Research Article

Learning from the Past: A Systematic Review on Risk and Protective Factors for Psychological Distress in Past Infectious Epidemics and COVID-19

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ABSTRACT

COVID-19 and the resulting social and economic lockdown has reportedly given rise to mental health issues globally. Existing literature suggests some groups experience higher psychological distress during pandemics than others. This systematic literature review highlights risk and protective factors that make these groups more vulnerable to psychological distress during an epidemic. We focus on trauma symptoms, post-traumatic stress disorder, anxiety, and depression studied in clinical science literature between 2010 and 2020, focusing on the SARS, MERS, Ebola, H1N1 and Zika virus epidemics, and draw parallels with COVID-19. Since out of the 29 selected studies, most included in this review focus on symptoms rather than risk factors, this paper determines these factors by identifying comparative statistics noted in findings. Gender, age, location, economic factors, information access, media exposure, being infected or knowing an infected person, and stigma around infection are risk factors isolated for negative psychological outcomes. Protective factors identified are religion, social support, and strong leadership. A missing focus on minority and underserved populations across cultures was noted. We recommend that media exposure be regulated and trauma screening at primary healthcare level be used to identify at-risk individuals. Additionally, interventions should incorporate preventative measures against mental health problems for high-risk populations, including educational programs de-stigmatizing infection.

Keywords: anxiety, depression, PTSD, psychological impact, viral epidemic

1. INTRODUCTION

The global outbreak of COVID-19 has disrupted everyday life leading to feelings of isolation, helplessness, and in some cases, traumatic stress responses. These stress responses can manifest as hypervigilance, social withdrawal, and Anxiety, all of which can be further exacerbated by the limited medical and economic infrastructures (Mikhael & Al-Jumaili, 2020) and stigma associated with carrying the disease (United Nations, 2020). Previous infectious epidemics also left a traumatic impact on the populations suffering from them. Literature examining past epidemics report high prevalence rates of Post-Traumatic Stress Disorder (PTSD), Anxiety, and Depression in areas affected by infectious outbreaks such as Severe Acute Respiratory Syndrome (SARS), Middle East Respiratory Syndrome (MERS), Ebola, Swine Influenza A (H1N1), or Zika virus (Keita et al., 2017; Liu et al., 2020; Mak et al., 2009; Mak et al., 2010; Mohammed et al., 2015; Paladino et al., 2017; Park et al., 2020; Rabelo et al., 2016; Secor et al., 2020; Stewart-Ibarra et al., 2017; Tang et al., 2017; Xie et al., 2011; Xu et al., 2011).

A brief overview of previous studies illustrates the psychological impact of these epidemics. Park et al. (2020) aimed to explore the psychological outcomes of MERS on survivors 12 months after the outbreak in the Republic of Korea. They found a 54% prevalence rate of at least one PTSD symptom amongst the sample population, and 42.9% of the subjects had significant PTSD (Park et al., 2020). Additionally, 27% of the sample suffered from Depression post-MERS (Park et al., 2020). Similarly, other studies conducted on populations impacted by SARS have found the prevalence of PTSD or Post-Traumatic Stress Symptoms (PTSS), to be up to 40% (Liu et al., 2020; Mak et al., 2010). Mak et al. (2009) discovered that SARS caused a mental health crisis, with PTSD and depressive disorders being highly prevalent. Furthermore, Ko et al. (2006) found that 3.7% of public cases and 9.6% of people belonging to the group whose friends or family had either been suspected of being infected or had been quarantined showed depressive symptoms after the SARS epidemic (as cited in Liu et al., 2020). Moreover, Wu et al. (2009) highlighted that people whose friends or family had been infected and those who had been isolated due to confirmed or suspected infection were two to three times more likely to experience severe PTSS (as cited in Liu et al., 2020).

Several studies have also been conducted to assess Trauma, Depression, and anxiety symptoms associated with the Ebola Virus (Bortel et al., 2016; Jalloh et al., 2018; Ji et al., 2017; Keita et al., 2017; Mohammed et al., 2015; Paladino et al., 2017; Rabelo et al., 2016; Secor et al., 2020; Thompson et al., 2017). Secor et al. (2020) found that Depression and Anxiety were common amongst Ebola survivors from Guinea, Sierra Leone, and Liberia. Ebola was found to be a particularly traumatic illness due to the suffering from being infected, witnessing others' death, fearing one's own death (Bortel et al., 2016; Mohammed

et al., 2015), as well as dealing with the stigma associated with Ebola and the lack of resources available to tackle the virus (Paladino et al., 2017; Rabelo et al., 2016; Secor et al., 2020). These factors caused the prevalence of PTSD in Ebola-infected populations to be up to 27%, with 76% of participants showing one or more symptoms of PTSD (Jalloh et al., 2018).

Finally, H1N1 Influenza was associated with Trauma, Depression, and Anxiety (Elizarras-Rivas et al., 2010; Xu et al., 2011). A study conducted by Elizarras-Rivas et al. (2010) found high levels of perceived Depression and stress and moderate levels of death anxiety were present in the sample compared to the general population. Concerning Trauma, Xu et al. (2011) discovered a 2% prevalence of individuals suffering from PTSD symptoms after the H1N1 outbreak amongst a sample of Chinese university students.

1.1. AIM

· Given the rapid spread of COVID-19 and the uncertainty around developing an effective vaccine, it is essential to learn from past infectious epidemics to prepare for an already growing mental health crisis. To develop preventative and treatment interventions for Epidemic induced PTSD, Depression, and Anxiety for sudden outbreaks of infectious disease, it is crucial to understand both risk and protective factors associated with the development of psychological distress amid an epidemic or pandemic. This will facilitate identifying populations most at risk for mental health issues, allowing for the streamlining of services to these groups. To this end, the current paper is a systematic literature review highlighting risk and protective factors for psychological distress identified during past epidemics, simultaneously drawing parallels with present literature on the psychological impact of COVID-19.

The current paper will be an informative resource for intervention scientists working on preventative measures, clinicians disseminating clinical interventions to the affected, and health policymakers working in the aftermath of COVID-19 to develop adaptive institutional responses. It can also hopefully inform mental health discourse during the early stages of similar future outbreaks.

2. METHODOLOGY

2.1. METHOD

Searches were carried out in the following databases: PsychINFO, NCBI, and ScienceDirect. Inclusionary and exclusionary criteria were developed only to include peer-reviewed papers published between 2010 and 2020 written in English. Information before 2010 was used only if it was quoted in a paper published within the last ten years.

Appropriate keywords were identified by carrying out a wide range of free-text searches using terms relevant to the study's subject. These terms included: (Epidemic*) AND (Trauma*) AND (Post-traumatic disorder*) AND (Mental health*) AND (Effects on mental health*) AND (Protective factors*) AND (Risk factors*) AND (Impact*) AND (Religion*) AND (Culture*) AND (Pandemic*) AND (H1N1* OR Zika* OR Ebola* OR MERS* OR SARS* OR COVID-19*) AND (Stress*) AND (Anxiety*).

A combination of the terms was utilized to cover relevant search results. These terms yielded a total of 21,096 results. The titles and abstracts of these results were then screened to find relevant papers that met the eligibility criteria. With the following eligibility criteria imposed, only 29 articles were retained (Refer to Figure 1):

2.1.1. Type of studies

Quantitative and qualitative primary research studies were included. Grey literature, reviews, books, chapters, position papers, commentaries, letters, dissertations were excluded.

2.1.2. Type of studies

Articles studying survivors of infectious diseases (SARS, MERS, Ebola, H1N1, Zika Virus and COVID-19), groups impacted by the selected infectious diseases directly or indirectly, university students from areas impacted by the selected infectious epidemics, general populations from areas hit by the selected epidemics were included. Studies that focused solely on healthcare workers, aid workers, adolescents, or children were excluded.

2.1.3. Type of context

Studies on populations hit by infectious epidemics (SARS, MERS, Zika, H1N1, Ebola, COVID-19) were included in the current study. Only epidemics and pandemics that took place in the past ten years were included.

