Utjecaj klimatskih promjena na mentalno zdravlje / *The Impact of Climate Change on Mental Health*

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U radu se ističe da se različita emocionalna stanja mogu javiti kao reakcije na klimatske promjene, od osjećaja manjeg distresa i anksioznosti do psihičkih poremećaja iz skupine poremećaja uzrokovanih stresom, anksioznih poremećaja, poremećaja raspoloženja i poremećaja spavanja, a ovisno o otpornosti pojedinaca i podržavajućih faktora okoline i društva. Potrebno je raditi na razvoju otpornosti, zaštitnih čimbenika i mehanizama suočavanja s klimatskim promjenama, kako kod pojedinaca, tako i na razini zajednica i društava. Naročito je važno brinuti o jačanju otpornosti kod osoba i populacija koje su osjetljive te osigurati dostupnost adekvatne skrbi i zbrinjavanja uz pomoć nadležnih službi u kriznim situacijama. Naglašava se važnost prevencije reakcija na stres i prilagodbu na posljedice događaja proizašlih iz klimatskih promjena te što ranijeg pružanja psihološke i psihijatrijske pomoći onima kojima je potrebna.

/ The paper highlights the notion that different emotional states can occur as reactions to climate change, ranging from a sense of minor distress and anxiety to mental disorders pertaining to the group of stress-related disorders, anxiety disorders, mood disorders and sleep disorders, all depending on the psychological resilience of individuals and the supportive factors in their surroundings and the society. It is necessary to work towards developing resilience, protective factors and mechanisms for coping with climate change at the individual as well as the community and societal levels. It is of particular importance to build resilience in sensitive individuals and populations, and to ensure the availability of adequate care and treatment with the help of the competent emergency services. The paper emphasises the importance of stress reaction prevention and adaptation to the consequences of events resulting from climate change and the early provision of psychological and psychiatric support to those in need.

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UVOD

Klima predstavlja prosječne vremenske prilike u određenom području tijekom vremena, dok klimatske promjene označavaju promjene u tim prosječnim vremenskim uvjetima (1). U svakodnevnom govoru pojam „klimatske promjene“ uglavnom označava globalno zatopljenje, no klimatske promjene obuhvaćaju i šire promjene u klimatskom sustavu Zemlje (1).

Potrebno je razumjeti da klima na Zemlji nije jednostavan, nego složeni sustav koji je karakteriziran i redovitim promjenama, ali i fluktuacijama u različitim vremenskim ljestvicama, kao i na pojedinim područjima. Tijekom Zemljine povijesti javljala su se različita klimatska razdoblja koja su bila povezana s velikim termodinamičkom promjenama (2–4). Promjene temperature i vremenskih obrazaca mogu biti prirodne kao posljedica sunčeve aktivnosti ili aktivnosti samog planeta Zemlje, kao što su velike vulkanske erupcije, no od početka devetnaestog stoljeća ljudske aktivnosti su glavni čimbenik koji utječe na klimatske promjene (5).

Istraživanja ukazuju da je aktualni porast prosječne temperature brži od prethodnih promjena temperature u Zemljinoj povijesti i smatra se da je primarno uzrokovan ljudskim djelovanjem (6). Korištenje fosilnih goriva, kao i različite poljoprivredne i industrijske aktivnosti, povećavaju količinu stakleničkih plinova među kojima osobito značajnu ulogu imaju ugljični dioksid, metan, dušični oksid, halogenirani plinovi te lakohlapljivi organski spojevi i ugljični monoksid (7). Staklenički plinovi apsorbiraju određenu količinu topline koju Zemlja ispušta nakon što se zagrije zbog Sunčevog djelovanja (8). Što su veće količine tih plinova, to zadržavaju više topline u donjim dijelovima Zemljine atmosfere uzrokujući globalno zatopljenje.

Klimatske promjene ne znače samo promjene u temperaturi s obzirom da je Zemlja sustav u kojem je mnogo čimbenika međusobno povezano,

INTRODUCTION

Climate is defined as the average weather conditions in a specific area over a period of time, while climate change refers to changes in these average weather conditions (1). In everyday speech, the term “climate change” usually refers to global warming, but climate change encompasses broader changes in the Earth’s climate system (1).

It is important to understand that the Earth’s climate is not a simple system, but a complex one characterised by regular changes, and fluctuations in different time scales and in specific areas. Various climatic periods associated with large thermodynamic changes occurred throughout the Earth’s history (2-4). Changes in temperature and weather patterns can occur naturally as a result of solar activity or autonomous activities of the planet Earth, such as large volcanic eruptions. However, since the early 19th century, human activities have been considered the main driver of climate change (5).

Research has shown that the current increase in average temperature is happening at a faster rate than the previous temperature changes in the Earth’s history, and it is considered that its primary cause is human activity (6). The use of fossil fuels and the various agricultural and industrial activities increase the amount of greenhouse gases, among which carbon dioxide, methane, nitrogen oxide, halogenated gases, as well as volatile organic compounds and carbon monoxide, play a particularly important role (7). Greenhouse gases absorb a certain amount of the heat emitted by the Earth after it is heated by the Sun (8). The larger the amount of these gases, the more heat they trap in the lower parts of the Earth’s atmosphere, thus causing global warming.

