. Developing resilience was reported as important for nurses in surviving through their fears and continuing to fulfil their role. To manage their fears, nurses found their existing and past knowledge helpful and adopted multiple mindful, educational and psychotherapies including; writing diaries and letters, breathing and relaxation techniques, music meditation and emotional expression and ventilation (Liu et al., 2020; Shih et al., 2007; Sun et al., 2020).

1.4 Personal Health & Well Being and Stigma

Beyond the work setting, papers identified deep and long-lasting emotional distress for nurses, often associated with poor outcomes for the patients they cared for (Almutairi et al., 2018; Chung et al., 2005; Holroyd & McNaught, 2008). Chung et al., (2005) reported that the sense of powerlessness (failure) was most distressing, with nurses who cared for dying patients

reportedly experiencing depression and grief. Holroyd and McNaught (2008) found that nurses caring for SARS patients reported Post Traumatic Stress Disorder and other mental and physical health problems, including insomnia and loss of appetite. The number and sudden nature of patient deaths were not only linked with nurses' sense of poor 'self-esteem', but Almutairi (2018) also reported flashbacks to traumatic experiences. Emotional distress was also associated with stigma (Almutairi et al., 2018; Robertson et al., 2004). Nurses reported being called 'vermin', 'contagion' and 'virus carrier' (Im et al., 2018). In countries where nurses were portrayed negatively in the media, there were implications for individuals and the nursing profession (Im et al., 2018; Shih et al., 2007). Being photographed, videoed, and shown on TV without permission during the SARS pandemic, Im et al., (2018) reported South Korean nurses were often objectified and rejected. Such rejection was not limited to outside work, nurse's experienced severe criticism and exclusion from other healthcare workers for being exposed when providing direct care to infected patients. This had lasting implications for their social and emotional wellbeing (Shih et al., 2007).

2.0. The Nursing Contribution in Challenging Conditions

Operational challenges for nurses were demonstrable within the review. This theme encapsulates the changes made by the profession to respond to the daily challenges of rising infections within the healthcare system and communities served by nurses.

2.1 First Line of Defence

Multiple factors were said to influence nurse workload during pandemic conditions, and these were primarily related to the nature of the disease, the condition of patients or the organization and its management (Kang et al., 2018; Lee et al., 2020). During MERS in South Korea, Im et al., (2018) and Kang et al., (2018), reported workload increases due to additional vigilance when monitoring patients, taking extra patient history related to the disease and maintaining supplementary infection control policies and protocols. Working with families to ensure safety and emotional support as well as providing additional information about patients, were noted (Corley et al., 2010). Being the first line of defence, ER nurses had to cope with a high volume of '*nervous patients and relatives*' as well as increasing clinical inquiries, providing information and advice, and handling complaints (Lam et al., 2019). In acute settings, Shih et al., (2007) reported that during the SARS outbreak the workload increased as a result of sudden patient deterioration. There is evidence that nurses act as 'substitutes' in the absence of other members of the team. Studies reported that other professionals demonstrated reluctance to come into contact with infectious patients (Shih et al., 2007). Due to this shortage of other staff, Corley et al., (2010) reported nurses becoming involved in equipment supply chains, resulting in overstretched nursing teams. Such pressure on nursing staff means they frequently work while being physically and mentally exhausted, with many nurses working without taking breaks or without taking adequate time to eat, drink or use the toilet (Corley et al., 2010; Im et al., 2018).

2.2 Juggling Depleted Resources and Patient Need

Successful management of a crisis depends on how staffing levels are met, particularly when flow of patients is overwhelming and the nature of disease unknown or uncertain (Corley et al., 2010; Honey & Wang, 2013; Lam et al., 2019). In many studies, the shortage of staff was

reported as a constant issue within their health sector, with the pandemics creating extra pressure on already overstretched staff (Corley et al., 2010; Ki & Maria, 2013). In the face of short staffing, there is evidence that nurse-to-patient ratios doubled with limited collaboration and support from other colleagues (Corley et al., 2010; Ki & Maria, 2013). During SARS, nurses felt an expectation and responsibility to relieve their management from staffing pressures (Aghaizu et al., 2011). In situations where supply of PPE was short, Chung et al., (2005) reported that nurse numbers were often cut down to balance the supply, thereby increasing their vulnerability to infection.