2.1.4. Type of mental health impacts

The current study was initially focused on examining Trauma only. However, not many studies fulfilled this criterion. Therefore, the search was expanded to include Depression and Anxiety. Although these can be possible indicators of an event being perceived as traumatic, the study does not make this assumption. The current review excluded research focusing on "general mental health" and only included studies specifically talking about Trauma (including PTSD and PTSS), Anxiety, and Depression.
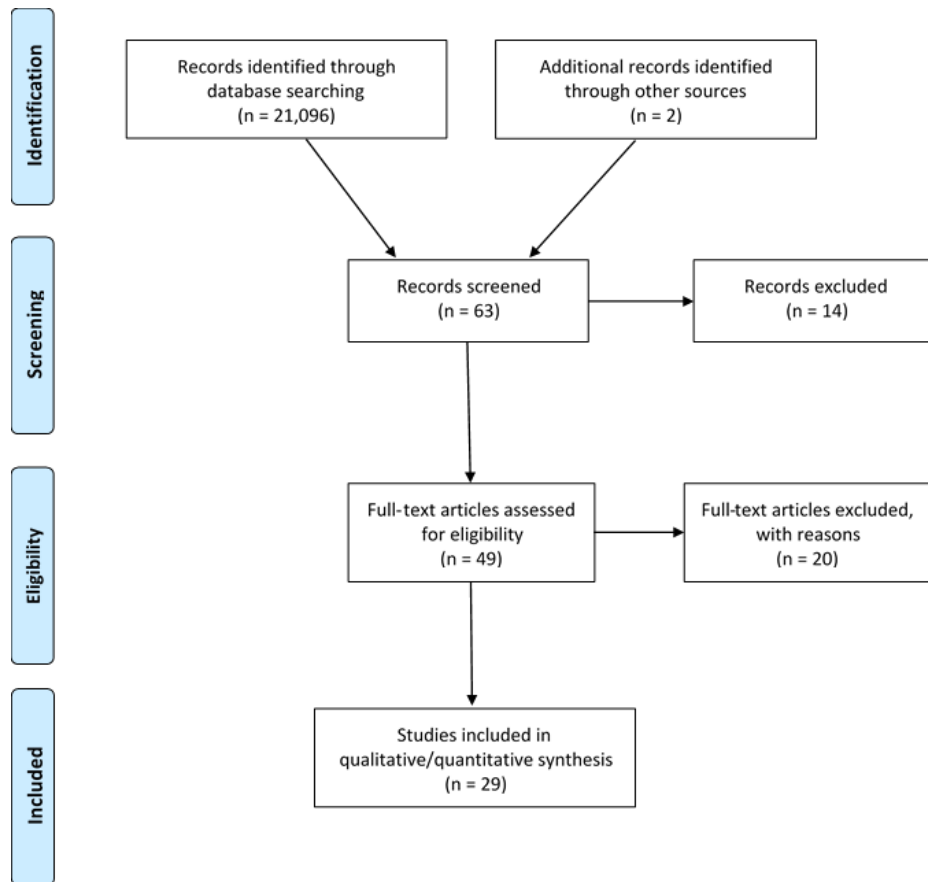
2.2. DEFINITIONS

Keeping in line with the study's research objectives and commonly recurring terms in the searches, the following keywords were operationalized to maintain consistency: mental health, Trauma, PTSD, Depression, Anxiety, Epidemic, risk factors, and protective factors.

2.2.1. Mental health

Mental health is defined as the state of well-being in which one is cognizant of their own abilities, can manage the regular stresses of life and work productively, as well as contribute positively to one's community ("WHO | WHO urges more investments, services for mental health", 2020). Mental health is imperative for both the individual and collective identities of human beings. It helps them think, feel, work, interact among themselves, and enjoy life ("WHO | WHO urges more investments, services for mental health", 2020). As this is a broad and all-encompassing definition, it fits for the current study

2.2.1.1. Psychological distress

For this study, psychological distress is broadly defined as any emotional and/or psychological stress response to the virus under consideration. It is also used to refer to the diagnosis of post-traumatic stress disorder (PTSD), Depression, and Anxiety as defined below.

2.2.1.2. Trauma and post-traumatic stress disorder

Trauma is defined as an experience encompassing physical, social, emotional, and spiritual distress resulting from an event or circumstances that may be harmful, awful, and threatening to an individual, resulting in prolonged negative impact (Substance Abuse and Mental Health Services Administration [SAMHSA], Trauma and Justice Strategic Initiative, 2012).

In the DSM-V, PTSD is categorized under Trauma- and Stressor-Related Disorders. PTSD is set off by experiencing either severe physical injury or extreme mental or emotional distress. Examples of such events are military combat, violent assault, natural disasters, and other life-threatening situations. Symptoms of PTSD hinder a person's normal daily functioning. They include reliving the traumatic experience via nightmares or flashbacks, avoiding other people, locations, and anything associated with the event, along with feelings of loneliness, lack of interest in daily activities, and trouble concentrating and sleeping ("PTSD", 2011).

2.2.1.3. Anxiety

The APA definition for Anxiety is followed for this study. It is defined as an emotion that comprises apprehension as well as physical symptoms of tension. Typical symptoms of Anxiety include anticipation of impending danger, misfortune, or catastrophe. The physical manifestations of Anxiety are often increased heart rate, rapid breathing, and tense muscles ("APA Dictionary of Psychology", 2020).

2.2.1.4. Depression

The definition of Depression employed for this review is experiencing a constant state of predominantly adverse emotions such as sadness, pessimism, and discontent, to the point that it impacts an individual's daily functioning. Symptoms that are frequently observable include disturbed sleeping and/or eating patterns, loss of interest and motivation in activities previously enjoyed, and cognitive and physical fatigue ("APA Dictionary of Psychology," 2020).

2.2.2 Risk & protective factors

Risk and protective factors are central to the purpose of this paper (Refer to Table 1 for the summary). Risk factors are defined as circumstances or variables that, when present, place an individual at a higher probability of facing unfavorable outcomes (Substance

Abuse and Mental Health Services Administration [SAMHSA], 2019). Protective factors are defined as circumstances or variables that, when present, place an individual at a lower probability of facing unfavorable outcomes (Substance Abuse and Mental Health Services Administration [SAMHSA], 2019). For this review, the outcomes under consideration are any kind of adverse impact on mental health.

2.2.3 Epidemic & pandemic

An epidemic is a rapid increase in the spread of infectious disease, effectively passing between hosts with an unexpected upsurge in the number of cases within a population; a pandemic is an epidemic that has globally spread among several people ("Principles of Epidemiology | Lesson 1 - Section 11", 2020).

3. RESULTS

Keeping in line with the selection criteria, 29 studies were used for the purpose of this review. Most studies did not explicitly highlight risk and protective factors, rather they focused on psychological distress symptoms with results highlighting prevalence rates for specific groups. This study adopts a specific methodology to analyze and identify risk factors based on comparative statistics in findings that show either specific groups as having higher or lower rates of psychological distress or highlight factors that correlate with a higher likelihood of symptom manifestation.

From the studies selected, ten focused on PTSD, Anxiety, and Depression symptoms, four on Anxiety and depression symptoms, two on PTSD and Depression symptoms, two only on PTSD symptoms, one only on depression symptoms, three on anxiety symptoms alone, one on anxiety and panic symptoms, while six others factored in general distress and fear.

The data collection procedure varied across studies as well. Twenty-three studies used psychological assessment tools like questionnaires and surveys, while 3 were qualitative studies using structured interviews—individual or group. Another 3 used a combination of questionnaires and interviews. The psychological assessment tools used for Depression were Patient Health Questionnaire-4 (PHQ-4), Patient Health Questionnaire-9 (PHQ-9), Beck Depression Inventory (BDI), Depression, Anxiety and Stress Scale (DASS-21), Self-Rating Depression Scale (SDS), and Center for Epidemiologic Studies Depression Scale (CES-D). For Anxiety, the scales used were Patient Health Questionnaire-4 (PHQ-4), Generalised Anxiety Disorder-7 (GAD-7), Chinese version of the STAI-Form Y, Anxiety Sensitivity Index-3 (ASI-3), Short Health Anxiety Inventory (SHAI), State-Trait Anxiety Inventory (STAI), Body Vigilance Scale (BVS), Beck Anxiety Inventory (BAI), Depression,

Anxiety and Stress Scale (DASS-21), Self-Rating Anxiety Scale (SAS) and, Death Anxiety Questionnaire (DAQ). The scales used for PTSD symptoms were PTSD Checklist-Civilian Version (PCL-C), PTSD Checklist for DSM-5 (PCL-5), Perceived Stress Scale (PSS-10), Impact of Events Scale-revised (IES-R), Impact of Event Scale-Revised Korean version (IES-R-K), Structured Clinical Interview for the DSM-IV. Symptoms Checklist 90-items Revised (SCL-90-R), Brief Symptom Inventory (BSI-18), Depression Anxiety Stress Scales-21 (DASS-2), Post-Traumatic Stress Disorder Self-rating scale (PTSD-SS), along with other self-reporting measures used to assess psychological distress.