Climate change does not imply only changes in temperature, considering that the Earth is a system of many interconnected factors where

pa promjene klime u jednom području mogu utjecati na promjene u drugim područjima.

Ekstremni klimatski događaji se rijetko događaju i izvan su normalnog opsega te ih se treba promatrati unutar konteksta u kojem se zbivaju. Promjene i trendovi promjena srednje temperature i precipitacije izravno su povezani s povećanom učestalošću pojave oluja, suša, toplinskih valova i pojačane kiše i smatra se da je utjecaj čovjeka značajno doprinio povećanju ekstremnih klimatskih događaja (9). Klimatske promjene dovode do niza posljedica kao što je povećana učestalost toplinskih valova i šumskih požara, proširenje pustinjskih područja, otapanja permafrosta, povlačenja glečera i gubitka ledenjaka. Zbog promjena u okolini mnoge biljne i životinjske vrste relociraju se i nestaju (5).

Mnoge klimatske promjene već se osjećaju s trenutnim porastom od 1,1 °C (6), a dodatno zagrijavanje će pojačati te učinke i može dovesti do točki s kojih nema povratka. Zbog toga se sve se više napora ulaže u proizvodnju energije iz izvora koji nisu fosilna goriva i u značajno povećanje korištenja izvora obnovljive energije, u cilju smanjenja emisija stakleničkih plinova.

Klimatske promjene mogu utjecati na zdravlje na različite načine kao što su mogućnost uzgoja hrane, sigurnost i posao i svakako će dovesti do određenih promjena u životnim stilovima ljudi.

Klimatske promjene mogu imati značajan utjecaj na mentalno zdravlje ljudi djelovanjem putem niza uzročnih puteva, kao što su značajni ekonomski gubici, narušavanje uobičajenih lanaca proizvodnje i distribucije vode i hrane, povećanje broja tjelesnih bolesti, migracija i društvenih sukoba (10).

Istraživanja pokazuju da iako siromašnije zemlje imaju manji doprinos globalnim emisijama stakleničkih plinova, osjetljivije su na klimatske promjene i imaju manje mogućnosti prilagodbe (8).

climate change in one area can bring about changes in other areas.

Extreme climatic events are rare and outside of the normal range, meaning that they should be observed within the context in which they take place. Shifts and trends in mean temperature and precipitation changes are directly correlated with the increased frequency of storms, droughts, heat waves and heavy rainfall, and human impact is considered to have greatly contributed to the increased occurrence of these extreme climatic events (9). Climate change leads to a series of consequences such as an increased frequency of heat waves and wildfires, expansion of desert areas, permafrost melting, as well as the retreat and loss of glaciers. Due to the changes in their environments, many plant and animal species relocate and disappear (5).

With the current temperature increase of 1.1°C (6), many climate changes are already visible, while further warming will only amplify these effects and may lead to points of no return. Increased efforts are, therefore, being made to produce energy from sources other than fossil fuels, as well as to significantly increase the use of renewable energy sources with the aim of reducing greenhouse gas emissions.

Climate change can impact health in various ways, by affecting our food production, safety and work, and will surely lead to certain changes in people's lifestyles.

Climate change can have a significant impact on people's mental health through a number of causal pathways which include significant economic losses, disruption of normal water and food production and distribution chains, increased rates of physical illnesses, migration and social conflicts (10).

Studies have shown that although poorer countries contribute less to the global greenhouse gas emissions, they are more sensitive to climate change and have less capacity to adapt (8).

UTJECAJ KLIMATSKIH PROMJENA TIJEKOM VREMENA

Istraživanja pokazuju da se kao izravna posljedica klimatskih promjena kod znatnog broja osoba mogu javiti poteškoće mentalnog zdravlja (11). Klimatske promjene odvijaju se u različitim vremenskim razdobljima i mogu biti akutne, subakutne i dugoročne (10,12,13). Psihičke reakcije i određeni obrasci ponašanja mogu se razvijati prije, tijekom i nakon klimatskog događaja (14). Neki posljedični poremećaji su specifični, dok se drugi općenito javljaju u različitim ekstremnim događajima (15).

Akutne klimatske promjene označavaju iznenadne promjene vremenskih uvjeta i prirodnih pojava i mogu dovesti do poplava, oluja, toplinskih valova, šumskih požara i dr. Akutne klimatske promjene uglavnom su prolazne, no zbog brzine nastanka mogu biti iznenadne i neočekivane. Kod takvih promjena osobe su neposredno izložene stresorima (16,17). Učinci akutnih promjena na mentalno zdravlje dobro su istraženi i uključuju poremećaje iz dijagnostičkih kategorija reakcija na stres, anksioznih poremećaja, smetnji spavanja (18).