2.3 Compensating for Organisational Failure

Organizational support was perceived as a vital part of pandemic preparation and reinforced nurses' contribution to risk management and infection control. Only one paper reported organizational pandemic preparedness and its impact on positive experiences of nurses working during outbreaks. Koh, Hegney, & Drury (2012) reported how nurses' confidence in care was linked with adequacy of resources, clarity on risk mitigation, and competency in the management planning. Ill-prepared organizations were cited as posing considerable danger to patients and nursing staff (Almutairi et al., 2018, Bergeron et al., 2006, Ives et al., 2009). Lee et al., (2020), Holroyd and McNaught (2008), and Shih et al., (2007) all found that when patient numbers increased, medical wards became isolation suites without adequate equipment, and nursing staff reported feeling increasing pressure to work under compromised and unpredictable conditions. During MERS-CoV in Saudi Arabia, respondents in the Almutairi et al., (2018) study reported that the underestimation and denial of the seriousness of the situation by officials and management was a major reason for spread of infection, including nurses becoming victims of infection. Similarly, Shih et al. (2007) found that the increased workload and stress among nurses was strongly linked with failure of management in providing staff sufficient time and resources. Holroyd & McNaught (2008) found that failing to provide nurses with sufficient training and resources meant working in compromised conditions, with many nurses re-using PPE, wearing substandard PPE, or having no knowledge of how to safely handle PPE after use.

2.4 Working in PPE

A key challenge in the provision of effective care during the pandemic was the nature of PPE, with many nurses finding it difficult to see, hear, or touch patients (Corley et al., 2010; Im et al., 2018; Ki & Maria, 2013; Lee et al., 2020; Liu et al., 2020). Noise from power air-purifying respirators (PAPR) and other machines (Kang et al., 2018), face shields affecting vision and communication (Ki & Maria, 2013), and double gloving, all made it harder for nurses to perform simple routine tasks (Liu & Liehr, 2009; Liu et al., 2020). Nurses suffered psychological and physical symptoms from wearing PPE including; difficulty in breathing, dizziness, perspiration, loss of appetite, dehydration, heat-stroke and skin problems (Corley et al., 2010, Im et al., 2018, Lee et al., 2020, Zhang et al., 2020). The physical and psychological discomfort of wearing PPE was aggravated by the severity and prolonged stay of patients (Liu et al., 2020), working environments and length of shift (Corley et al., 2010). Substandard and damaged PPE (Holroyd & McNaught, 2008, Lee et al., 2020), and short supply of protective clothing, were also found to be key features, highlighting the risk and stress under which nurses worked (Corley et al., 2010). During the MERS pandemic in South Korea, Lee at al., (2020) reported that the quality and amount of PPE were limited, threatening the life of both care recipients and nurses. The ambiguity around PPE supply and guidelines not only influenced

nurses' ability to provide safe and effective care (Kang et al., 2018) but frequently left them feeling ‘unprotected’ and ‘undervalued’ (Corley et al., 2010).

2.5 Demonstrating Versatility

Nurses are willing to adapt and change in situations of uncertainty and unfamiliarity. For outsourced nurses, according to Liu et al., (2020), the physical and psychological adaptation to new working environments, wards and colleagues was mentally stressful and physically exhausting. Similarly, pandemic conditions places extra pressure on newly qualified nurses due to their unfamiliarity with pandemic diseases. Despite this, Zhang et al., (2020) reported how nurses found meaning and purpose in their profession while providing care to COVID -19 patients. In the face of low PPE stocks during SARS epidemic in Taiwan, nurses demonstrated their resilience through their innovations and skills in protecting their patients using “a combination of crafted facemask, surgical gown, and disposable raincoat shoe covers to cover the whole body” (Shih et al., 2007). Honey and Wang (2013) reported that during HIN1 pandemic ECMO nurses often worked overtime taking extra responsibilities beyond their standard practice and designated roles with little support from management.

3.0. Above and Beyond

This theme brings together the emphasis placed within the literature about the extensive contribution of the profession. It suggests that nurses sought to take charge of situations, innovated and provided peer support to colleagues in distress.