SARS, Ebola, H1N1, MERS, Zika, and COVID-19 were the main epidemics and/or pandemics examined in these studies. Two studies focused on SARS, eight studies on Ebola, two on H1N1, one on MERS, two on Zika, and fourteen on COVID-19. Nine studies consisted of survivors of the infection, two studies were conducted only on university students, one study on family members of patients, six on community representatives from the region of the outbreak, one where participants had been exposed to prior collective Trauma. Ten studies consisted of participants who were in the vicinity of the outbreak—Zika outbreak in Bahía de Caráquez, Ecuador and the U.S., Ebola outbreak in Sierra Leone, SARS outbreak in some areas of China, and COVID-19 outbreak in Bangladesh, Turkey, Italy, and various regions of China. Participants included males and females in a combination of varying ages, with university-going students listed as the youngest. With varying sample sizes across all studies, 22 of them recruited participants through non-probability sampling; six studies carried out random sampling while one carried out cluster sampling. 24 out of 29 studies were ethically approved by review boards. Countries where the studies were carried out, were as follows: Eleven in China, two in Liberia, two in Sierra Leone, two in the USA, two in Italy, one each in Ecuador, Guinea, Mexico, Saudi Arabia, India, Nigeria, South Korea, Tukey, and Bangladesh and one was carried out in three separate countries simultaneously—Liberia, Sierra Leone, and Guinea.

4. DISCUSSION

This section discusses risk and protective factors observed in the literature on past epidemics, comparing findings from recent studies on COVID-19.

4.1 RISK FACTORS

4.1.1 Gender

4.1.1.1 Gender identity

Several studies on past epidemics suggested that females are more likely to develop PTSD symptoms during an epidemic (Xu et al., 2011; Elizarrarás-Rivas et al., 2010; Mak et al.,

2010; Jalloh et al., 2017). This pattern was witnessed in two studies carried out with Chinese university students during the H1N1 epidemic (Xu et al., 2019; Jalloh et al., 2017), showcasing that more females than males developed PTSD symptoms. Elizarrarás-Rivas et al. (2010) noted that female family members of an infected individual showed higher Anxiety around death along with PTSD in comparison to male members caring for the patient.

A similar pattern has been observed in studies conducted for COVID-19 as well. Studies by Varshney et al. (2020), Di Crosta et al. (2020), Cai et al. (2020), and Alkhamees et al. (2020) showed COVID-19 had had a higher psychological impact on females in comparison to males. However, a different trend was noted in the research carried out by Liang et al. (2020a) on Chinese youth after the COVID-19 emergency;. At the same time, the prevalence of PTSD in women increased to a significant extent after the pandemic started, the prevalence of PTSD in men increased to a greater extent. The explanation suggested for this was that males experienced a greater amount of distress due to the loss of job opportunities and financial struggles, which hindered their responsibility to provide for the household. This pattern was also noted by Liang et al. (2020b). However, they suggested it was due to varying coping styles and social roles across genders, with men having greater responsibilities upon their shoulders.

Additionally, Liu et al. (2020) explored gender-associated differences in PTSS symptoms in COVID stricken populations and found that female respondents re-experience sub-symptoms more than males. They also have more negative changes in mood or cognition sub-symptoms than males and are also more likely to experience arousal sub-symptoms. Similarly, according to Hacimusalar et al. (2020), anxiety levels were higher in individuals identifying as female, living with individuals at high risk of contracting the virus, experienced difficulties in taking care of their children, and faced a loss of income following the pandemic.

Therefore, the overall comparison shows a remarkable overlap between previous epidemics and COVID-19 concerning gender differences, showing a higher risk of developing psychological distress in women than men in most cases, with men showing higher risk for economic factors.

4.1.1.2 Gender roles

Overall higher psychological distress among females might also be explained by gender roles assigned to women in certain households (Stewert-Ibarra et al., 2017). The study examining the Zika Virus outbreak in Ecuador, where women had to care for their family members' health (Stewert-Ibarra et al., 2017), showed heightened stress levels for women. Therefore, in some cases, gendered expectations put women at a higher risk for stress and Anxiety during the spread of a virus. A parallel with COVID-19 is best illustrated in a study conducted in Bangladesh that revealed a 37.3% prevalence rate for Generalized

Anxiety Disorder (GAD) in a sample of 1311 individuals between ages 13 and 63 years, resulting from the pandemic (Islam et al., 2020). Echoing findings from previous epidemics, the study showed that generalized Anxiety was mainly prevalent in individuals who were female, aged above 30, had higher education, were married, were housewives, and had a considerable panic. Hence, gender roles seem to create circumstances that put women at higher risk for psychological distress during infectious disease epidemics.

4.1.2 Age

4.1.2.1 Youth

Certain age groups are considered more vulnerable during an infectious disease outbreak. In the studies selected, younger populations reported higher stress and Anxiety than older people. One study found that among a group of college students with a mean age of 20 years, 2% met the criteria for PTSD symptoms, while most of them presented stress symptoms (Xu et al., 2011). A possible explanation for this impact is the disruption in their lives with respect to the closure of educational institutes and a halt in academic progress (Ji et al., 2017). COVID-19 resulted in disruptions of many activities that impact almost all age groups. Varshney et al. (2020) noted that young age was a likely predictor for high psychological impact in their sample in India, and Alkhamees et al. (2020) found the same trend in Saudia Arabia. Cai et al. (2020) explained high impact findings in a younger age group utilizing Cognitive Theory. They suggested that because older adults have more previous life experiences than the younger population, they are less likely to form their identity around new traumatic events than younger individuals with fewer life events shaping their still-developing identity. Interestingly, they also used the burden hypothesis to highlight that the elderly may have fewer financial and social responsibilities to fulfill than younger individuals who might feel pressured to sustain a livelihood during economic crises that commonly follow such outbreaks.

A study conducted by Zhao et al. (2020) on self-isolating people during the initial Covid-19 outbreak found that people between the age of 21 to 45 years rated highest on level of Anxiety as compared to people above 45 years and below 21 years; with the above 45 years age group showing the least level of anxiety prevalence. Another study carried out by Ahmed et al. (2020) showed a similar pattern. From the participants ranging between ages 14 to 68 years, the 21 to 40 years age group experienced the highest levels of Depression, Anxiety, and worsening of mental well-being during the initial outbreak of Covid-19 in China (Ahmed et al., 2020). Therefore, a common theme across literature indicates that people in these age ranges might be at higher risk for a negative psychological impact. Younger individuals are more vulnerable to experiencing these events as traumatic.

4.1.2.2 Death anxiety in elderly

In contrast, one study carried out with family members of H1N1 patients found that older family members showed more intense symptoms of stress due to the association of older age with higher levels of death anxiety (Elizarrarás-Rivas et al., 2010). A parallel was not found in studies examined for COVID-19.

4.1.3 Location

A study carried out in China examining participants' professional anxiety levels and psychological distress with respect to their area of residence during the SARS epidemic found that those who lived away from epidemic areas at the time of the outbreak experienced higher levels of Anxiety and psychological distress than those in nearby areas. The study posited that participants away from the center of the Epidemic overestimated the risk and outcome of contracting the virus (Xie et al., 2011). Interestingly, studies on COVID-19 have reported a contrasting scenario. Ahmed et al. (2020) studied the prevalence of Anxiety, Depression, and PTSD in participants from Hubei province - the epicenter of the COVID-19 Epidemic - as well as other provinces of China. They found that while symptoms of Anxiety and PTSD were alike for participants from either of the regions, the prevalence of severe Depression was almost double for participants from Hubei province (Ahmed et al., 2020). Moreover, Tang et al. (2020) reported that Chinese college students residing in areas worst-hit by COVID-19 were at a high risk of developing PTSD and depression symptoms. Therefore, as far as the current literature reports, it seems that psychological distress is higher in areas most affected by the pandemic as opposed to findings from previous epidemics.