Subakutne klimatske promjene odnose se na promjene tijekom više mjeseci ili godina i uključuju promjene u prosječnoj temperaturi i padalinama, promjene vremenskih obrazaca i regionalnih klimatskih uvjeta. Posljedice subakutnih klimatskih promjena uključuju osjećaje koje doživljavaju ljudi zahvaćeni klimatskim promjenama, kao što su anksioznost povezana sa sumnjom u opstanak ljudi i prirode, osjećaji prepuštenosti i pasivnosti (19).

Dugotrajne klimatske promjene odnose se na promjene koje se događaju tijekom dugih razdoblja i uglavnom se koriste za opisivanje dugotrajnih promjena u globalnim vremenskim obrascima. Navedeno uključuje globalno povišenje temperature, porast razine mora, dugotrajne promjene obrazaca padalina i sve češća pojava ekstremnih vremenskih zbivanja. Po-

THE IMPACT OF CLIMATE CHANGE OVER TIME

Research has shown that a significant number of people may experience mental health difficulties as a direct consequence of climate change (11). Climate change occurs over different time periods and can be acute, subacute and long-term (10, 12, 13). Psychological reactions and certain behavioural patterns can develop before, during or after a climatic event (14). Some resulting disorders are specific, while others generally emerge due to various extreme events (15).

Acute climate changes include sudden changes in weather conditions and natural phenomena and can lead to floods, storms, heat waves, wildfires etc. Acute climate changes are mostly transient; however, due to the quickness of their formation they can be sudden and unexpected. When such changes occur, people are directly exposed to stressors (16, 17). The effects of these acute changes on mental health are well-researched and include disorders pertaining to the diagnostic categories of stress responses, anxiety disorders, sleep disturbances (18).

Subacute climate changes refer to the changes occurring over several months or years and include changes in the average temperature and precipitation, weather patterns and regional climatic conditions. The consequences of subacute climate changes include emotions experienced by people living in the areas affected by these climate changes, such as anxiety associated with uncertainty about the survival of people and nature or a sense of abandonment and passivity (19).

Long-term climate changes refer to the changes occurring over long periods of time and are mainly used to describe long-term changes in global weather patterns. These include global temperature increase, sea level rise, long-term changes in precipitation patterns and an in-

sljedice dugotrajnih klimatskih promjena uključuju široko rasprostranjene društvene učinke koji se mogu manifestirati kao ekonomske poteškoće, natjecanje za resurse, raseljavanje, prisilne migracije, kronične okolinske stresove, pojavu nasilja, oporavak nakon katastrofe (16,17,20).

Iako sva područja Zemlje ne doživljavaju akutne ili subakutne ekstremne promjene vremenskih zbivanja, dugoročna zbivanja povezana s klimom poput promjena okoliša, ekonomskih događaja i sukoba utječu na sve (21).

Povezanost psihičkih poteškoća s klimatskim promjenama je složena i klimatske promjene mogu utjecati na mentalno zdravlje nizom izravnih i neizravnih puteva. Izravne učinke na mentalno zdravlje ima neposredno djelovanje klimatskih promjena, koje uključuju ekstremnu toplinu, poplave, oluje, porast razine mora, suše i požare, dok okolinske i socioekonomske promjene, kao što su nezaposlenost, poteškoće smještaja i ekonomske poteškoće djeluju kao neizravne posljedice (22–24).

Faktori osjetljivosti na klimatske promjene obuhvaćaju zdravstvene (osobe s kroničnim bolestima, osobe s tjelesnim invaliditetom, osobe koje imaju psihičke poremećaje), socioekonomske (siromaštvo, nesigurno stanovanje, neformalni i nesiguran posao), demografske (dob, spol, etnička pripadnost, autohtoni status), zemljopisne (područja konflikata, udaljene zajednice, područja s manjkom vode, područja u kojima se češće javljaju ekstremni vremenski uvjeti) i sociopolitičke čimbenike (politička nestabilnost, raseljeno stanovništvo i diskriminirane grupe) (22).

EMOCIONALNE REAKCIJE NA KLIMATSKE PROMJENE

Iako većina osoba koja doživi ekstremno klimatsko zbivanje može imati određeni psihološki i sociološki distres, neće se kod svih ra-

creasing frequency of extreme weather events. The consequences of long-term climate changes include widespread social effects that can manifest as economic difficulties, competition for resources, displacement, forced migration, chronic environmental stresses, outbreaks of violence, post-disaster recovery (16, 17, 20).

Although acute or subacute extreme changes in weather events do not occur in all areas of the Earth, all areas are affected by the climate-related long-term events such as environmental changes, economic events and conflicts (21).

The link between psychological difficulties and climate change is complex, and climate change can affect mental health in a number of direct or indirect ways. Immediate climate changes have a direct impact on mental health, and they include extreme heat, floods, storms, sea level rise, droughts and fires, while indirect effects include environmental and socioeconomic changes such as unemployment, housing difficulties and economic difficulties (22–24).

