

DAVETLİ DERLEME

INVITED REVIEW ARTICLE

LIVING IN HARMONY WITH THE EARTH AND WITH EACH OTHER

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ABSTRACT

Environmental deterioration and violent armed conflict are both massive public health problems. They are often associated with each other, and they are also interconnected in complex ways with physical, biological, social, demographic, economic and cultural factors that can be described as addiction to carbon-based fuels. Collectively the combination threatens the earth's life-support systems and human survival. This is the most serious public health problem of modern times. Tackling this problem will challenge all public health workers, and there is much that public health can do to help.

Key Words: Global public health problems, environmental pollution.

ÖZET

DÜNYA İLE VE BİRBİRİMİZLE UYUM İÇİNDE YAŞAMAK

Çevresel şartların kötüye gidişi ve şiddete dayalı çatışmaların her ikisi de büyük çaplı halk sağlığı sorunlarıdır. Bunlar sıklıkla birbirleriyle ilişkilidirler ve yine karbon kaynaklı yakıtlara bağımlılık olarak tanımlanabilecek fiziksel, biyolojik, sosyal, demografik, ekonomik ve kültürel faktörlerle kompleks bir şekilde bağlantılıdır. Bunların kombinasyonu, beraberce, yeryüzünün yaşam destek sistemlerini ve insan yaşamını tehdit ediyor. Bu durum, modern zamanların en ciddi halk sağlığı sorunudur. Bu problemi çözmeye çalışmak tüm halk sağlığı çalışanlarını ilgilendirmektedir ve destek için halk sağlığı disiplininin yapabileceği birçok şey vardır.

Anahtar Kelimeler: Global halk sağlığı sorunları, çevre kirliliği.

Two challenges tower above all others confronting us. Putting an end to violent armed conflicts that kill and maim millions is the lesser challenge, the

accelerating crisis of global climate change is the greater of the two. Unless we control both, the future for humanity is bleak.

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Public health professionals have the same self-interest and obligation as everyone else to safeguard the life-supporting ecosystems that sustain us. Moreover stressed ecosystems lead to conflict when people fight for a share of shrinking resources (1). If humans are to survive, we must learn how to live in harmony with our ecosystem and with each other, must stop trying to conquer or subdue one another and the world around us. Public health specialists can help everyone learn how to do this.

Many changes in my lifetime of 80 years have improved the human condition: reduced infant mortality; increased life expectancy; control of many previously fatal diseases; breathtaking progress in medical and other technologies; reduction of financial barriers between sick people and the care they need; a gender-balanced, culturally diverse medical profession rather than one dominated by white men in suits. But other changes are ominous portents. Profligate misuse of non-renewable resources; worldwide chemical pollution; widening rich-poor gaps; escalating species extinction; savage, costly, and unnecessary wars; and climate change, do great harm (2). Wars in the 20th century killed over 100 million people and maimed many times that number, most of whom, 70-80% in recent wars, were infants, children, women, or elderly non-combatants, drained wealth and talent, and did terrible environmental damage.

Climate change, however, is the gravest danger facing life on earth. Signs

of planetary stress and climate-related risks to health are obvious everywhere (3). These are manmade, and everyone must help to undo the harm we have done to the earth, to each other, and to future generations.

Multiple interconnected forces are responsible and we may have only a few decades to stop the headlong rush towards what may be an irreversible tipping-point that will change our world forever (4). The worrying changes are physical, biological, demographic, social, cultural, behavioral, economic and political. All interact and reinforce each other in many complex ways.

Physical changes in the atmosphere include the increasing burden of carbon dioxide that causes climate change (global warming); acid rain that kills our lakes; smog that rots our lungs; and contamination with chlorofluorocarbons (CFCs) that destroys the stratospheric ozone layer shielding the biosphere from lethal ultraviolet radiation. The rising burden of atmospheric carbon dioxide is our gravest danger. It comes from combusted carbon-based fossil fuels that we use to generate electricity, provide power for airplanes and cars, for cooking, heating and cooling, for televisions and computers, and to make and drive our war machines. We are fouling and destroying our habitat with addiction to fossil fuels (5). Our economy, our political systems, our entire way of life are so dependent on fossil fuels that addiction is the only apt word. Our civilization risks perishing

like others that relied on unsustainable customs and policies (6).

