CLIMATE CHANGE AND MENTAL HEALTH: Future perspectives.

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ABSTRACT

Introduction

While the impacts of climate change on infectious and non-infectious diseases is well known, its impacts on mental health remains poorly understood. As climate change is likely to increase the risk of human health and well-being, we examine the possible effects of its impacts on mental health at the global scale.

Methods

Literature search was undertaken in PubMed and Google scholar using key words such as climate change, variability, extreme events, mental health, depression, suicide, anxiety. Publications were classified according to the presented statistics on the impacts and linkages of extreme events such as floods, droughts, hurricanes, heat waves and snowstorms. The psychological impacts of the extreme events were collated.

Results

Of all the events farming was associated with high rates of suicide, while flooding was associated with high rates of depression and posttraumatic stress disorders. Displaced populations due to disasters such as floods and hurricanes who did not return to their homes did not recover from their traumas, while those who left and returned fared better. Altered environments resulted in cultural breakdowns and subsequent disorientation and grief. Events from India, China, United States, UK, Canada and Kenya were among those reviewed.

Conclusion

Climate change impacts are predicted to increase in frequency and intensity and it is likely that the adverse impacts on mental health will increase. There is need to increase awareness of these events in medical practice.

INTRODUCTION

To fully understand why there is a need for concern when it comes to the connection between climate change and mental health, we must first understand the importance of having proper mental health. Proper mental health is tied to proper decision making, and since that is an important element of continuity, growth and progress, we must never underestimate the importance of proper mental health, and, of taking care of the environments that affect it. The increasing accumulation of greenhouse gasses will cause the intensification and frequency of extreme weather events, which have a negative impact on human health and wellbeing.

For a long time, there has been debate around the world as to the legitimacy of the concept of global warming. For the most part, the resistance to the fact comes from blind followers of those against the idea, and those that are heavily invested in current profitable systems. Another contributor to this idea that global warming is farfetched involves the delusion that global warming is a pending calamity rather than something we are in the midst of.

MacMillan (2016), defines global warming as the gradual heating of the planet, where global temperatures increase due to the greenhouse effect. Although the scale of this problem is not well understood, it's likely to affect millions of people in different parts of this planet. The problem is exacerbated by the unpreparedness of the populations at risk, low resilience, and adaptation capacities.

Average global temperatures have increased beyond the 1°C mark over the last century (Connor, 2015). This slight increase may seem insignificant to some until we begin to look at what has changed since the beginning of the industrial revolution. Environmental degradation, decline in physical health, and now influences of climate change on mental health, are some of the main

areas in which climate change has had major impacts. It is probably the indigenous people from various regions around the world who are experiencing the impacts of global warming the most. These native peoples have lived in their respective regions for generations and have developed ways of life that are being threatened by the climatic changes happening.

This paper examines the impacts of adverse and extreme climate events on the mental health.

Deprivation of vital resources and its connections to mental health

Our environments provide food, shelter, water and lifestyles that promote human wellbeing. Deprivation of this ecosystem can have adverse effects that include deterioration of mental health.

"People are not only from a particular place, but they are also of the place" (Willox et al., 2012). When we understand that people have a connection to their lands and environments, we approach the idea of climate change and mental health from the perspective of a relationship between two entities i.e. the land and its people, and since these long-lasting climate changes are reshaping the land that its occupiers have grown to love and appreciate, we understand the grief the people are subject to because of these disruptions.

Willox et al. (2012) agreed with Albrecht and colleagues when they stated that people are emotionally affected by changes in weather, climate and environment through degradation or disaster, as we see in cases of hurricanes, tsunamis, earthquakes, heat-waves, droughts, floods and so forth.

As we speak of emotional well-being and climate change we need to remember it does take place within a myriad of overlapping social contexts such as socio-cultural, socio-economic, and socio-political structures which act as stressors of their own (Willox et al. 2012)

Merriam-webster defines affect as "the conscious subjective aspect of an emotion considered apart from bodily changes; also: a set of observable manifestations of a subjectively experienced emotion".

If people are emotionally attached to the land they live on, we can see the chain of reactions that lead to an affect on mental health. Especially if we consider the aspect of the unfamiliarity a changing environment imposes on its inhabitants. Such emotional changes can lead to depression, substance abuse, deviant behaviour and even suicide.