4.1.4 Economic factors

A rapidly spreading virus disrupts aspects of the economy at the micro and macro levels. Economic factors shape access to necessities and the maintenance of people's lifestyles. Therefore those most impacted by economic instability are more likely to develop psychological distress.

4.1.4.1 Economic insecurity

Rabelo et al. (2016) noted that an immense amount of stress was experienced by Ebola patients due to concern about the economic status of their families during the Epidemic. The infected individuals also reported worries regarding the care of their household while they were hospitalized and unable to work (Rabelo et al., 2016). The pressure and fear around the uncertainty of remaining economically stable made it more likely for them to develop PTSD symptoms. Similar to previous epidemics, COVID-19 also disrupted the economy and left many in an unstable economic situation. Di Crasto et al.

(2020) conducted a study to observe the factors that could cause PTSD as a result of the COVID-19 pandemic, and they discovered that a reduction in economic stability caused by the outbreak played a significant role in worsening the psychological state of individuals during it. According to Hacimusalar et al. (2020), levels of Anxiety were higher in individuals who faced a loss of income following the pandemic.

Previously, economic insecurity also included Anxiety around the post-epidemic period as economic consequences extended beyond the outbreak period. Xu et al. (2019) looked at this fear by noting how an epidemic caused Anxiety among university students due to the negative impact on the economy caused by H1N1. Students were psychologically distressed about the future state of the economy and the job prospects they might have in an unstable economy. It would be interesting to explore the long-lasting impact of the current pandemic concerning economic instability in the aftermath of COVID-19.

4.1.5 Access to knowledge

Exposure to incorrect information has been noted as a risk factor for psychological distress. Ji et al. (2017) discovered that individuals with lower levels of education had less understanding of the Ebola virus and its management, putting them at a greater risk of experiencing psychological distress during the outbreak. Conversely, according to Islam et al. (2020), individuals with a lower level of education may have less generalized Anxiety due to a lack of awareness and understanding about the consequences of the pandemic as opposed to those with higher education. However, this warrants further research with the emerging awareness campaigns aired on mass media.

A study by Blakey & Abramowitz (2017), investigated the psychological predictors of Anxiety associated with the Zika virus in a sample of 216 university affiliates in the U.S. Their study showed that having the more accurate knowledge on Zika was a predictor of experiencing Anxiety related to the virus (Blakey & Abramowitz, 2017). The information-seeking process, according to Blakey & Abramowitz (2017) could either be adaptive (i.e., seeking correct information) or maladaptive (i.e., seeking information to reassure). However, it is important to note that the cross-sectional nature of their study meant for a possibility that fearful participants sought out virus-related information to cope, making it unclear whether Anxiety was caused by more knowledge or whether knowledge was sought due to Anxiety (Blakey & Abramowitz, 2017).

With respect to COVID-19, Alkhamees et al. (2020) reported that most of the respondents (95%) in their study in Saudi Arabia showcased a sound level of knowledge. However, a relationship was noted between the degree of confidence in sources of information, including local health authorities, WHO, and unofficial social media platforms, with reported psychological distress. A lower level of confidence in information sources was

linked with higher levels of Depression, Anxiety, and stress. However, a direct comparison between previous epidemics and COVID-19 around information about the virus and psychological distress cannot be established based on the studies used for this review.

4.1.6 Exposure to media

Media exposure to traumatic events can be a strong predictor of PTSD (Xu et al., 2011). Participants in a study reported the number of hours spent on virus-related media exposure during the Ebola outbreak, and it showed increased virus-related media exposure as a key indicator of psychological distress (Thompson et al., 2017). A similar trend has been observed with respect to COVID-19. Tang et al. (2020) found that 89.7% of their sample of college students were isolated at home, and almost all had been exposed to stressful social media content about the virus. Since a significant amount of misinformation was spread through social media, the sample reported increased psychological distress and feelings of helplessness as a result. Cai et al. (2020) suggested that the widespread usage of smartphones and the Internet these days results in individuals being flooded with all kinds of information. This inevitably causes various misunderstandings regarding COVID-19, avoidable fears, and a lot of Anxiety. Therefore, regular consumers of information through media and social media are at higher risk of developing psychological distress through secondary trauma exposure.

4.1.7 Infection

Impacted participants are those who were either directly impacted through the contraction of the virus or were indirectly impacted; that is, they knew people close to them who were infected. These participants showed higher symptoms of Depression, Anxiety, and PTSD (Rabelo et al., 2016). The helplessness and lack of control among impacted participants over their health changed their view of self and the world (Mak et al., 2010). A study conducted by Park et al. (2020) which explored psychological outcomes of MERS 12 months after the outbreak, found that losing a family member due to MERS was associated with the development of PTSD and/or Depression. Another study measuring symptoms of Depression in Ebola survivors showed that participants experienced depressive symptoms months after they had been discharged, even in those who had not lost any family members (Keita et al., 2017). Keita et al. (2017) further showed how psychological distress hindered the capacity of survivors to reintegrate into their society after discharge. Similar to previous epidemics, an alarmingly high number of people have lost their lives to COVID-19, globally and those who survived have reported lingering health issues in some cases. A study by Mazza et al. (2020) aimed to investigate the mental health impact of COVID-19 on a sample of Italian COVID-19 survivors. The study found that, amongst the sample, the prevalence of PTSD was 28%, Depression was 31%, and Anxiety was 42%. The psychological

impact of the virus on those infected could be attributed to the concern of passing it on to others as well as the novelty and severity of the disease. Therefore, the psychological distress of having survived the infection or having lost someone to the virus might extend beyond the pandemic, and it is an important aspect to study in the aftermath of the pandemic.

4.1.8 Stigma

4.1.8.1 Stigma after being infected

Stigma plays a significant role in the experience of infectious disease, impacting not only infected individuals but also those around them. It leads to isolation and distance from one's friends, family, and wider community when they need their support the most. Jalloh et al. (2017) looked at PTSD, Anxiety, and depression symptoms in Sierra Leone a year after the Ebola epidemic. They discovered stigmatization to be one of the strongest factors contributing to these symptoms. Rabelo et al. (2016) reported that some Ebola survivors ended up getting divorced, forced out of their own households, avoided by relatives, and in some cases, were denied food by their children. Since public spaces had to be avoided, public restrooms, public water tabs, and religious meetings were off-limits. It was discovered that stigma in communities and exposure to death in the Emergency Treatment Unit (ETU) were factors leading to depression and PTSD symptoms within the survivors (Rabelo et al., 2016). Stigma has also contributed to stressful experiences for those infected with COVID-19. Cai et al. (2020) explored psychological distress caused by COVID-19 and found that a majority of COVID-19 survivors were scared of being stigmatized as they had been infected, and thus, were overwhelmed by the possibility of being treated differently. Therefore, whether or not being infected is stigmatized in a particular community can shape individual experiences of the disease.

4.1.8.2 Stigma leading to reduced care seeking behavior

A study conducted by Secor et al. (2016) discovered a prominent association between Depression and avoidance of care due to the stigma surrounding Ebola in Guinea and Liberia. This was particularly concerning as the population of both countries was predisposed to mental health issues and dealing with weak institutional support. Hence, the stigma not only made it less likely for infected people to seek medical assistance, but it also made them more likely to develop Depression (Secor et al., 2016).

Furthermore, there was a significant association found between experiences of health facility-based Ebola stigma and Depression in Libera, Guinea, and Sierra Leone (Secor et al., 2016). The health facility-based stigma consisted of acts such as the refusal to provide health services and providers gossiping about the survivor status of patients as well.

Thus, the stigma made it likelier for survivors to experience Depression. However, similar literature has not been reported in the selected studies.

4.2 PROTECTIVE FACTORS:

4.2.1 Religion

Religion was shown to be a factor that helped individuals cope with psychological distress caused by the Ebola epidemic in Monrovia, Liberia (Rabelo et al., 2016). The study noted that religious beliefs allowed individuals to attribute a higher meaning to their suffering. Prayer was important, too, as it gave impacted individuals something to hold on to during their times of distress. This is strongly linked to the culture of Liberia, where religion is central to social life (Rabelo et al., 2016). Thus, this study highlights the protective role of religion in coping with traumatic events through a belief system that rationalizes deleterious circumstances (Rabelo et al., 2016).