Biological changes include species extinctions, reduced biodiversity, and emergence of dangerous new pathogens including HIV, the virus that causes AIDS, and about 30 other new infectious agents since 1970. Almost all are potentially lethal and some are highly contagious. By mid-2006, HIV/AIDS had infected 42 million and killed over 12 million people since it was identified in the early 1980s (7). New and emergent infections have various origins. The HIV/AIDS pandemic is probably the result of a recent mutation of the causal retrovirus and its species jump from forest monkeys to humans in equatorial Africa. Several other diseases have arisen because humans have disrupted previously balanced ecosystems, or because pathogens or their vectors have invaded a new ecological niche.

The pressure of people on fragile ecosystems is exceeding sustainable limits. Population numbers and distribution, social structure and culture have been transformed. The world's population almost quadrupled from 1.7 billion in 1901 to 6.5 billion in 2001. There has been unprecedented migration from rural to urban areas and from one country to another far from birthplace and family traditions, pushed by oppression and conflict, pulled by powerful economic forces. Wars can be a cause and a consequence of these massive population shifts. The proportion in cities rose from less than one in 20 in 1901 to about half by 2001. Tens of millions of new city dwellers

live in abject squalor in slums and shanty towns in low and middle income countries. Over 20 million are refugees or internally displaced persons, forced out of homes and habitat by conflict, ethnic cleansing, even genocide.

The age structure of populations in industrial countries has changed from predominantly 'young' (high proportions of infants and children) to 'old' (high proportions of middle-aged and old people, low proportions of children). Similar demographic and social changes are occurring in emerging industrial nations like India, Indonesia and Brazil. Large extended multi-generation families that made their own entertainment have been replaced by small nuclear families that rely on mass entertainment – mass 'culture' that undermines individual thought. We are bombarded by a confusing jangle of signals from TV and the internet that ought to bring us all together in a global village but instead often divide generations and nations. Cohesive family ties have fragmented, and traditional faiths and loyalties have eroded. We rapidly tire of our political leaders, disillusioned by their failure to correct the discontents of our daily lives. A consequence is political volatility and frequently changing, often unstable, governments with different national and international policies, plans and priorities, when we urgently need visionary leadership and long-range planning with a time horizon of at least several decades. Instead we seek scapegoats and are easily seduced by demagogues with empty and worthless promises, who distract the people by

declaring ‘wars’ – war on crime, war on drugs, war on poverty, war on terror, war on nations or ethnic groups with fabricated, fomented, hostility and imaginary aggressive designs against us. Rarely our leaders get the priorities more nearly right and declare war on diseases, though seldom on conditions that kill and disable the largest numbers – cystic fibrosis and muscular dystrophy that disable and kill small numbers annually generate greater enthusiasm and more charitable donations from well-meaning but ill-informed benefactors than infant diarrhea which kills about 2 million infants and children annually. Until the Bill and Melinda Gates Foundation got involved, malaria, tuberculosis and HIV/AIDS largely failed to attract the needed attention, expertise and funding.

All these confront mankind. It may be the most complex and difficult cluster of social and public health problems of any time in human history. Reflecting on the social history of public health some years ago, I identified five essential requirements that must be present for the successful control of every public health problem (8). We must:

- Recognize that the problem exists;
- Understand what causes it;
- Be able to control the cause;
- Believe it is important to control it;
- Have the political will to do what is required.

In the late 19th century this combination of essential requirements produced the sanitary revolution. By the 1970s they were being deployed with some success to control the public health

problems of tobacco smoking, impaired driving, child abuse, domestic violence and occupational cancers such as those caused by exposure to asbestos.

Well-informed people agree that the most threatening health problems of people and the planet itself are associated with climate change and stressed ecosystems and are ultimately due to unsustainable economic policies and dependence on carbon-based fuels. These problems are real and dangerous, and many health professionals and other thoughtful people have some insight into what is causing them. Some can identify at least parts of necessary corrective action. Many believe the problems matter, perhaps more than any other problem we face. A few are willing to act, but often only in puny, almost irrelevant ways. What is lacking is the political will to tackle these problems at the societal level. At best, ruling parties even in the most supportive nations pay lip service but do little or nothing. The ruling parties in almost all democracies and totalitarian states alike deny reality and take no meaningful action.