Climate change sensitivity factors encompass health-related factors (people with chronic illnesses, physical disabilities, or mental disorders), socioeconomic factors (poverty, unsafe housing, informal and unstable employment), demographic factors (age, gender, ethnicity, autochthonous status), geographical factors (areas of conflict, remote communities, areas with water scarcity, areas with frequent extreme weather conditions) and sociopolitical factors (political instability, displaced population and discriminated groups) (22).

EMOTIONAL REACTIONS TO CLIMATE CHANGE

Although most people who go through an extreme climatic event may experience psychological and sociological distress, not all of them will develop a mental disorder. The majority of people are able to fully recover after a disas-

zviti psihički poremećaj. Većina ljudi može se u potpunosti oporaviti nakon katastrofe, a mnogi simptomi ranih reakcija na stresni događaj imaju tendenciju nestati s vremenom (25). Međutim, neki ljudi koji razviju simptome mogu razviti i psihičke poremećaje (25–27), osobito ako je istovremeno prisutno više čimbenika osjetljivosti koji međusobno djeluju (8,28,29). S druge strane, postojanje dobre socijalne mreže i sposobnost osoba za suočavanje i nošenje sa psihičkim poteškoćama čimbenici su koji pozitivno utječu na otpornost i prilagodbu nakon katastrofe povezane s vremenskim prilikama (30,31). Uz osobne čimbenike razina izloženosti osobe neizravnim učincima klimatskih promjena također ima značajnu ulogu u oporavku (32). Potrebno je uzeti u obzir da su kod mnogih ljudi psihičke reakcije prolazne i prilagodbeni su odgovor na događaje te ne dosežu razinu psihičkog poremećaja (32–35).

Kao reakcije na klimatske promjene može se javiti niz emocionalnih stanja, od osjećaja manjeg distresa i anksioznosti, do kliničkih poremećaja poput posttraumatskog stresnog poremećaja, poremećaja prilagodbe, anksioznih poremećaja, poremećaja raspoloženja i poremećaja spavanja (24,36).

Klimatske promjene utječu na osnovne potrebe i korištenje usluga u zajednici te mogu negativno utjecati na osjećaje osobne autonomije i kontrole (37,38). Osobe mogu imati osjećaj distresa i nepovjerenja u sustav s obzirom na ono što smatraju „klimatskim nedjelovanjem“ (34). Svjedočenje polaganim učincima klimatskih promjena dovodi do zabrinutosti za budućnost, osjećaja bespomoćnosti, gubitka i frustracije jer se osobe mogu osjećati nesposobnima zaustaviti klimatske promjene (38–40).

Promjene povezane s klimom mogu dovoditi i do napetosti u međuljudskim odnosima i porasta nasilja među intimnim partnerima (39–41). Jedno istraživanje je ustanovilo značajnu korelaciju između prosječne mjesečne temperature i stope nasilnog kriminala tijekom razdoblja od

ter, while many symptoms of early reactions to stressful events tend to disappear over time (25). However, some people who develop symptoms may also develop mental disorders (25-27), especially if several interacting sensitivity factors are present at the same time (8, 28, 29). On the other hand, a good social network and the individual's ability to cope with and handle psychological difficulties represent factors that have a positive impact on their resilience and adaptation following a weather-related disaster (30, 31). In addition to the personal factors, an individual's level of exposure to the indirect effects of climate change also plays a significant role in their recovery (32).

It should be taken into account that many people experience psychological reactions which are temporary and represent an adaptive response to the events, and they do not reach the level of a mental disorder (32–35).

Reactions to climate change may encompass a range of emotional states, from a sense of minor distress and anxiety, to clinical disorders such as post-traumatic stress disorder, adjustment disorder, anxiety disorder, mood disorder and sleep disorder (24, 36).

Climate change affects the people's basic needs and the use of community services, and can have a negative impact on the sense of personal autonomy and control (37, 38). Individuals may experience a sense of distress and distrust of the system in light of what they perceive as "climate inaction" (34). Witnessing the slow effects of climate change leads to anxiety about the future, a sense of helplessness, loss and frustration, as people may feel powerless when it comes to stopping climate change (38-40).

Climate-related changes can lead to tensions in interpersonal relationships and increased violence between intimate partners (39-41). One study found a significant correlation between the average monthly temperature and violent crime rates recorded over a 16-year period, us-

16 godina koristeći nasilni zločin kao zamjenu za individualnu agresiju (42).

Ostali psihosocijalni učinci uključuju odvajanje obitelji i nepovezanost sa sustavima socijalne podrške (npr. privremeno premještanje djece i pohađanje druge škole ili izostajanje iz škole).