3.1 Taking Further Responsibility

In the situation of a high volume of patients, creating a safe space for staff and patients was essential with some nurses becoming involved in taking a consultant role in ‘‘remodelling some floor units’ (Shih et al., 2007). The leadership contribution made by nurses has been demonstrated as a pivotal contribution to care (Lee et al., 2020, Shih et al., 2007). Building consensus and cooperation among the multi-disciplinary team (MDT) (Shih et al., 2007, Shih et al., 2009), mastering new skills (Liu et al., 2020) and advocating on behalf of patients (Shih et al., 2007), were identified as important leadership skills. In situations where nurses were outsourced from different areas/provinces for support, Liu et al., (2020) reports adaptation to team working was also critical. Further versatility and adaptation is described in relation to under-resourced environments and the need to take on the ECMO role, with new responsibilities being given to junior nursing staff (Corley et al., 2010). In order to provide clear guidance to nurses for managing infections in times of confusion and uncertainty, Shih (2009) reported that leadership demanded that nurses often work beyond their immediate working environment, demonstrating further leadership and versatility. During the SARS Pandemics in Taiwan, for example, nurses consulted and sought support and collaboration from the World Health Organization, Centres for Disease Control and Prevention, and from local and international nursing associations.

3.2 The Contribution to Reducing Risk of Infection

Considering the lethality of pandemic viruses (Koh et al., 2012), there is evidence that nurses developed and adopted different strategies to promote improved outcomes. Examples include: developing new working systems to constantly replace contaminated teams (Shih et al., 2007); strictly maintaining the standards of infection control in challenging contexts, particularly during emergencies (Kang et al., 2018); ensuring the correct use of PPE (Corley et al., 2010;

Koh et al., 2012), tracing and screening families and visitors (Bergeron et al., 2006; Kang et al., 2018), and keeping themselves infection free (Yin & Zeng, 2020).

3.3 Supporting One Another

Peer support was highlighted as important in ensuring quality care during pandemics (Im et al., 2018, Shih et al., 2007). Different terms were used by participants in these studies to describe their commitments to professional comradery including '''*pulling together*'' (Corley et al., 2010), ''*getting the job done*'' and "*not letting down*" (Honey and Wang, 2013). In the event of burnout and exhaustion, respondents in Shih et al., (2007) and Corley et al., (2010) found that appreciation and verbal encouragement from colleagues such as '*you can do it*', '*never give up*', were important sources of inspiration for the continuity of their contribution. Nurse's individual motivation in 'saving life' frequently relied on their mutual collaboration, with some nurses describing their working environment as a 'battlefield' (Im et al., 2018, Lee et al., 2020, Liu and Liehr, 2009). Here, the only way through the battle and saving lives was seen as dependant on their '*non-hierarchical team spirit* (Chung et al., 2005) and *willingness to work together* across different professions (Corley et al., 2010; Liu et al., 2020). Junior and novice nurses found that mentoring and support from their senior colleagues was not only a main source of learning and knowledge but also fostered confidence, respect and collegiality (Honey & Wang, 2013; Im et al., 2018; Kang et al., 2018; Zhang et al., 2020). For nurses experiencing isolation, sharing resources and support (including food) and discussing successes and failures, bolstered their bonds and friendship (Im et al., 2018, Shih et al., 2009). Many nurses found this professional comradery a key source for developing resilience and coping with stress and anxiety (Liu et al., 2020; Shih et al., 2007). Nurses with young children, pregnant, or who were quarantined, also benefitted from this collegial contribution in difficult moments (Lee et al., 2020). The sacrifices colleagues made were noted to have a significant impact on nurses generating collegiality and a willingness to work together (Bergeron et al., 2006). The death of colleagues during a pandemic was also a powerful inspiration or motive for collective identity, with nurses seeing the continuity of high standard of care as their main responsibility and vital contribution (Holroyd & McNaught, 2008; Sun et al., 2020).