4.2.2 Social support

Social support has been highlighted as an essential coping mechanism for communities dealing with epidemics. The study conducted in Monrovia by Rabelo et al. (2016) also noted that survivors found it easier to cope with distress in their communities after receiving support from friends, family, counselors, and a survivor network. They mainly referred to the tailor-made plan for survivors that consisted of meetings with community leaders and neighbors.

Moreover, Morelli et al. (2019) looked at 'Social Reconnection Groups' in a rural Liberian community set up by the International Medical Corps. These groups were set up for the reintegration of survivors and to provide support to their families. Sessions within these groups consisted of discussions and reflections, music, prayer, and a shared meal. The discussions revolved around various topics such as building trust and safety, how the lives of everyone had changed because of the virus, cultural misconceptions regarding the disease, and coping strategies (Morelli et al., 2019). The positive impact of these sessions was indicated through talking to participants, some of whom said the following: "It made us overcome the grief of Ebola and go back to normal activities" (Morelli et al., 2019, p.6) and "The Ebola brought hatred among us, but the workshop has put us together. We have learned how to counsel other people" (Morelli et al., 2019, p.6). The researchers concluded that these sessions helped participants attribute meaning to their suffering, which helped them cope with the Trauma from the disease. Without these sessions, the mental health consequences and psychological distress caused to these participants could have been graver (Morelli et al., 2019).

Research carried out by Cai et al. (2020) on the psychological impact of COVID-19 observed that strong social support had a high association with less severe stress symptoms and symptoms of Depression. This finding is consistent with previous research suggesting that good social support can assist with alleviating the psychological stress caused by traumatic events.

4.2.3 Strong leadership

A study carried out by Alonge et al. (2019) aimed to understand the factors that strengthened community resilience and led to better recovery at the Ebola epidemic in certain counties in Liberia. The communities that were less affected by the Epidemic and showed more resilience were the ones with solid leadership councils that did not allow the spread of misinformation (Alonge et al., 2019). Communities placed their trust in local leaders, due to which effective communication channels were built among people and unfounded information was dismissed. The leaders partnered with NGOs and ran campaigns, allowing government and health agencies to do their job effectively, consequently reducing the distrust and fear that came as a response to the outbreak (Alonge et al., 2019).

In a recent longitudinal study carried out by Wang et al. (2020) on the impact of Covid-19 on psychological well-being, it was found that among participants higher level of confidence in health authorities and government's measures acted as a protective factor against symptoms of Anxiety, Depression, and PTSD even when the number of cases was rising significantly.

Table 1

Identified Risk and Protective Factors

Risk factors contributing to Depression, Anxiety, PTSD and/or psychological distress during an infectious epidemic	Empirical evidence
Access to knowledge	Alkhamees et al. (2020), Blakey and Abramowitz (2017), Islam et al. (2020), Ji et al. (2017)
Gender	Alkhamees et al. (2020), Cai et al. (2020), Di Crosta et al. (2020), Elizarrarás-Rivas et al. (2010), Hacimusalar et al. (2020), Islam et al. (2020), Jalloh et al. (2017), Liang et al. (2020a),

	Liang et al. (2020b), Liu et al. (2020), Mak et al. (2010), Stewert-Ibarra et al. (2017), Varshney et al. (2020) and Xu et al. (2011)
Economic Factors	Di Crasto et al. (2020), Rabelo et al. (2016), Hacimusalar et al. (2020) and Xu et al. (2019)
Stigma	Jalloh et al. (2017), Rabelo et al. (2016), Secor et al. (2016), and Xin Cai et al. (2020)
Age	Ahmed et al. (2020), Alkhamees et al. (2020), Cai et al. (2020), Elizarrarás-Rivas et al. (2010), Ji et al. (2017), Varshney et al. (2020), Xu et al. (2011), and Zhao et. al (2020)
Location	Ahmed et al. (2020), Tang et al. (2020), and Xie et al. (2011)
Exposure to media	Cai et al. (2020), Tang et al. (2020), Thompson et al. (2017), and Xu et al. (2011)
Direct impact of the virus	Keita et al. (2017), Mak et al. (2010), Mazza et al. (2020), Park et al. (2020) and Rabelo et al. (2016)
Protective factors contributing to Depression, Anxiety, PTSD and/or psychological distress during and infectious Epidemic	Empirical Evidence
Religion	Rabelo et al. (2016)
Social Support	Cai et al. (2020), Morelli et al. (2019) and Rabelo et al. (2016

5. LIMITATIONS

The review focuses on research published in the past ten years; this means that some important research on the covered epidemics has not been included as it preceded the selected time frame. Additionally, although studies specifically carried out with healthcare workers are excluded, supposing that their experiences might differ from the general population, we cannot know for sure that there were no healthcare workers in the samples studied in the chosen literature. Furthermore, it is important to highlight that the review was initially intended to study risk and protective factors for Trauma only. However, during the search it became clear that there was not enough literature analyzing Trauma, and so the study's aim was broadened to include a formal diagnosis of PTSD, Depression, and Anxiety. Considering the epidemics in question broke out in specific geographical locations, the results cannot be generalized across sociocultural contexts worldwide. Lastly, at the time of this review, COVID-19 is still an ongoing pandemic and it is important to revisit this comparison when the pandemic has ended.

6. RECOMMENDATIONS AND IMPLICATIONS

Results from this review highlight the prevalence of Trauma, stress, Anxiety, and other mental health problems, in samples impacted directly or indirectly by infectious diseases. COVID-19's global nature means that it will impact populations on a vaster scale than previous epidemics. Therefore, it becomes imperative to adopt a multi-faceted approach towards tackling the mental health impact of this pandemic while it is ongoing, and after it has ended.

6.1 LIMITED MEDIA EXPOSURE

Exposure to both information and misinformation related to the diseases has shown to increase people's risk of developing psychological distress and Anxiety (Blakey & Abramowitz, 2017; Ji et al., 2017). Rumours, rife with misinformation, escalate fear associated with the disease. Repeated exposure to stressful media content about COVID-19 can result in people feeling unsafe. This feeling of fear may result in maladaptive information seeking for reassurance (Blakey & Abramowitz, 2017). Therefore, it is recommended that media exposure be limited in terms of the frequency of updates on media channels, and stricter regulatory standards be applied to both public and social media. Governments should

focus on educational campaigns as soon as an outbreak takes place. Dissemination of easily and readily accessible information for the wider audience is crucial even though it is a daunting task during the age of social media and fake news.

6.2 MENTAL HEALTH INTERVENTION & DIAGNOSIS

Studies have shown that those directly impacted by infectious diseases (i.e. individuals who contracted the virus or had family or friends who contracted it) are at a high risk of developing psychological problems, like Anxiety, Depression, and PTSD (Keita et al., 2017; Mak et al., 2010; Park et al., 2020; Rabelo et al., 2016). Thus, screening coronavirus patients and their family members for associated psychological problems and providing them with mental health support during and after their stay in health facilities is recommended. Having Trauma, Anxiety, and depression screening tools as part of the primary healthcare protocol can streamline this process while mitigating the impact of stigma around mental health facilities.

6.3 SUPPORT PROGRAMS FOR AT-RISK POPULATIONS

As illustrated earlier, women, young adults, and elderly populations are identified as high-risk populations with respect to psychological distress during epidemics. It is important to highlight the needs of these vulnerable groups when developing support programs and health policies in response to epidemics or pandemics.

6.4 EDUCATIONAL CAMPAIGNS TO MINIMIZE THE IMPACT OF STIGMA ON SEEKING TREATMENT

It was noted that the stigma of being infected diminished help-seeking behavior and increased the risk of Depression associated with seeking out and accessing healthcare facilities. Therefore, a campaign geared towards destigmatizing infection will not only lead to better mental health outcomes but might also encourage people to seek care and treatment, leading to better infection management. Such a campaign could reduce discrimination towards those infected, contributing to a stronger social support system and lessened feelings of shame in patients.

6.5 TAKING INTO ACCOUNT CULTURAL VARIATIONS

The global spread of COVID-19 means that it will impact a greater number of cultures than previous epidemics covered in this review. Although culturally specific risk and protective factors have not been identified in previous research, it is worthwhile to acknowledge these differences and look for them while studying the impact on the mental health of an outbreak. Such research studies will be useful in culturally adapting screening

tools for mental health problems and identifying culturally specific risk and protective factors for under-researched and underserved populations across the globe. This might be particularly important with respect to low to middle-income countries that face additional burdens of economic instability and inadequate healthcare facilities.