Ima radova koji ukazuju na određene emocionalne reakcije koje su isključivo povezane s klimatskim promjenama. U ovu skupinu poremećaja uključeni su „ekoanksioznost" i „ekodepresija" koji su potaknuti sviješću o klimatskim promjenama i odnose se na osjećaje brige i straha o budućnosti ljudi, flore i faune na Zemlji (43,44). Solastalgija označava psihološke promjene koje se javljaju uglavnom kod autohtonih naroda nakon destruktivnih promjena osobito važnih mjesta ili područja u kojima su živjeli do kojih je došlo zbog posljedica klimatskih promjena ili ljudskih aktivnosti (8,38,45).

PSIHIČKI POREMEĆAJI VEZANI S KLIMATSKIM PROMJENAMA

Kada se govori o pojedinim dijagnostičkim entitetima u okviru psihičkih poremećaja, kao neposredna posljedica akutnih klimatskih zbivanja izdvajaju se poremećaji uzrokovani stresom.

Većina ljudi doživi neki oblik distresa nakon hitne situacije, ali se može učinkovito nositi s tim nakon što se zadovolje osnovne potrebe i ponovno uspostavi sigurnost (40,46), no dio osoba može razviti akutnu reakciju na stres, poremećaj prilagodbe ili posttraumatski stresni poremećaj (11). Istraživanja ukazuju da bez obzira na prostor ili populaciju gotovo svaka vrsta vremenske nepogode može dovesti do posttraumatskog stresnog poremećaja (11,18,47). Visoke stope izloženosti traumi uzrokovane su ekstremnim vremenskim prilikama, uključujući izloženost okolnostima opasnima za život koje proizlaze iz katastrofa i pozadine naknadnog porasta međuljudskog nasilja kako unutar obi-

ing violent crime as a substitute for individual aggression (42).

Other psychosocial effects include family separation and disconnection from social support systems (e.g. temporary relocation of children and transfer to other schools or absence from school).

Some studies indicate certain emotional reactions that are associated exclusively with climate change. "Eco-anxiety" and "eco-depression" also belong to this group of disorders, triggered by the awareness of climate change and relating to the sense of worry and fear about the future of people, flora and fauna on Earth (43, 44). Solastalgia refers to psychological changes that occur mainly among indigenous peoples after experiencing destructive changes to particularly important sites or areas where they lived, and which were caused by the effects of climate change or human activity (8, 38, 45).

MENTAL DISORDERS ASSOCIATED WITH CLIMATE CHANGE

In terms of individual diagnostic entities within the framework of mental disorders, stress-related disorders stand out as a direct consequence of acute climatic events.

After going through an emergency situation, the majority of people experience some form of distress, but are able to cope effectively with these situations once their basic needs have been met and safety has been restored (40, 46). Some people, however, may develop an acute stress reaction, adjustment disorder or post-traumatic stress disorder (11). Studies have shown that regardless of the location or the population, almost any type of adverse weather conditions may lead to post-traumatic stress disorder (11, 18, 47). High rates of trauma exposure are caused by extreme weather events, including exposure to life-threatening circumstances arising from disasters and the background of subsequent increases in interpersonal violence within

telji tako i u široj zajednici (48,49). Posttraumatski stresni poremećaj povezan s katastrofom učestalije se javlja kod žena, starijih osoba, osoba s lošijim socioekonomskim položajem ili nezaposlenih osoba, kao i osoba s već postojećim psihičkim poteškoćama (50). Čini se da postoji povezanost ovisna o razini između stupnja izloženosti iskustvu prirodne katastrofe i pojave simptoma posttraumatskog stresnog poremećaja, što pokazuju rezultati istraživanja vezanih uz šumske požare i poplave (51,52). Čimbenici osjetljivosti za razvoj posttraumatskog stresnog poremećaja uključuju i postojanje prethodne traume, težina i neposrednost prijetnje osobi, njezinoj obitelji ili skrbnicima te subjektivni osjećaj mogućnosti kontrole situacije (49,53). Posttraumatski stresni poremećaj povezan s katastrofom može trajati godinama nakon početne katastrofe (54).

Anksiozni poremećaji i poremećaji prilagodbe mogu nastati i kao izravna reakcija na klimatski uvjetovane ekstremne vremenske prilike (49,55), no i neizravni učinci klimatskih promjena, kao što je narušena sigurnost u održavanju lanaca prehrane, migracije, poteškoće zapošljavanja i obrazovanja doprinose porastu učestalosti anksioznih poremećaja (49,53,55). Potrebno je izdvojiti da u određenim uvjetima snižena dostupnost zdravstvenog sustava, lošije funkcioniranje obitelji kao i društvene promjene mogu biti povezani s kasnijom prezentacijom ili odgoditi početak liječenja anksioznih ili drugih psihičkih tegoba što može osobito utjecati na osjetljivu populaciju, kao što su djeca i mladi (53). Tijekom vremena uz kumulativnu izloženost manifestacije psihičkih teškoća mogu postajati sve učestalije i ozbiljnije (49). Specijalizirane službe, posebice one za djecu i adolescente, sve se češće susreću s poremećajima u obliku somatskih simptoma koji se javljaju u kontekstu konverzivnih reakcija (53).