In a study conducted by Willox et al, 2012 on the Inuit people from the arctic regions of Canada, the climate changes that take place in the region physically change the landscape of the place, directly influencing the people's mental health by inhibiting their cultural activities such as hunting, fishing, foraging, trapping and travelling on snow and ice. These activities support the health and well-being of the Inuit, and when they cannot spend time on the land as they have for generations, it has an adverse effect on their mental well-being. Some of the residents also spoke of how their diets have been affected by these climate changes, so that whereas they would normally eat from the land, they now have resulted to unfamiliar diets. These foods cause illnesses such as diabetes, which is on the rise, and compounds to the emotional stress they are faced with from all the changes on their land. The environmental changes that occur have an impact on the place, which would be the obvious and tangible physical changes that are observed. It affects the peoples' individual and collective sense of place-attachment i.e. the level of connection and love to and for the environment, it disrupts their place-specific socio-cultural

activities which include hunting, fishing and more. The changes create transformations in the mental conceptions of place (socio-cultural and psycho-social meanings attributed to particular places) and, creates alterations to place-based identities held individually and collectively. One member of the community put it best when they stated, "It's challenging when you were living a different lifestyle then, but still living in the same area".

Individual mental health and collective mental health

Each person is different in the way they think, process information and feel about different things and situations. In isolation, we as humans are capable of producing very diverse results when put under the same conditions, however, we have a capacity to behave in very similar ways and feel similar things when in groups or when we feel a part of the collective. A perfect example of collective mental health is what happens when we observe mobs, and military training, where the conditions necessary for deindividuation cause people to experience similar emotions and reactions even though they may all hold different values from the collective. What this tells us is that by being a part of a collective, we become a part of its collective conscious, and if the collective is subjected to a given trauma, even if the people who are not directly affected by the event, may still be subject to second-hand/vicarious trauma.

COMPELLING CASES

1. Hurricane Katrina

Hurricane Katrina is known as one of the worst natural disasters to hit the coast of America. The disaster came in the early morning of August 29th 2005, causing over $100 billion in damage, killing nearly 2000 people and affecting even more survivors in its aftermath. The category 3 hurricane brought sustained winds of 100-400 miles per hour and stretched 400 miles across (History, 2017)

Mortensen, Wilson & Ho (2009) stated that those who survived the hurricane were either separated from their family members or moved/relocated to entirely new areas, and these confounding factors on top of the disaster the survivors of the hurricane had to deal with, increased the risk of mental health problems. These problems included anxiety mood disorders (acute stress disorder particularly), PTSD (Posttraumatic stress disorder) and depression disorders (which included features such as feelings of worthlessness and hopelessness). Rhodes, Chan, Paxson, Rouse, Waters & Fussell (2010) agreed with Adeola (2009) and Jones-DeWeever (2008) when they mentioned that "low-income, African American, single mothers were at particularly high risk of suffering these adverse effects". However, Rhodes et al., also quoted Dyson (2006) who explained that even among those vulnerable groups, there was often considerable variation in survivors' resources, exposure and responses.

"Previous research has found that evacuees from natural disasters who did not return to their communities within one year fared worse in terms of mental health than those who never evacuated and those who evacuated and returned" (Mortensen et al., 2009)

Certain factors prior to the disaster play a very significant role in determining the psychological health of different people after the disaster, these areas of vulnerability include prior distress, social class (which includes access to resources), gender, and social isolation depending on social inequalities already in place (Mortensen et al., 2009)

2. Flooding

Flooding has also been known to cause some of the worst damage and devastate large numbers of people in their aftermath, and because flooding is sudden it causes shock. Some of the world's worst floods in modern history include the Ohio River floods of 1937 where 385 people died and because it happened during the time of the great depression, providing relief and resources proved to be a problem. In 1938 Yellow River flooded, killing between 400,000 and 500,000 people and creating between 3 million and 10 million refugees in China. 1966, Aron River flooded in Florence killing 101 people and destroying millions of art masterpieces and rare books which are still being restored, 1998, Yangtze River in northern China floods killing 3,704 people, the worst flood to hit China in 40 years. In 2010, heavy monsoon rains cause the flooding of Indus River basin submerging one-fifth of Pakistan's total land, killing nearly 2,000 people and affecting the lives of 20 million more people, and finally in January of 2015, tropical storm Chedza floods all of Southeast Africa killing 176 people in Malawi, 86 in Mozambique and at least 46 in Madagascar with hundreds more missing and 200,000 left homeless (Huffman).

The psychological effects of this have not been well documented.