7. CONCLUSION

The results of this review suggest that infectious epidemics result in a high prevalence of associated psychological distress (including PTSD, Anxiety, and Depression) in impacted populations. The resulting psychological distress extends beyond infected individuals to their immediate circle and the general population. The risk factors associated with pandemic-induced psychological distress include a lack of (or too much access to) knowledge, gender, economic insecurity, stigma, age, location, exposure to media, and the direct impact of the virus. The protective factors identified include religion, social support, and strong leadership. Although COVID-19 is an unprecedented global crisis, these findings are useful in informing our approach to and understanding the potential psychological outcomes of this pandemic, as parallels between the two are already evident in studies conducted so far. Since previous epidemics have also indicated long-lasting impacts in some cases, it is crucial that psychological distress with respect to COVID-19 be surveyed after the pandemic ends as well.

The review is meant to be a resource for informing the development of preventative and treatment interventions for any future epi-/pandemic. While each infectious disease crisis brings its own challenges, it might nevertheless be useful in most cases to regulate disease information reaching the general public, integrate mental health screening at primary healthcare, create support programs for at-risk populations, and conduct further studies highlighting culturally specific risk and protective factors.

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9. APPENDIX

Table 2:

Summaries of selected studies

Study	Participants	Nationalities	General Description	Method	Types of mental health impact	Results	Quality of the study
Ahmed et al. (2020)	1076 individuals	China	This study aimed to find the psychological impact on Chinese people right after the COVID-19 Epidemic hit China. They observed these results among different age groups and participants from different provinces of China.	An online survey conducted to obtain results from Chinese version of Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI), Warwick Edinburgh Mental Wellbeing Scale along with demographic information such as age, gender, province where they were living,	Anxiety, Depression and psychological well-being	They found that it was the young adult age group from 21 years to 30 years that were most at risk of developing anxiety and depression symptoms, followed by the age group of 31-40 years. Depression was severe in participants living in the province most affected by COVID-19 Epidemic.	Appropriate for exploring the research questions: Yes

Depth of investigations: Thorough

Sample size: Large |

				educational qualification, profession, and monthly income			
Alkhamees et al. (2020)	1160 community members	Saudi Arabia	The purpose of this research was to survey the general population in Saudi Arabia to analyze the degree of psychological impact during the pandemic	The adopted questionnaire covered knowledge concerns, mental health status, psychological impact, and participant sociodemographic.	Psychological distress	The results pointed out that regarding the early psychological impact of the general public,23.6% of respondents reported moderate or severe psychological impact of the outbreak and severe symptoms of stress were experienced by 13.7%.	Appropriate for exploring the research questions: Yes Depth of the investigation: Thorough Sample size: Large
Alonge et al. (2019)	36 interviews (Individuals and individuals representing	Liberia	The aim of this paper was to understand key factors that constitute	Key informant interviews were conducted with community representatives	Resilience	The study found several factors critical for addressing the Ebola epidemic in Liberia. These factors	Appropriate for exploring the research questions: Yes

| | organizations who played a key role in the Ebola response in Liberia). | | community resilience and their role in responding to the EVD outbreak in Liberia. | in Bomi, Margibi and Montserrado counties, and other national stakeholders involved in the Ebola response in Liberia from. A national stakeholder meeting was conducted to verify and interpret information emerging from the interviews. | | included strong leadership, tight bonds and sense of kinship at the community level; trusted communication channels; and trust among various health system stakeholders. These factors assisted in the initiative of collection action within communities and helped towards directing response initiatives from various levels of the health system to the community. Foreign assistance was perceived as essential for recovery and revitalization of | Depth of investigations: Thorough

Sample size: Large |
|---|---|---|---|---|---|---|---|

					affected communities. However, on the other hand, such aid is often not targeted at addressing critical challenges in a sustainable way, particularly when the assistance is highly restricted to specific activities, and those activities are determined without consultation with local actors and community groups.	
Blakey and Abramowtiz (2017)	216 university affiliates	USA	This study was aimed at Zika-related Anxiety in adults residing in the U.S. Their	Through an online survey, data was collected on demographics	Anxiety and general distress	This study found that mild Zika-related Anxiety was found on average. Linear regressions also	Appropriate for exploring the research questions: Yes

			hypothesis was that less knowledge would predict greater Zika-related Anxiety along with factors such as overestimating chances of contracting the virus, tendency of being vigilant to body's sensations and general health anxiety.	questionnaire, Anxiety Sensitivity Index-3 (ASI-3), Body Vigilance Scale (BVS), Contamination Cognitions Scale (CCS), Depression Anxiety Stress Scales-21 (DASS-21), Disgust Scale-Revised (DS-R), Short Health Anxiety Inventory (SHAI) and Zika Facts Quiz (ZFQ)		found that factors such as contamination-related threat and more accurate knowledge about the virus were associated with higher Zika-related Anxiety.	Depth of the investigation: Thorough Sample size: Large
Cai et al. (2020)	126 COVID-19 survivors	China	The aim of this research was to analyze the psychological distress and the associated predictor factors	A survey questionnaire was given consisting of the following scales: post-traumatic stress disorder	PTSD and psychological distress	The occurrence rate of psychological distress among the COVID-19 survivors in early recuperation was significant, indicating the	Appropriate for exploring the research questions: Yes

			of COVID-19 on survivors in the early convalescence in Shenzhen.	self-rating scale (PTSD-SS), self-rating depression scale (SDS), and self-rating anxiety scale (SAS). Scores of each scale and subscale were post-traumatic stress disorder self-rating scale (PTSD-SS), self-rating depression scale (SDS), and self-rating anxiety scale (SAS).		necessity for all COVID-19 survivors to be screened for psychological distress regularly for timely intervention.	Depth of the investigation: Thorough Sample size: Large
Di Crosta et al. (2020)	1253 general population member	Italy	The goal of this research was to highlight the prevalence of high psychological	The study was carried out as a battery of questionnaires through the Qualtrics survey	PTSD	The main results of this research is during the peak of COVID-19, more than 1/3rd of the respondents	Appropriate for exploring the research questions: Yes

			distress due to the COVID-19 pandemic on the general population, particularly considering that this aspect is consistently associated with PTSD symptoms.	software. The survey consisted of two standardized measures and two ad-hoc measures. A set of sociodemographic measures were also presented.		reported high PTSD symptoms.	Depth of the investigation : Thorough Sample size: Large
Elizarras-Rivas et al. (2010)	35 family caregivers	Mexican family caregivers of H1N1 patients	The study tests the psychological response of family members who are primary caregivers of patients hospitalized due to H1N1/influenza. It also aimed to identify risk	Family primary caregivers of H1N1 patients from the General Hospital of Zone 1in Oaxaca were assessed using PSS-10, CES-D, and DAQ. Data was collected by a single interviewer shortly after a	Perceived stress, Depression, death anxiety	The study found that high levels of perceived Depression & stress were present in participants in comparison to the general population. Risk factors included higher levels of education, increasing age, and female gender.	Appropriate for exploring the research questions: Yes Depth of the investigation : Thorough Sample size: Large

			factors for negative psychological responses.	family patient was hospitalized in the ICU.			
Hacimusalar et al. (2020)	1121 healthcare workers

1035 non-healthcare workers | Turkey | This study attempted to evaluate levels of Anxiety and hopelessness, as well as the factors that contribute to them, of healthcare and non-healthcare workers during the COVID-19 outbreak. | An online survey was disseminated which consisted of the Beck Hopelessness Scale and the State-Trait Anxiety Inventory (STAI). | Anxiety and hopelessness | Anxiety levels were found to be higher in healthcare workers. For the sample as a whole, Anxiety and hopelessness levels were found to be higher in women, those living with high-risk individuals, those who were experiencing difficulty in child caring, and those whose income had decreased during the pandemic. | Depth of the investigation: Thorough