Nakon proživljenih ekstremnih vremenskih nepogoda mogu se pojaviti kao dugotrajna po-

the family and in the wider community (48, 49). Disaster-related post-traumatic stress disorder occurs more frequently among women, the elderly, people with a lower socioeconomic status, the unemployed, and people with pre-existing mental health problems (50). There appears to be a connection depending on the degree of exposure to a natural disaster and the onset of post-traumatic stress disorder symptoms, as evidenced by the results of studies relating to wildfires and floods (51, 52). Sensitivity factors associated with the development of post-traumatic stress disorder also include the existence of previous trauma, the severity and immediacy of the threat to the individual, their family or caregivers, as well as the subjective sense of having control over the situation (49, 53). Disaster-related post-traumatic stress disorder can persist for years after the initial disaster (54).

Anxiety disorders and adjustment disorders may also occur as a direct reaction to climate-related extreme weather conditions (49, 55), but the indirect effects of climate change, such as impaired security in the maintenance of food chains, migrations, difficulties in employment and education, contribute to the increased frequency of anxiety disorders as well (49, 53, 55). It should be noted that under certain conditions the reduced availability of the health system, poorer family functioning and social changes may be associated with a later onset of anxiety or other psychological difficulties or may delay the start of their treatment, which can particularly affect the vulnerable population such as children and youth (53). Over time and with cumulative exposure, the manifestations of psychological difficulties may become more frequent and more severe (49). Specialised services, particularly those for children and adolescents, increasingly encounter disorders in the form of somatic symptoms that occur in the context of conversion reactions (53).

Depressive symptoms and major depressive disorder can occur as a long-term consequence

sljedica depresivni simptomi i veliki depresivni poremećaj. Istraživanja ukazuju da između jedne četvrtine i jedne trećine ljudi može doživjeti simptome depresije nakon šumskih požara (50), a značajan broj osoba razvija simptome depresije i nakon uragana. Nakon uragana Sandy stope simptoma depresije bile su visoke i nakon godinu dana (56). Nakon uragana Katrina 23 % pojedinaca je nakon katastrofe pokazalo znakove klinički značajne depresije (57), a oni koji su već imali problema s mentalnim zdravljem imali su veću vjerojatnost da će doživjeti novu depresivnu epizodu. Podatci pokazuju da suša povećava prevalenciju depresivnih bolesti u ruralnim područjima (49). Osim povećanja stope depresije, klimatske promjene povećavaju i učestalost bolesti koje se prenose putem vektora poput nekih virusa (49). Neki podatci upućuju na to da izloženost onečišćenom zraku povećava vjerojatnost razvoja depresivnih poremećaja (58). Učinci klimatskih promjena mogu pogoršati socioekonomske odrednice zdravlja kao što su beskućništvo, nesigurnost dostupnosti hrane, prisilna migracija i nezaposlenost, a svi su oni povezani s većom mogućnošću razvoja depresivnog ili anksioznog poremećaja (8,59). Kašnjenja u pružanju skrbi ili otežana dostupnost skrbi zbog klimatskih uvjeta mogu imati negativan učinak na kliničke ishode pacijenata (60).

Interesantno je da na depresiju i druge poremećaje raspoloženja mogu značajno utjecati biološki uzročnici klimatskih promjena. Naime, postoji korelacija između depresije i visokih temperatura koje su u skladu s očekivanim povećanjem globalnog zatopljenja (61). Povećanje varijabilnosti temperature, još jedan utjecaj klimatskih promjena, također je značajno povezan s većom vjerojatnošću samoprijavljene anksioznosti, beznađa i besmisla (62). Pojedini zagađivači iz zraka (dizel, ugljični monoksid, dušikov oksid, sumporni dioksid, ozon i čestice), mijenjaju funkciju neurotransmitera u serotoninergičkim i dopaminergičkim puto-

of experiencing extreme adverse weather conditions. Studies have shown that between one quarter and one third of people may experience symptoms of depression after wildfires (50), while a significant number of people develop these symptoms after hurricanes as well. The depression symptom rates after Hurricane Sandy were still high one year later (56). After Hurricane Katrina, 23% of individuals showed signs of clinically significant depression after the disaster (57), and those with pre-existing mental health issues were more likely to experience a new depressive episode. Data indicate that droughts increase the prevalence of depressive illnesses in rural areas (49). In addition to increasing the depression rates, climate change also increases the incidence of vector-borne diseases, such as certain viruses (49). Some data suggest that exposure to polluted air increases the likelihood of developing depressive disorders (58). The impacts of climate change may exacerbate the socioeconomic determinants of health, such as homelessness, food insecurity, forced migration and unemployment, all of which are associated with a higher risk of developing a depressive or anxiety disorder (8, 59). Delays in the provision of care or difficult access to care due to climatic conditions can have a negative impact on the clinical outcomes of patients (60).

