Heat and mental health

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Background
Climate change is increasing the risk of exposure to extreme heat. The potential harms from such exposure are not distributed evenly through the population but are concentrated in groups such as the elderly, children and those with severe mental illness (SMI). General practitioners (GPs) are on the frontline of managing vulnerable people with SMI.

Objective
The aim of this article is to discuss the problem that extreme heat poses for mental health and to provide examples of how these problems can be anticipated and mitigated.

Discussion
Awareness of the challenge of climate change is high. GPs are in an excellent position to identify those at increased risk of poor health outcomes secondary to extreme heat or drought and to prevent or mitigate these outcomes. These responses need to be placed within a broader model of care for best effect.

CLIMATE CHANGE and the frequency and intensity of extreme weather events such as heatwaves and droughts has been linked with detrimental health outcomes due to the direct effect of heat on health, the increase in vector-borne disease and the undermining of food and water security.[1] However, the effect on mental health is less well appreciated and extends far beyond the trauma of experiencing adverse weather events. Overall, high temperatures have been associated with an increased number of presentations/admissions of mental health conditions to hospital,[2,3] increased rates of suicide[4,5] and increased levels of violence,[6] including gender-based violence,[7] but the pathway to this is complex.[8,9]

Climate change triggers a broad range of problems that we need to anticipate for our patients and communities.[10] Physically, extreme temperatures cause a cascade of heat-related damage as the body struggles to manage heat stress, leading, if unchecked, to cardiovascular collapse and death.[11] Both the physiological effects and the mental health effects are worsened during heatwaves.[8,12] Certainly people who are victims of heat-related weather events such as bushfire[13] or drought[14] are more at risk of developing a mental illness. However, people with a severe mental illness (SMI) are placed at added risk because of the medication they are prescribed (Box 1). Their behaviours, such as substance use, agitation or even wearing multiple layers of clothing, can also increase that risk. The danger of these factors is magnified by the poor physical health of many people with a SMI.[11,15] Their poverty and social marginalisation make it harder for them to adapt their surroundings to climate change by insulating their homes or using air conditioning.

Aim

In this article, we explore the interaction of the abovementioned factors that affect people with a SMI with rising temperatures and demonstrate ways in which these can be mitigated.

Box 1. Case 1: James

James, a man aged 40 years, is single, unemployed and lives alone in a large social housing estate within a sprawling urban centre. He was diagnosed with schizoaffective disorder in his early 20s and sees the local mental health service who prescribe olanzapine and lithium. Despite reasonable medication adherence, James experiences chronic persecutory delusions, meaning he rarely leaves his home, except to visit his elderly mother, a 30-minute walk away. James also has poorly controlled metabolic syndrome and consumes alcohol most days.

Heat and people with serious mental illness

During a heatwave, with several days higher than 40°C, James struggled to keep cool in his poorly ventilated unit, which is without air conditioning or an electric fan (Box 1). In response to sleep disturbed by high overnight temperatures, he consumed more alcohol and took additional olanzapine. The following day while walking along a sun-exposed route to his mother's home, James experienced extreme fatigue, nausea and dizziness. A neighbour found James exhausted and distressed and took him to the nearby general practice clinic. Once seated inside the air-conditioned waiting room, his condition rapidly improved with access to cold water and ice towels. The general practitioner (GP) diagnosed heat exhaustion and suspected early lithium toxicity owing to a new-onset hand tremor. James was instructed to rehydrate and withhold lithium until an urgent serum level was available. James suggested that he never received education about heat stress prevention, which the GP now provided along with written information.

This case demonstrates how risk factors for heat-related morbidity and mortality often aggregate in those with SMI (eg medication impairing heat tolerance, comorbid substance use, obesity, decreased access to quality housing). In a warming climate, GPs can play an important role in educating their patients on the prevention and management of heat-related illness, with particular reference to an individual's risk factors and how to modify these where possible. Changing behaviours, such as avoiding exercise in the hottest part of the day, buying a fan for home and maintaining fluid intake, are simple and effective.