How and where can public health workers intervene to break the vicious circles in which we seem to be trapped? We have the advantage that most people care about their health and want to preserve and protect it; so there is some goodwill towards health professionals and we are trusted. When we mobilize, organize, and proselytize we attract a following. Occasionally the efforts of organized health professionals are rewarded with the Nobel Peace Prize or similar honors.

We can start interventions with ourselves, our families, our friends and neighbors. Because so many people care about their health, they ask health professionals for advice about other matters besides disease. Leading by example we have a responsibility to educate everyone with whom we have professional and social contact. Actions we can encourage everyone to take to minimize climate change include basic do's and don'ts. Do walk or cycle, don't drive gas-guzzling cars; do invest in insulation to enhance efficient energy use for heating and cooling homes and workplaces; do eat locally grown food, don't eat processed junk food; do hang the washing out of doors in the breeze, don't use a clothes dryer; do turn off electric appliances when not in use, don't overheat homes and offices in winter, don't keep the air conditioning on all summer long. Always dispose of hazardous medical waste safely and responsibly. We must advocate with our political leaders for use of renewable energy sources, for energy saving and conservation, and for peaceful resolution of conflicts with adversaries, and we must collaborate in international activities aimed at these goals. Wars and preparation for war consumed enormous quantities of non-renewable fossil fuel and of financial and human resources that are desperately needed to educate children and prevent and treat disease, notably in Africa and South Asia (9). We must reject politicians whose policies are not oriented to sustainability, who distract us with unnecessary wars and

bribe us with short-sighted and irresponsible tax cuts.

These actions, multiplied throughout society, can help to reduce the impact of climate change but they won't stop it. It is too late for that. Our immediate task is to prepare for and take all necessary actions to adapt to inevitable changes. Much of what we can expect is predictable. Appropriate action by public health professionals follows logically and is among the most essential aspects of adaptation to the climate change that is happening now and will increase over the next few decades.

We know there will be more frequent, more severe extreme weather events like heat waves, hurricanes, floods and droughts. Heat waves, especially associated with smog, kill isolated, frail, debilitated, old people, premature and low birth weight infants, poor and homeless people. The European heat wave of July 2003 caused the premature deaths of an estimated 35,000 people (10). Humid, wet weather increases the risk of vector-borne and water-borne diseases, causes an upsurge of malaria in vulnerable regions and increases the risk of fecal-oral transmission of diarrheal diseases. Malaria kills 2 million annually, half of them children. Diarrhea kills another 2 million, mostly infants and children. Floods and hurricanes incapacitate and often destroy infrastructure and obliterate habitat, even entire human settlements. Floods disable sewage treatment plants and pollute water supplies. Both floods and droughts destroy food crops and endanger food supplies for large numbers of people.

Rising sea levels and desertification devastate grain-growing regions and cause habitat loss and displacement of people who become environmental refugees. The United Nations High Commissioner for Refugees estimated in 2006 that there will be a tenfold increase in environmental refugees from 5 million in 2005 to 50 million by 2010 (11). Most of this will be due to habitat loss caused by sea level rise or desertification of marginal land now used for subsistence farming or grazing. Movement on that scale and at that speed is a huge public health problem as well as a major logistic, security, and social problem. The cost of climate-related disasters is staggering. In the autumn of 2005, the US Congressional Research Services made a preliminary estimate that hurricanes Katrina and Rita would cost at least \$65 billion in restoration and repair. The insurance industry estimate was about double this but it will be many years before all the claims are settled. The long-term human costs include regional depopulation – several hundred thousand former citizens may never return because their homes and sources of livelihood are gone (12). They have become internally displaced persons, perhaps the first of many in the USA because further massive storms are certain to occur. Melting glaciers and alpine and polar icecaps associated with global warming are raising sea levels (probably by about 90 cm in the next 50-75 years). This alone will displace several hundred million people as well as destroying their habitat. The costs of this and their relocation will be enormous.