Interestingly, biological causes of climate change can have a significant impact on depression and other mood disorders. In fact, there is a correlation between depression and high temperatures that are consistent with the expected increase in global warming (61). Increased temperature variability, another consequence of climate change, is also closely associated with a higher likelihood of self-reported anxiety, sense of hopelessness and meaninglessness (62). Certain air pollutants (diesel, carbon monoxide, nitrogen oxide, sulphur dioxide, ozone and particulate matter) alter the function of neurotransmitters in serotonergic and

vima (63) s mogućim utjecajem na razvoj psihijatrijskih poremećaja, uključujući depresiju. Osim toga, smatra se da izloženost stresu, bilo da se radi o izravnim ili neizravnim posljedicama klimatskih promjena, značajno povećava rizik od depresije (63). Toplina snižava razinu hormona štitnjače, što dovodi do funkcionalne hipotireoze, koja može uzrokovati kognitivno oštećenje, disforiju i smanjenu energiju (64).

Zajednice pogođene ekstremnim vremenskim prilikama imaju povećanje prevalencije i ozbiljnosti poremećaja ovisnosti o drogama (49). Rizik intoksikacije vjerojatniji je u uvjetima ekstremnih vremenskih prilika (65). Prekid obrazovanja, nezaposlenost i izloženost oružanim sukobima među neizravnim su učincima klimatskih promjena koji također povećavaju vjerojatnost poremećaja ovisnosti (53).

Pogoršanje simptoma akutnih i kroničnih mentalnih poremećaja može se javiti kao posljedica toplinskih valova (66,67), dok je izloženost povišenim temperaturama okoline i zagađivačima zraka povezana i s višim stopama samoubojstva (68). Jedno istraživanje ukazuje da je 2 %-tni porast pojave negativnih događaja mentalnog zdravlja povezan s porastom temperature od jednog stupnja tijekom pet godina (69).

Kao posljedica viših temperatura dolazi i do povećane učestalosti javljanja osoba u hitne ambulante zbog mentalnog distresa, suicidalnih misli, agitacije ili pogoršanja psihotičnih poremećaja ili delirija superponiranog na demenciju (55,65,70).

Ekstremne temperature povećavaju mogućnost pojave delirija i pogoršavaju kognitivne probleme kod pacijenata s demencijom. Delirij je posebno opasan za vrlo mlade, vrlo stare i osobe s tjelesnim bolestima poput dijabetesa melitusa (71). Konkretno, lijekovi s antikolinergičkim nuspojavama poput starijih antipsihotika i antidepresiva mogu uzrokovati štetne

dopaminergic pathways (63) with a potential impact on the development of psychiatric disorders, including depression. Furthermore, exposure to stress, whether as a direct or indirect consequence of climate change, is considered to increase significantly the risk of depression (63). Heat lowers the thyroid hormone levels, which leads to functional hypothyroidism that can cause cognitive impairment, dysphoria and lower energy levels (64).

There are increased prevalence and severity of drug addiction disorders in communities affected by extreme weather conditions (49). The risk of intoxication is higher under extreme weather conditions (65). Discontinuation of education, unemployment and exposure to armed conflicts are among the indirect impacts of climate change, and they also increase the likelihood for the development of addiction disorders (53).

The worsening symptoms of acute and chronic mental disorders can develop as a result of heat waves (66, 67), while exposure to increased ambient temperatures and air pollutants is associated with higher suicide rates (68). One study indicated that a 2% increase in the incidence of adverse mental health events correlates with a one-degree rise in temperature over a period of five years (69).

Elevated temperatures also lead to an increased frequency of people reporting to emergency rooms due to mental distress, suicidal thoughts, agitation, worsening of psychotic disorders or delirium superimposed on dementia (55, 65, 70).

Extreme temperatures increase the likelihood of delirium onset and contribute to the worsening of cognitive problems in patients with dementia. Delirium is especially dangerous for very young or very old individuals as well as individuals with physical ailments such as diabetes mellitus (71). Specifically, drugs with anticholinergic side-effects, such as older antipsychotics and antidepressants, can cause adverse effects of psychotropic drugs that are

učinke psihotropnih lijekova koji su vjerojatniji u uvjetima ekstremnih toplina (72). Neželjena posljedica koja se posebno pogoršava za osobe koje uzimaju antidepresive tijekom viših temperatura je hiponatrijemija (73).

Povišene temperature nose i povećan rizik smrtnosti kod osoba s psihotičnim poremećajima, demencije i zlouporabe psihoaktivnih tvari zbog višestrukih čimbenika poput dehidracije ili samoubojstva (67).

more likely to occur in extreme heat conditions (72). An undesirable side-effect that becomes worse during periods of high temperatures, especially in people taking antidepressants, is hyponatremia (73).

Elevated temperatures also carry an increased risk of mortality for people with psychotic disorders, dementia and psychoactive substance abuse, due to multiple factors such as dehydration or suicide (67).