3.4 Providing Holistic Care

The anxiety associated with emerging infectious diseases was found to have distressing psychological and mental consequences, with patients (like nurses) feeling isolated, powerless and vulnerable (Liu et al., 2020). Despite their own struggles with these emotions, nurses led in the provision of psychological and emotional care during these times. This was considered a vital and often unique nursing contribution (Corley et al., 2010), with nurses undertaking mental health care conscientiously as part of the professional commitment in "*treating the patient, not just the disease*" (Liu et al., 2020, p. 4). While other professionals felt *'disorganized and helpless'*, Chung et al., (2005) found that nurses were the most capable in handling distressed families and patients going through disease and death. Prioritizing others, whilst often being overwhelmed with high volumes of calls from relatives, nevertheless increases nurse's overstretched workload (Im et al., 2018; Ki & Maria, 2013).

Discussion:

This review highlights the contribution made by the nursing profession to health care systems around the world during pandemic conditions that have occurred within the last 20 years. The review has synthesised 24 qualitative and mixed method papers, enabling a detailed exploration

of the nursing contribution. Evidence reveals contribution to all aspects of patient care, clinical leadership, innovation, and personal and professional sacrifice. The pivotal role played by nurses in increasing their own workload (Corley et al., 2010; Ki & Maria, 2013), adding to the resources to reduce further risk (Kang et al., 2018; Shih et al., 2007) and leading care teams (Lee et al., 2020, Shih et al., 2007), helps in recognising the valuable contribution made by the profession at the most salient of times. Further evidence of this vital contribution is underpinned by the reporting of innovation and increased versatility, including the substitution of other's roles (Corley et al., 2010). Evidence also supports the idea that the profession has, during such pandemics, acted to compensate for previous organisational failure (Almutairi et al., 2018; Holroyd & McNaught, 2008) and worked in stultifying conditions whilst caring with full PPE (Corley et al., 2010, Im et al., 2018, Ki & Maria, 2013, Lee et al., 2020, Liu et al., 2020). In undertaking this review, we believe that what we have identified goes beyond a functional or task centred understanding of the notion of contribution, seeking to include those social, psychological, familial and relational efforts made by the profession both within and out with the care environment. Indeed, our final theme 'Above and Beyond', we believe encapsulates the essence of the contribution. Within this key theme, the extraordinary role of nurses in pandemic conditions in providing holistic approaches to care, innovate, prevent and provide interdisciplinary support is clear. Our review indicates that the nursing profession provides comfort and relief to those suffering from the physical and psychological effects of respiratory pandemics (Im et al., 2018; Ki & Maria, 2013; Sun et al., 2020), maintains collegiality within teams (Honey & Wang, 2013), whilst at the same time managing wider family obligations (Im et al., 2018; Ki & Maria, 2013).

Our understanding of the contribution is enhanced by recognizing the cost and risk associated with the continued work and efforts evidenced here. In continuing and maintaining a contribution, nurses experience hardship on a number of levels, including those of a financial, physical and emotional nature. There is much evidence here to suggest that in some circumstances nurses risked their own lives to better assist and care for dying patients, indeed in going above and beyond. Our review is appreciative of the pivotal contribution the nursing profession has played during pan-national epidemics and pandemics. The review has also, however, highlighted a number of contextual factors which mitigate the potential for sustained contribution as well as indicate those factors which might worsen the plight of the nurse. These conditions or contexts provide both the circumstances for the nursing contribution to flourish or be diminished and exist on material, cultural, social and relational levels.

Aghaizu et al. (2011) noted that nurses found it more difficult to continue to work where there is no guarantee of income as a result of ill health. Where welfare systems are present to provide healthcare workers with financial support should they become unwell, nurses feel able to persist with the work they do, feeling relatively free from the longer term impact of sickness and able to make a continuous and sustainable contribution. Several papers indicate that the social stigma associated with being in close proximity to infected patients hindered nurses motivation to continue (Im et al., 2018; Shih et al., 2007); a phenomena already reported in relation to media representations of Ebola health care workers (Gee & Skovdal, 2018). The consequences of marginalisation following front-line contribution of the nursing workforce are reduced when the work is carried out in a culture free from stigma and rejection. Where the wider cultural and media narrative does not stigmatize the close proximity of nurses to very sick patients, or intrude on the nature of the work in a negative way and where the work of nurses is valued.