Inland flooding and Coastal flooding

According to Maddox (2014), coastal floods happen around the coastal areas, places next to the sea, ocean or other large bodies of open water that are vulnerable to tidal conditions caused by severe weather. Coastal flooding is categorised into minor flooding which involves beach erosion, moderate which has beach erosion plus damage to homes and businesses, and finally major flooding which threatens life and property, beach erosion and flooding of roads. Fluvial or river floods happen when rivers overflow due to excessive rainfall, heavy snow melt and ice jams. Because of the network rivers share, this can cause widespread overflow that affects smaller rivers downstream. The two main types of riverine floods are overbank flooding which is the rise of water so that it overflows over the edges of the river or stream, and flash flooding which is the "high velocity torrent of water that occurs in an existing river channel with little to no notice" (Maddox, 2014). They are dangerous because of the hurtling debris that travel on it. And finally, we have Pluvial or surface floods that is caused by heavy rains.

3. Snowstorms

Snowstorms create conditions that are strenuous to people, studies on the impacts of snowstorms begun in the late 1970s and since then, it has been found that even though snowstorms may not always directly increase mortality, snowstorm related deaths do increase. Examples include people who end up stranded in their cars and deceased due to carbon monoxide intoxication, ischemic heart disease or coronary artery disease which involves the narrowing of arteries so less blood and oxygen reach the heart (CDC, 1982). These snow storms

affect individuals, animals, and communities. They bring with them the responsibility to keep warm, which can be stressful if one is not prepared and lead to frostbite, hypothermia, and even death. Vehicle accidents due to poor weather conditions, fires from the misuse of heaters, isolation for long periods of time, just to mention a few, make it a stressful and anxious time for those who must endure these snow storms (mini-state partnership for security in agriculture & the centre for food security and public health ISU, 2010)

4. Heatwaves

Heatwaves involve those long periods of time, usually several days or weeks of abnormally hot weather. This behind the scene killer has been increasing in frequency over the last 3-4 decades. It is notorious for killing the elderly and is responsible for more annual deaths than hurricanes, lighting, tornados, floods & earthquakes combined. It is usually characterized by high humidity and high night-temperatures, however there are those low-humidity heatwaves that go hand in hand with droughts fuelled in part by climate change and create the conditions that drive wild fires (climate communication science and outreach, 2017).

"In August 2003, the UK experienced heatwave conditions lasting 10 days and resulting in 2,000 deaths. During this heatwave, a record maximum temperature of 38.5°C was recorded at Faversham in Kent" (Met Office, 2016). For those who are lucky enough to survive these heatwaves, they still have to put up with a great deal of discomfort, distress and even grief for those who lose loved ones to the event.

5. Droughts

Droughts are described as extensive periods of time, where there is a lack of rain, leaving the environment extremely dehydrated. They are slow-moving hazardous events and have psychological consequences that can be subtle and long lasting, and, create the conditions necessary for other disasters such as wildfires and landslides. Long periods of drought can cause emotional distress, and economical, environmental, agricultural, health, and social problems. Some of the more vulnerable groups of people who suffer from the consequences of droughts include farmers and others working in agriculture and their families, people living in rural or remote areas, and other adults prone to heat-related stress (SAMHSA, 2015).

In Australia, researchers found that during the droughts and weather disasters, there were higher reports of psychological distress and hopelessness. Chronic drought in particular was linked to chronic psychological distress, general anxiety, depression and increased incidence of suicide (Bourque & Willox, 2014)

PSYCHOSOCIAL STRESS

When we think of stressors we consider our environments, genetics, life space, social structures and systems, etc. However, reactions to stressors are not always universal, so why is it that people react to stressful life events in different ways? Psychosocial stress is defined as “the result of your mental interpretation of what is at stake and what can be done about it” (Scott, 2016)

"Stress is not an inherent attribute of the environment or the person in isolation from each other, therefore, but emanates from discrepancies between the world and internal needs, values, ambitions, fears, weaknesses and so forth" (Aneshensel)

Aneshensel agreed with Wheaton (1980) who disagreed with the idea of transitional life events having traits that are universally agreed on/ felt. Such traits include the assumption that the stressfulness of an event either is universal, or that the characteristics of the event are that it is undesirable, uncontrollable and unpredictable. Considering an individual who just got a divorce from an awful marriage, or another who losses their employment from a stressful job. These transitional life events (divorce and unemployment) maybe be considered stressful to some, but for some they mark the end of a previous condition of ongoing strain.