Sample size: Large |

Islam et al. (2020)	1311 community members between the ages of 13 and 63 years	Bangladesh	The study endeavored to explore the mental health impact of COVID-19 on the general Bangladeshi population,	Informed consent was obtained from individuals who were then administered an online survey which consisted of sociodemographic questions, the Panic Disorder Severity Scale and the Generalized Anxiety Disorder scale (GAD-7).	Generalized Anxiety and panic	Prevalence of generalized Anxiety was 37.3% and panic was 79.6%. Predicting factors for panic were being more than 30 years of age, having higher education, being married, and living in a joint family. For generalized Anxiety the predicting factors were being female, more than 30 years of age, having higher education, being married, and being a non-government employee.	Appropriate for exploring the research questions: Yes Depth of the investigation: Thorough Sample size: Large
Jalloh et al. (2017)	3640 individuals	Sierra Leone	The aim of this study was to assess the mental health	Cross-sectional survey was carried out a year after the start of	Anxiety, Depression and post-traumatic	It was found that prevalence of any anxiety, Depression, and PTSD symptom	Appropriate for exploring the research

| | | | impact of the Ebola epidemic in the general population of Sierra Leone, after over a year of the outbreak. | the Epidemic with a national sample. Survey included Patient Health Questionnaire-4 (PHQ-4) and items from the Impact of Events Scale revised (IES-R) to capture mental health symptoms and examine them in relation to Ebola-related experience and perceived threat through binary logistic regression. | stress disorder (PTSD) | was significant among various regions in Sierra Leone. Having gone through some kind of experience with Ebola and perceived threat of Ebola also independently associated with anxiety, depression and PTSD symptoms. | questions: Yes

Depth of the investigation: Thorough

Sample size: Large |
|---|---|---|---|---|---|---|---|
| Ji et al. (2017) | 18 EVD survivors | Sierra Leonean Ebola | The study tests the impact of job classification and | Cross-sectional study using demographic | Obsession-compulsions, Anxiety, | Found that those with lower levels of education were at a | Appropriate for exploring the research |

	59 S.L. medical staff 21 S.L. logistic staff 22 S.L. medical students 41 Chinese medical staff	survivors and healthcare workers, Chinese healthcare workers	education on the psychological state of healthcare workers and Ebola survivors in Sierra Leone	data such as participants' age, gender, profession and education, as well as using the Revised Symptoms Checklist (SCL-90-R) to measure psychological impact.	hostility, phobic Anxiety, and paranoid ideation	higher risk of developing psychological disorders due to Ebola and that Ebola survivors had extreme psychological symptoms of the dimensions studied.	questions: Yes Depth of the investigation: Thorough Sample size: Large
Keita et al. (2017)	256 Ebola survivors	Guinea	This study aimed to investigate depressive symptoms among adult Ebola survivors in Conakry, Guinea that were discharged from Ebola Treatment Center (ETC)	Center for Epidemiologic Studies-Depression Scale (CES-D) was administered to assess the depressive symptoms among survivors along with a sociodemographi	Depression	The results of this study show that even months after discharge from the ETC, participants showed mild to severe forms of Depression. After the psychiatrist's consultation, a few	Appropriate for exploring the research questions: Yes Depth of the investigation: Thorough Sample size: Large

			after recovery from the virus.	c questionnaire. A clinical consultation by a psychiatrist was also carried out as a follow up for those that needed psychosocial care.		cases of PTSD were found as well.	
Liang et al. (2020a)	584 youth individuals	China	The purpose of this study was to analyze the extent to which youth groups were likely to develop psychological problems due to COVID-19, and also to explore the correlation between the GHQ-12,	The following questionnaires were used for this study: The General Health Questionnaire, Knowledge about COVID-19, Simplified Coping Style Questionnaire, and the PTSD	PTSD and psychological distress	This study noted that mental health problems are a serious issue among the most of youth groups due to COVID-19. I also pointed that negative coping styles, PTSD symptoms, education level, and enterprise employee were risk	Appropriate for exploring the research questions: Yes

Depth of the investigation: Thorough

Sample size: Large |

			sociodemographic variables, PTSD, and negative coping styles.	Checklist-Civilian Version.		factors regarding youth mental health.	
Liang et al. (2020b)	570 community members	China	The goal of this study is to explore the connection between PTSD and psychological distress among Chinese participants due to the COVID-19 outbreak.	The following measures were used in the questionnaire administered: The PTSD Checklist-Civilian Version, Simplified Coping Style Questionnaire, and The General Health Questionnaire Scale.	PTSD and psychological distress	This study showcased that 12.8% of participants were 12.8%, which was lower than PTSD (41%) reported by SARS patients 3 months after discharge, and also lower than a cross-sectional study of the prevalence of PTSD (22.3%) 1 month after the earthquake in Chengdu, Sichuan province, China.	Appropriate for exploring the research questions: Yes Depth of the investigation: Thorough Sample size: Large

| Liu et al. (2020) | 285 residents of Wuhan | China | The aim was to explore the prevalence of post-traumatic stress syndrome and post-traumatic stress disorder in Wuhan one month after the COVID-19 outbreak and identify any gender differences. | Survey consisting of the PTSD Checklist for DSM-5 (PCL-5) and 4 items from the Pittsburgh Sleep Quality Index (PSQI) were disseminated in Wuhan and surrounding cities. | Posttraumatic Stress Syndrome (PTSS) and Posttraumatic Stress Disorder (PTSD) | The prevalence of PTSS in Wuhan and surrounding cities a month after the COVID-19 outbreak was 7%. Women were at a higher risk of experiencing PTSS symptoms while individuals with better sleep quality were at a lower risk of experiencing PTSS. | Depth of the investigation: Thorough

Sample size: Large |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Mak et al. (2010) | 90 participants (SARS survivors, relatively young, predominantly female, and relatively | Hong Kong | The objective of this study was to identify the predictors of chronic PTSD in SARS survivors. | PTSD at 30 months after the SARS outbreak was analyzed through the Structured Clinical Interview for the *DSM-IV*. The | PTSD, chronic mental illnesses. anxiety. | The study found that female gender along with the presence of chronic medical illnesses diagnosed before the onset of SARS were independent predictors of PTSD at | Appropriate for exploring the research questions: Yes

Depth of investigations: Thorough |

	well-educated)			demographic data, psychosocial variables and medical information of survivors were collected for risk factor analysis.		30 months post-SARS. Associated factors included higher-chance external locus of control, higher functional disability and higher average pain intensity.	Sample size: Large
Mazza et al. (2020)	402 COVID-19 survivors	Italy	The aim was to explore the psychological impact of COVID-19 on survivors.	A clinical interview and self-report questionnaires were administered to patients during their one month follow up after being discharged from the hospital to assess PTSD, Depression,	Post-traumatic Stress Disorder (PTSD), depression, anxiety, insomnia, and obsessive-compulsive (O.C.) symptoms	The prevalence of PTSD was found to be 28%, of Depression 31%, of Anxiety, 42%, of insomnia 40%, and of O.C. symptoms 20%. Females were found to suffer more from Depression and Anxiety.	Depth of the investigation: Thorough Sample size: Large

				insomnia, and OCD. Sociodemographic information, oxygen saturation levels, clinical information, and inflammation markers were also collected.			
Morelli et al. (2019)	60 residents	Liberia	This case study was carried out on International Medical Corps (IMC) 's community-based intervention to provide psychosocial care for Ebola survivors who had been	IMC created four small social reconnection groups with 14-17 participants each with sessions held once a week for 10 weeks. These social reconnection groups were aimed to provide social support for	Psychological distress	The social reconnection groups formed helped the participants in empowering each other while pooling their resources to deal with the Epidemic. Such group interventions also allowed the participants to find meaning in life and	Appropriate for exploring the research questions: Yes Depth of the investigation : Thorough Sample size: Small

			admitted to Ebola Treatment Units (ETU).	participants who were having trouble getting back to their lives after recovery from the virus.		feel less stigmatized and isolated after recovery.	
Park et al. (2020)	63 MERS survivors	South Korea	The aim of this study was to find mental health outcomes in the long term in MERS survivors and the risk factors associated with them.	A prospective nationwide cohort study was carried out with MERS survivors, a year after the initial outbreak. The questionnaire included sociodemographic questions along with MERS related questions such as duration of infection and hospitalization. The	Anxiety, Depression and PTSD	A significant percentage of participants reported PTSD and Depression. It was also found that Anxiety and stigma were predictors of PTSD.	Appropriate for exploring the research questions: Yes

Depth of the investigation : Thorough

Sample size: Small |

				psychological assessment tools used to assess PTSD, Anxiety and Depression were Impact of Event Scale-Revised Korean version (IES-R-K) and the Patient Health Questionnaire-9 (PHQ-9).			
Rabelo et al. (2016)	17 participants (9 females, 8 males)	Liberia	The purpose of this study was to better understand the mental distress experienced by Ebola survivors during hospitalization and reintegration	A total of 17 participants were selected to be a part of focus group discussions. Three focus groups were conducted between February and	Mental health distress, PTSD, and Depression.	Two factors induced post-traumatic stress reactions and symptoms of Depression among Ebola survivors. Exposure to death in the ETU and stigma in the communities. The timely management of	Appropriate for exploring the research questions: Yes