In addition, many medications (refer to Table 1) have significant effects on fluid balance and heat regulation through:[16]

- changes in heat loss from the body secondary to altered sweating via cholinergic mechanisms (eg tricyclic antidepressants [TCA], opioids)
- changing skin blood flow via vasoconstriction (eg aspirin, beta-blockers, psychostimulants), volume depletion and increasing fluid excretion (eg diuretics, lithium, alcohol), decreased thirst (eg diuretics, angiotensin-converting enzyme inhibitors)
- increased heat generation in the body (eg serotonin syndrome due to selective serotonin reuptake inhibitors interacting with other medications)
- change in thermoregulation (eg antipsychotics, anticholinergics), electrolyte imbalance (eg diuretics, calcium channel blockers, lithium, sulfamethoxazole laxatives) sedation and cognitive impairment (eg benzodiazepines, opiates, antipsychotics, TCA antiepileptics).

These changes are amplified by cardiovascular and renal disease.[17] For James, alcohol use, cholinergic burden and exercising during a hot time of the day all increased his susceptibility to heat-related illness.

Climate distress and young people

Katie was referred to a clinical psychologist who initially focused on her restrictive eating using a cognitive behavioural approach targeting her eating disorder (Box 2).[18] Katie was able to improve her cognitive flexibility while increasing and stabilising her eating. She found this helpful and with her psychologist began to explore her values by

Box 2. Case 2: Katie

Katie, a woman aged 18 years, attending her first year at university, presents to her general practitioner after she fainted on a very hot summer day. On assessment, it emerges that she also has a low mood and recent weight loss of 7 kg. Her oral intake has been restricted to tap water and juice with little solid food. She lives in university accommodation, but 8 months ago, her family home was damaged in a bushfire that also killed her pet cat. Since then, she has withdrawn socially. She reports feeling guilty if she purchases anything in plastic wrapping and has stopped going out as she does not want to see people eating meat. When her low mood is explored, she reports significant climate anxiety, both general and specifically eating-related, with mixed emotions of anxiety, sadness, helplessness, guilt and anger. She has amenorrhoea, which she thinks is a good outcome of weight loss as she does not want to have children because she is concerned about the world they will inherit. She acknowledges that she had deliberately altered her eating behaviours as a personal response to the climate crisis and to feel less guilty.

Table 1. Medications that can increase the risk of physical harm on hot days

Cardiovascular	CNS	Analgesics	Drugs of abuse	Other
• Beta blockers	• SSRI, SNRI	• NSAIDs	• Amphetamines	• Antihistamines
• Diuretics	• TCA	• Aspirin	• Cocaine	• Sulphonamides
• Ca++ channel blocker	• Lithium	• Paracetamol	• MDMA	• Thyroid replacement
• ACEi and ARB	• Antipsychotics	• Opiates	• Alcohol	• Laxatives
• ARNI	• Antiepileptics		• Opiates	
• Antiplatelets	• Anticholinergic			
• Antianginals	• Stimulants			
	• Benzodiazepines			

Adapted from the Centers for Disease Control and Prevention (CDC). Heat and medications - Guidance for clinicians. US Centers for Disease Control and Prevention, 2024. Available at www.cdc.gov/heat-health/hcp/clinical-guidance/heat-and-medications-guidance-for-clinicians.html, with permission from the CDC.[16]

ACEi, angiotensin-converting enzyme inhibitor; ARB, angiotensin II receptor blocker; ARNI, angiotensin receptor–neprilysin inhibitors; Ca++, calcium; CNS, central nervous system; MDMA, 3,4-methylenedioxymethamphetamine; NSAIDs, non-steroidal anti-inflammatory drugs; SNRI, serotonin and noradrenaline reuptake inhibitor; SSRI, selective serotonin reuptake inhibitor; TCA, tricyclic antidepressant.

which she could acknowledge climate change but still exist in her world. This helped her balance her despair with hope. People with an eating disorder are a group particularly vulnerable to heat stress. Her GP monitored her physical health, which improved with better fluid intake and diet, and encouraged her to develop her social network with like-minded young people on campus.