RASPRAVA

Pri neposrednim katastrofičnim vremenskim prilikama potrebno je djelovati u smislu neposrednih reakcija na događaje i pružanja društvene i psihološke podrške. Međutim, s obzirom da su klimatske promjene već prisutne te ako se i zajedničkim djelovanjem uspiju postići pozitivne promjene, učinci će trajati barem još neko vrijeme.

Socio bihevioralni čimbenici, kultura, informacije i pripremljenost imaju važnu ulogu u određivanju hoće li društvo biti otporno ili će doći do psihološkog poremećaja i iscrpljenosti (19). U tom okviru potrebno je raditi na razvoju otpornosti i zaštitnih čimbenika i mehanizama suočavanja s klimatskim promjenama, kako kod pojedinaca, tako i na razini zajednica i društava (23). Prioritet treba dati izgradnji otpornosti zajednice kako ozbiljnost globalnog klimatskog problema raste. Za razliku od pasivnih primatelja vanjske pomoći ili podrške, pristupi temeljeni na zajednici vide one pogođene hitnim slučajevima kao aktivne vođe i sudionike u naporima za promicanje individualnog i društvenog mentalnog zdravlja i dobrobiti (74).

Potrebno je pažljivo planirati aktivnost i jačanje mogućnosti zdravstvenog sustava kako bi se mogla pružiti pomoć u okviru akutnih zbivanja, ali i prevenirati poremećaje uzrokovane klimatskim promjenama.

DISCUSSION

In the event of immediate catastrophic weather conditions action is required in terms of ensuring immediate response to events and providing social and psychological support. However, considering that climate changes are already present and provided that collective actions succeed in achieving positive change, the effects will last at least for a while.

Socio-behavioural factors, culture, provision of information and preparedness play an important role in determining whether the society will develop resilience or psychological disorders and exhaustion (19). In that context, it is necessary to work towards developing resilience, protective factors and mechanisms for coping with climate change at the individual, as well as the community and societal levels (23). As the severity of the global climate problem increases, priority should be given to building community resilience. As opposed to passive recipients of external aid or support, community-based approaches view those affected by emergency situations as active leaders and participants in the efforts to promote individual and social mental health and well-being (74).

It is necessary to carefully plan the activities of the healthcare system and strengthen its capacities to provide assistance in case of acute events and prevent the occurrence of disorders caused by climate change.

Kontinuirano razumijevanje odnosa između sustava mentalnog zdravlja i klimatskih promjena može zahtijevati prilagođavanje postojećih ili razvoj novih intervencija, iako i postojeće mogu biti od pomoći (23).

Može se očekivati da će utjecaj klimatskih promjena na mentalno zdravlje povećati potrebu za psihijatrijskom stručnom pomoći i liječenjem. Planiranje je potrebno i za predvidljive poremećaje zdravstvene skrbi izazvane pojavama povezanima s klimatskim promjenama (75). Ključno je započeti s planiranjem odmah, kako bi se usluge mentalnog zdravlja bile spremne nositi se s rastućom potražnjom koju donose klimatske promjene u budućnosti.

ZAKLJUČAK

S obzirom na sve intenzivnije klimatske promjene, naročito toplinske udare te prijeteće oluje koje sa sobom nose ne samo materijalne štete već i opasnost od ugroze ljudi, važno je raditi na jačanju otpornosti, osobito kod osoba i populacija koje su osjetljive, te osigurati dostupnost adekvatne skrbi i zbrinjavanja uz pomoć nadležnih službi u kriznim situacijama. U tome je posebno važna prevencija reakcija na stres i prilagodba posljedično događajima proizašlim iz klimatskih promjena te što ranije pružanje psihološke i psihijatrijske pomoći onima kojima je potrebna. Sve je to potrebno tijekom akutnih, subakutnih i trajnih klimatskih zbivanja, ali i planiranje programa za podizanje svijesti i izgradnju otpornosti društva u cjelini, kao i izrada strategija zaštite mentalnog zdravlja u novim civilizacijskim okolnostima kojima smo izloženi.

Continuous understanding of the relationship between mental health systems and climate change may require the adaptation of existing or the development of new interventions, although the existing ones may also prove to be helpful (23).

The impact of climate change on mental health is expected to increase the need for psychiatric expertise and treatment. Planning is also required for the predictable healthcare disruptions caused by the occurrences associated with climate change (75). It is crucial to start planning now, so that the mental health services are prepared to deal with the increasing demand brought about by climate change in the future.

CONCLUSION

In view of the ever-increasing intensity of climate change, particularly the heat waves and impending storms that not only cause material damage, but also pose the threat of endangering people, it is important to work on the strengthening of resilience, especially among sensitive individuals and populations, and to ensure the availability of adequate care and treatment with the help of competent emergency services. In this context, particularly relevant are stress reaction prevention and adaptation to the consequences of climate change, and the provision of psychological and psychiatric support to those in need as soon as possible. All of this is necessary during acute, subacute and permanent climatic events, in addition to planning programs that will raise awareness and build the resilience of the society as a whole, and developing mental health protection strategies in the new civilisational circumstances to which we are exposed.

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