Another reason people react to stressful events in different ways is because of their access to resources and their coping skills. Coping is used to negate the effects of the stressor on the person. These can involve positive or negative coping mechanisms such as exercise or substance abuse and suicide respectively. While positive coping mechanisms contribute to resolution of the problem, negative coping styles may lead to outcomes such as depression, anxiety, nonspecific psychological distress, substance abuse or dependence and deviant behaviour (Aneshensel).

Negative coping skills can also lead to suicide like in the case of Indian farmers. Pandya-Wagh, (2015) quoted India's National Crime Records Bureau which stated that in the last 20 years nearly 300,000 farmers had committed suicide because of climate changes that took away the predictability of their livelihoods. Pandya-Wagh gave an example of Ram Rao Narayan who tried to poison himself because his crops had perished in a drought and two

untimely rains. Narayan was driven to this because he was in debt with the banks and could not pay them off due to his lack of crop.

We should remember that even though we react to stressful events differently, there is the risk of being affected by the collective mood, such as when a traumatizing event affects a group of people. It is this dynamic that puts more people at risk during and after disasters that affect large numbers of people.

Climate Change Related Resource Conflict

Climate change can cause the shrinking of resources such as water, foliage, and food for both people and their livestock.

There have been ongoing conflicts in the northern parts of Kenya for many years among the pastoralists in the region. They are conflicts for resources due to the nature of the environment, since the region's environment allows for a limited amount to flourish, and because of a culture of conflict that has risen since the introduction of arms, the pastoralists in the region are forced to defend what little they have from their neighbours. The Met-Office (2011), quoted Oludhe et al. 2006 who stated that in 2005-2006, Kenya was hit by one of the worst humanitarian crisis when several rain cycles failed to take place, particularly the October-December short rains in 2005. The drought affected 3.5 million people who required humanitarian aid, a crisis that received $27 million out of the $150 million that was required to feed the hungry. The worst affected where the pastoralists of north-eastern who lost up to

70 % of their livestock in some areas, and resulted in the migration of many people to the urban areas, creating new problems of their own.

These northern parts of Kenya receive an average annual rainfall that amounts to as low as 500-200mm (Met-office, 2011).

"Indirectly, violent conflict creates a strong and omnipresent perception of insecurity which results in the ineffective resource utilisation, reduced mobility, food insecurity and closure of markets and schools" (Schilling, Opiyo & Scheffran, 2012).

These are resource based conflicts that are driven by hunger and the fact that livestock are a highly valued economical commodity in the region. Since these pastoralists are mainly based in arid and semi-arid regions that require a delicate balance when managing resources, is it not plausible that climatic changes in the region could be the root stressor that leads to conflict in the regions? If climatic changes are indeed reshaping the environment and allowing for less to prosper in a culture whose main economical commodity requires that the environment provide for its nourishment, then perhaps we should look at these conflicts from a perspective of mental health and how environment and psychosocial stress tie in.

According to Schilling et al. (2012), for the pastoralists in these arid and semi-arid areas, their livestock are a main source of income and livelihood, also contributing to their social and religious lives by means of dowry compensation, and store of wealth and security against drought, disease and other calamities. These conflicts are predominantly about livestock and the resources needed to sustain them i.e. water, land and pasture. And because of the increase of arms in the region, land disputes and the commercialization of livestock raiding, the resource based conflicts have become widespread. It is indeed a complex and

multidimensional conflict however; would it not be safe to say that these people's mental state and health, and how this it is tied to their environment is a major contributing factor to these conflicts?

Future scenarios and conclusion

The high CO2 levels that are trapped in our atmosphere because of our burning of fossil fuels will remain in the atmosphere for decades to come, which means even if we made the necessary changes today; which it would seem the world is waking up and trying to do, it would take a while before the changes we made would make a difference to the damage we have already done. That being said, it is not yet too late to make these changes, however, if we continue to ignore the urgency for a change in our behaviour as a species (which affects the health of the planet), we will continue to create an environment that is going to have a tremendously negative effect on the mental health of people around the world. Our behaviour will continue to create environments that leave people in a state of disharmony without them knowing the reason for their discomfort.

Increased greenhouse gas emissions will lead to a higher frequency and intensification of adverse events, which will have an increased effect on emotional wellbeing, anxiety, trauma cases, suicidal ideation and conflict. This state of mental health will further more affect the decision making process in affected populations, and this could adversely affect their coping mechanisms, resilience and adaptation capacities. This brings into question of how we may put systems in place to prevent adverse mental health and the capacity to address those that are affected.

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