GPs need to be mindful that climate distress, the psychological state of an individual overwhelmed by climate change, can present with a wide range of mental health symptoms, as evident in this case, and includes anxiety, depression, trauma-related symptoms or disordered eating, and might be triggered by traumatic events or grief. Appropriate and timely supports might include listening and validation, strategies for adaptive coping and evidence-based psychological interventions.[19]

Rural impact of climate change

It is important to recognise the chronic trauma and existential threat that increasing temperatures and climate change have on rural communities (Box 3).[20] A systems-focused approach allows for multiple factors (eg psychological trauma, high burden of cognitive dissonance, crop failure, livestock loss, increased workloads, changes to social cohesion, climate and market uncertainty) to be taken into account when assessing mental health in individuals and communities.[20]

Extreme weather events[21] and heat[5] are associated with increased rates of depression, anxiety and post-traumatic stress disorder (PTSD). Heat itself is associated with increased aggression and violence,[4] with estimates of a low (2.25%) but significant increase in homicide with each additional degree in annual temperature in Australia.[6] Rates of suicide increased in rural men aged between 30 and 49 years by up to 15% during periods threatened by drought.[22] In this group, suicide is frequently completed by firearms.[23] GPs should regularly screen for domestic violence and suicide risk, making efforts to ensure farmers have appropriate ownership and storage of firearms. In this case, Simon also experiences a high burden of cognitive dissonance with his concerns about climate change set against his awareness of the extractive nature of some farming practices and his reliance on fossil fuels (Box 3). However, this emotional engagement can drive psychological adaptation and motivate one to change.[19]

An important role of GPs will be to participate in community planning, including developing psychological resilience and preparedness.[19] Simple steps include educating farmers about heat-safe practices on farms, wearing protective clothing, adjusting the frequency and length of breaks, ensuring adequate hydration, using air-conditioned vehicle cabs where possible, provision of shade and means to recover from heat, and supporting acclimatisation (especially for migrant workers or any outdoors worker). GPs will also need to check-in on vulnerable mental health patients, review medications, screen for domestic violence and suicide risk, and provide increased psychological supports.

Box 3. Case 3: Simon

Simon, a third-generation farmer and Rural Fire Service volunteer aged 53 years, has presented to his general practitioner at the behest of his wife, who is concerned about his poor sleep, increased anxiety and irritability. Simon expressed feeling worried and overwhelmed since the forecast of another dry and hot season. His increased irritability often leads to conflict with his wife.

Simon ruminates about his children's future, especially the environment he is leaving behind for them. Stress has been compounded by recent poor produce prices. Several local farmers have left after selling or filing for bankruptcy. He has also lost a close friend and fellow farmer to suicide. During the last dry season, Simon was on the frontline battling bushfires and witnessed the loss of property, livestock and the destruction of vast natural habitats. He continues to be heavily involved with the local fire service but is haunted by what he saw.

Conclusion

The negative effects of heat on mental health are diverse. GPs are uniquely placed within our communities to intervene and mitigate the effects of excess heat upon mental health. This starts with anticipating issues for vulnerable people, such as the elderly, the very young or those with SMI, and planning with them steps to decrease their risk. This might include thinking about housing and the accessibility of ventilation or cooling in the home environment or in community settings such as shopping centres or libraries. Most importantly, it includes a detailed consideration of the overall physical health of the patient. Information that can be shared with patients at risk include simple interventions such as keeping hydrated, using fans, avoiding the hottest time of the day for any exercise and airing hot buildings at night.[24]

GPs are often one of the few supports for a community challenged by drought or fire – despite their own involvement in these events – and are seen as a trusted entry point into care by those who are frequently reluctant to disclose their emotional distress. Planning for extreme weather events such as heatwaves is now a part of our public mental health response[25] and the consideration of patient vulnerabilities to extreme weather, especially for those at high risk such as the elderly, children and those with severe mental illnesses, is the responsibility of their health professionals including GPs.

Key points

- Extreme heat causes significant harm to mental health through multiple complex mechanisms.
- Many commonly prescribed psychotropic medications can impair fluid balance and thermoregulation.
- Young people are much more likely to experience climate distress in the context of heat-related events and natural disasters.
- People with severe mental illness are at increased risk of illness and death during extreme heat.
- GPs are uniquely placed to assess, mitigate and manage the mental health harms caused by extreme heat.

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