Nicholas Stern, former chief economist of the World Bank in a report to the British government, recently presented data to show that the cost of doing nothing about this situation, in other words, persisting with ‘business as usual’ policies, would be about 20% per annum of total global gross national product, whereas the cost of acting now to mitigate climate change and get ready to adjust to its impact, would be far less, about 1% of global GNP per annum. There is also an implication in the Stern Report that we must develop urgently an effective system of global governance (13).

The attenuated stratospheric ozone layer allows more harmful biologically active ultraviolet radiation to penetrate into the biosphere where it increases the incidence of malignant melanoma, non-melanoma skin cancer and cataract. Advisory messages about sun avoidance and warnings about high ultraviolet radiation have become routine in spring and summer weather forecasts. More ominously, increased UV solar radiation kills delicate small and single-cell organisms at the base of aquatic food chains, including phytoplankton that are a vital component of the carbon cycle, absorbing large quantities of atmospheric carbon dioxide. Moreover, rising carbon dioxide levels lead to higher concentration of carbonic acid in sea water, and this kills oceanic phytoplankton, further impairing the carbon sink.

Actions to preserve and protect the environment can be lifesaving for people in vulnerable human settlements. The

loss of life and homes in New Orleans from hurricane Katrina in 2005 would have been lower if wetlands that once acted as a sponge to soak up the impact of tidal surges had not been drained for housing and industrial development. Preserving, protecting, and where possible restoring wetlands and marshes is intelligent environmental planning and sound public policy. This sort of environmental protection may aggravate other health risks for instance by allowing mosquito breeding sites to proliferate, requiring use of pesticides for control; but natural predators such as fish, and other human protective measures such as use of bednets and screened windows can offset this. To achieve a balanced ecosystem where humans, other living species, and natural environments co-exist in harmony is sound public policy and holistic public health practice.

Essential adaptive and reactive strategies by public health agencies and by primary health care workers can be briefly stated. The public health services must maintain systematic monitoring, surveillance and analysis of all aspects of the health situation. Public health nurses can identify, register, and when necessary, evacuate the most vulnerable to safer places when weather-related emergencies occur. After the Chicago heat wave in 1995 which killed over 700 mostly isolated, frail elderly people in low rental housing, the city public health authorities created a register of similarly vulnerable people. In subsequent Chicago heat waves there have been no deaths because vulnerable people were

evacuated to air-conditioned shopping malls and similar places of refuge. Family physicians can advise patients and parents about sun exposure, especially about protecting infants and small children from excessive exposure to ultraviolet radiation. Environmental monitoring includes air quality assessment, routine surveys of the distribution and abundance of insect vectors, epidemiological surveillance of communicable and exotic disease outbreaks and identification of pathogens; and occurrence of actinic cancer, cataract, and heat-related illness. Compiling a registry of vulnerable individuals (frail elderly, infants, etc), preparation and dissemination of advisory messages about UV radiation levels, sun avoidance and routine precautions such as immunizations are other important functions. Disaster planning and preparation for adverse health impacts of extreme weather events are high priorities. Other essentials include food and nutrition policies, delineating health research policies and priorities, and standard setting, for example for protective clothing.

The roles and responsibilities of primary health care workers include vigilance and notification of exotic disease outbreaks (sentinel surveillance); advising on adaptation and helping to soften the impacts of social and cultural change; anticipating, preventing, treating adverse effects of extreme weather (heat waves, floods, hurricanes etc); advising patients about sun avoidance and smog alerts; and participating in planning for emergency preparedness.

Political leaders mostly are in denial and avoid discussing the complex cluster of problems that accompany and cause global changes. Public health professionals should use every opportunity to advocate and to remind political leaders that they must consider health problems in the context of all else happening in the world. When opportunities arise, health professionals

who occupy prominent positions in society can engage in advocacy in other forums. Such advocacy should include reminders to all of the complexity and interconnectedness of political, economic, social and cultural determinants with health problems, including those associated with armed conflicts and those due to climate change.

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