It is notable that the efforts of nurses (and other health care professions) are hindered where material resources (such as PPE) are lacking (Corley et al., 2010; Holroyd & McNaught, 2008; Lee et al., 2020). Likewise, the nursing profession is at its most potent where staffing and other human resources are adequate. Many note the importance of the latter when working in non-pandemic conditions (Senek et al., 2020). The additional effort, versatility and leadership of the nursing workforce is enhanced in a context of additional resources (human and material), resulting in potential for improved patient outcomes. In the context of resources being readily available (human and material), the nursing workforce is able to 'go the extra mile', perform a greater range of relevant skills and tasks and engage in leadership activities, rendering the possibility of improved patient outcomes more likely. Improved patient outcomes are maximised as a result of additional adaptation and versatility, in a context of non-hierarchical human relations and senior mentorship (Chung et al., 2005). Where senior mentorship is available and accessible, and there remains a non-hierarchical organisational structure, nurses are able to adapt, be creative and innovative and ultimately meet with a dynamic and changeable set of patient circumstances (Honey & Wang, 2013; Im et al., 2018; Kang et al., 2018; Zhang et al., 2020).

Conclusion and relevance to clinical practice:

This review confirms that the nursing profession goes 'above and beyond' in its contribution to patient care, public health, and social and psychological well-being of the community during pandemic conditions. As a result, the contribution made by profession goes beyond a task or functional view, to include the social, relational, emotional and material. Furthermore, the review highlights the conditions whereby the nursing contribution can be enhanced or at least sustained. Again, these conditions are not solely designed by the profession itself but includes organisational and political leaders. These have implications for public and health policy, especially given the new reality that such pandemics will revisit global health systems. Telling in our review is the strength of the profession itself to motivate, protect and sustain during troubled and challenging professional activities.

What does this paper contribute to the wider global clinical community?

- The paper highlights the challenges nurses experience and the sacrifices they make while providing care to patients during pandemic conditions
- The paper discusses the key factors (personal, interpersonal, organization and wider societal) which enhances or reduces the contribution of nurses during the pandemics.

III. References

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IV. Tables

Table 1: Population, exposure and outcome.

Population:	*Exposure*:	*Outcome*:
Nurse OR Nurs* OR Nursing staff OR Nurses OR Nursing OR Health professional OR health care worker OR Health Personnel	Coronavirus OR SARS-COV-2 OR 2019-nCoV OR COVID-19 OR "Coronavirus disease" OR "Middle East Respiratory Syndrome" OR MERS OR "Avian influenza" OR "swine flu" OR H1N1 OR SARS OR "Severe Acute Respiratory Syndrome"	Experienc* OR perception OR Perspective OR Opinion OR Understand* OR Belief OR View* OR Impact OR Contribution

Table 2: Key themes

#	Themes	Sub-themes	Properties
1	Personal and Family Life	Living in Isolation	• Compromised living condition • Distanced from loved ones • Psychological impacts of loneliness and isolation
		The Financial Cost of Nursing	• Additional financial responsibilities toward family care • Sick leave entitlement
		Nursing in the context of fear and uncertainty	• Fear of contagion • Coping and resilience
		Personal Health & Well Being and Stigma	• Emotional distress • Stigma and rejection
2	The Nursing Contribution in Challenging Conditions	First Line of Defence	• Prolong and close contact • First contact and care channel • Extra workload and vigilance
		Juggling Depleted Resources and Patient Need	• Shortage of staffing • Working extra shifts/hours to meet care needs
		Compensating for Organizational Failure	• Inadequate resources • Organizational denial of seriousness
		Working in PPE	• Challenges of wearing and working with PPE • Risk of infection and PPE
		Demonstrating Versatility	• Adaptability and acceptance • New roles and responsibilities
3	Above and Beyond	Taking Further Responsibility	• Leadership roles • Managing MDT and conflicts
		The Contribution to Reducing Risk of Infection	• Maintaining high standards • Track and tracing infection chain
		Supporting One Another	• Team working and collegiality • Motivation and inspiration
		Providing Holistic Care	• Diversity in patient presentation • Patient and family care • Psychological, social and physical care

Figure 1: PRISMA Flow Chart