Depth of investigations: Thorough |

			into their community.	April 2015. Thematic analysis approach was utilized to analyze the data.		corpses can significantly reduce the distress in the ETU, and coping mechanisms can be solidified through religion, peer/community support, trust relationships, and community-based psychosocial care.	Sample size: Large
Secor et al. (2020)	726 male survivors 769 female survivors	Guinean, Sierra Leonean, Liberian Ebola survivors	The study aimed to examine the prevalence and correlates of Anxiety and Depression among adult Ebola survivors.	Cross-sectional study with data collected using one-on-one surveys in communities impacted by Ebola in Sierra Leone, Guinea, and Liberia. Psychological impact was	Depression, Anxiety	The results showcased that Depression and Anxiety were both common among survivors in all three countries, and that factors such as stigma related to Ebola and a lack of mental health resources led to this	Appropriate for exploring the research questions: Yes Depth of the investigation: Thorough Sample size: Large

				measured using PHQ-9 and GAD-7 scores.		psychological impact within survivors.	
Stewart-Ibarra et al. (2017)	601 households	Ecuadorian community	The aim of the study was to assess whether psychological distress was associated with Dengue, Zika, and Chikungunya outbreak 3 months after the 16th April 2016 earthquake (magnitude 7.8).	Data was collected by field technicians and relief workers of the Ministry of Health, as part of a post disaster evaluation, who conducted face-to-face surveys. Demographic information as well as self-reported medical history and psychological distress symptoms was collected.	PTSD, stress, Anxiety, psychological distress, insomnia, anorexia	The study found a 58.1% prevalence of psychological distress 3 months post-earthquake, particularly those from rural communities and adolescents. The average number of psychological distress symptoms was much higher among individuals with suspected DCZ infections.	Appropriate for exploring the research questions: Yes Depth of the investigation: Thorough Sample size: Large

| Tang et al. (2020) | 2485 university students | China | The aim was to explore the prevalence of PTSD and Depression amongst home quarantined university students during the COVID-19 pandemic. | Online surveys were disseminated consisting of the PTSD Checklist Civilian Version, the 9-question Patient Health Questionnaires (PHQ-9), data on sleep durations, exposure, home-quarantine time and sociodemographic variables. | Post-traumatic Stress Disorder (PTSD), Depression, and psychological distress | The prevalence of PTSD was 2.7% while that of Depression was 9.0%. Feeling extreme fear, short sleep duration, being in the final year, and living in the worst hit areas were the most significant risk factors for psychological distress. | Appropriate for exploring the research questions: Yes

Depth of the investigation: Thorough

Sample size: Large |
| Thompson et al. (2017) | 3,447 individuals | U.S. citizens | The study examines the correlates of the psychological response to the Ebola crisis to the collective Trauma caused | Data was collected from a national probability sample that was asked to fill a survey 2-3 weeks after the Boston | Collective Trauma, Depression, Anxiety, acute stress, psychological distress, functional | They found that individuals who previously had the strongest response to prior Trauma were at the greatest risk of psychological distress further increasing | Appropriate for exploring the research questions: Yes |

			previously by the Boston Marathon bombing.	Marathon bombing, and again 18 months later with regards to the Ebola crisis. Mental health was assessed using the National Health Interview Survey.	impairment, Ebola related worry	behaviors such as extensively following Ebola-related news and falling further into distress.	Depth of the investigation: Thorough Sample size: Large
Varhsney et al. (2020)	Initial psychological impact of COVID-19 and its correlates in Indian Community: An online (FEEL-COVID) survey	India	The aim of this survey was to assess the psychological impact of COVID-19 on the Indian Community	An anonymous online questionnaire was administered. The first part of the questionnaire collected sociodemographic information regarding respondents along with	Psychological distress	Among the 653 respondents, it was found that 33.2% had significant (mild/moderate/severe) psychological impact due to COVID-19	Appropriate for exploring the research questions: Yes Depth of the investigation: Thorough Sample size: Large

				physical symptoms. The second part of the survey was an adopted form of the Impact of Event Scale-Revised.				
Wang et al. (2020)	1738 respondents from the general population of 190 Chinese cities	China	This was a longitudinal study carried out, assessing the psychological impact of the COVID-19 Epidemic from the initial outbreak to the peak of the Epidemic in China.	Two online surveys were carried out, one during the initial outbreak and the next four weeks after the peak of cases. Surveys included personal information such as demographics, history and knowledge about COVID-19, measures taken	Anxiety, Depression and PTSD.	It was found that not a significant difference in Anxiety, Depression and PTSD was observed between the two time periods indicating the swift action taken by China's government and health authorities to protect against COVID-19 that also acted as a protective factor	Appropriate for exploring the research questions: Yes Depth of investigations: Thorough Sample size: Large

				against COVID-19 and the Impact of Event Scale Revised (IES-R) to measure PTSD symptoms along with Depression, Anxiety and Stress Scale (DASS-21) to measure anxiety and depression symptoms		against these psychological factors.	
Xie et al. (2011)	644 participants (419 males, 225 females)	China (various locations such as Beijing, Hunan, Shanxi etc.)	The aim of this study was to examine the effect of the SARS crisis on the level of distress in people both in and around epidemic areas of China during	Data was collected via questionnaires distributed on the Internet (n = 142), via emails to acquaintances (n = 30), and through data collected in person at various	The results from the analysis of the objective characteristics associated with SARS suggest that Anxiety is not just a response to	Distress, Anxiety, and PTSD.	Appropriate for exploring the research questions: Yes

Depth of investigations: Thorough |

			the time of the crisis.	universities (n = 475), for a total of 647 participants. All data were collected from 1 May to 8 May 2003.	the objective features of the situation. In fact, Anxiety appeared to be greater in situations that appeared from the outside to be objectively better. The results of the study demonstrated that, in contrast to a 'Bull's Eye' model of distress, objective features of		Sample size: Large

					the situation played only a small role in the actual amount of distress that was experienced. Instead, the manner in which people interpreted the outbreak, and their resulting behaviors, seemed to be the primary determinants of distress		

| Xu et al. (2011) | 1082 participants (610 male, 472 female). | China | The goal of the study was to evaluate the predictors of stress symptoms among Chinese university students during the 2009 H1N1 influenza pandemic. | The study used self-reported questionnaire, the PTSD (post-traumatic stress disorder) Checklist-Civilian Version (PCL-C) to evaluate the stress symptoms among Chinese university students from Heilongjiang (n=455), Beijing (n=106), Shanghai (n=419) and Sichuan (n=102). Once the results were collected, it then analyzed the predictors of stress symptoms. | PTSD | A number of predictive factors of stress symptoms were discovered. These included being of the female gender, having H1N1 influenza, having acquaintances or friends or family members having H1N1 influenza, and being afraid of H1N1 influenza. These results were consistent with the facts that stress symptoms are related to the degree of exposure to a stressful event. On the other hand, having knowledge about H1N1 influenza, | Appropriate for exploring the research questions: Yes

Depth of investigations: Thorough

Sample size: Large |

						receiving the vaccine, and contacting people infected with H1N1 influenza were not predictors of the stress symptoms.	
Zhao et al. (2020)	515 individuals from the general population that were self-isolating	China	The purpose of this study was to examine the mental health impact of COVID-19 in self-isolating individuals from January end to February start - when the spread of the virus was rapid in China.	Online questionnaire was disseminated that required sociodemographic information of the participants, Self-Rating Anxiety Scale (SAS), Self-Rating Depression Scale (SDS) and PTSD checklist for DSM-5(PCL-5) to	Anxiety, Depression and PTSD	It was found that the prevalence of Anxiety, Depression and PTSD was 14.4%, 29.7%, and 5.6%, respectively among the participants. It was further found that the prevalence rates of Anxiety were highest in participants above 20 and below 45 years, while prevalence of Depression and PTSD	Appropriate for exploring the research questions: Yes Depth of investigations: Thorough Sample size: Large

				assess anxiety, depression and PTSD symptoms, respectively.		remained similar across age groups.	