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Towards Reducing the Burden of Global Environmental Related Health Problems in the 21st Century

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Abstract
Environmental health issues are major risk factors in the global burden of disease. This paper therefore focuses on the most important link between health and environment. It discusses the most important environmental threats to health in the 21st Century especially in the low and middle income countries. It reviews the burden of disease from unsafe water supply, hygiene, sanitation, outdoor and indoor poor pollution toward achieving the Millennium Development Goals (MDG). It examines the contributions of personal hygiene to reduce the burden of environmentally-related health problems, comment on the consequences of environmental health problems on human health and explain the future global challenges to reduce the burden of disease in the community. Towards the most cost-effective ways of reducing the global burden of environmental related health problems, it was therefore recommended that there should be a reduction in the air pollutants to enhance health status of the inhabitants through the use of improved stove or gas for cooking at homes. There is need to focus on investment in low-cost environmental sanitation, improve water quality for human consumption and inculcate the hand-washing habit to reduce the burden of food-water borne infections.
Keywords: millennium goals, environment, environmental-health problems, burden of disease, sanitation, pollution.

INTRODUCTION

The modern concept of health viewed environment as everything that is not genetic which surround man. Environment is considered as a whole set of natural and social systems in which man and other living organisms live and from which they draw their sustenance. Environment includes not only the water, air and soil that form the environment but also the social and economic conditions under which we live. Environment is also viewed as the biosphere and its implications for mankind (WHO, 2002). The key to man's health lies largely in his environment. In fact, much of man's ill-health can be traced to adverse environmental factors such as water pollution, soil pollution, air pollution, poor housing conditions, presence of animal reservoirs and insect vectors of diseases which pose a constant threat to man's health. The natural environment on its own may create problems for human health as evidenced by temperature fluctuations and such natural events as forest fires, tidal waves and landslides. The created environment also poses many risks to health. For example, the slum areas, of many cities are in themselves a health hazard due to poor housing and poor availability of adequate safe water, air pollution and sanitation.

Environmental health comprises those aspects of human health including quality of life that are determined by physical, chemical, biological, social, and psychological factors in the environment. Environmental health focuses on public health efforts that are concerned with preventing diseases, death, and disabilities by reducing the exposure to adverse environmental conditions and promoting health behaviour change. In other words, it is concerned with the direct and indirect cases of diseases and injuries and tap resources inside and outside health care system to help implore health outcomes (World Bank, 2006; WHO, 2015). It is the control of all those factors in man's physical environment which exercise or may exercise a deleterious effect on his physical development, health and survival. In brief, environmental health relates to the impact the environment can have on a population as holistic nature consisting of its biological, social, cultural, economic, political and other significant dimensions which are interrelated with and independent on each other towards a more stable holistic state. (Yassi, Kjellstrom, deKok, & Guidotti, 2001). Thus, environmental health addresses all the physical, chemical and biological factors external to a person, and all the related factors impacting behaviours. It encompasses the assessment and control of those environmental factors that can potentially affects health. It is targeted towards preventing disease and creating health-supportive environments (Howard, 2010). It excludes behaviour not related to environment, as well as behaviours related to the social and cultural environment and genetics.

The purpose of environmental health is to create and maintain ecological conditions that will promote health and thus prevent disease. One of the essential environmental health care elements is safe drinking water supply, in addition to environmental sanitation, conducive outdoor and indoor air pollution. The importance of environmental health risk factors to the global burden should not be a surprise. For instance, the third leading cause of death in low and middle income countries in sub-Sahara regions in Africa are related to lower respiratory

infections and diarrhea diseases which closely link with environmental risk factors especially when considering the death of children 0-14 years of age (McMichael, Kjellstrom, and Smith, 2001). The underlying determinants of environmental health are organized by their level of impact on the household, the community, and the region or global. Each level of impact has its adverse health consequences such as vector related diseases- poisoning, respiratory disease, reduction in intelligent quotient in children, injuries or deaths and indirect comprised food production, reservation, flood, cold and fire outbreak. The most recent important risk factors on environmentally-related diseases in low and middle income countries include unsafe water, sanitation, hygiene, outdoor and indoor pollution. These factors are also the focus of this paper because they take a disproportionate toll on the health of low-income people in the developing world and the enhancement of their health status will require important gains in environmental health.

Environmental health and the millennium goals

Environmental health matters are also of special importance because of addressing them effectively is central to the achievement of the millennium goals (United Nations, 2006). The millennium goal is to eradicate poverty and hunger as identified to be as environmental risk factors and central to eradicating poverty by reducing the burden of disease, which falls largely on the poor, of environmentally-related morbidity and mortality. Children should be given universal basic education because children that do not have access to basic education and clean water are more likely to suffer from malnutrition due to a vicious cycle of diarrhoea disease and malnutrition. Children with poor nutritional status are not likely to stay in the school for effective learning or learn as much as healthy children.

Furthermore, there is need to promote gender equality and empower women towards reducing burden of disease. Thus, there is need to improving access to water and improve the lives of poor women in the developing world by reducing the amount of time required to get water. Reducing indoor pollution can also substantially improve the lives of women since they suffer a disproportionate burden when they are cooking at homes. Another millennium goal on environmental health is to reduce child mortality. Identifying the environmental risk factors will clearly make a major contribution to reducing child mortality by reducing two major causes of death in children diarrhoea and pneumonia diseases. Diarrhoea disease is reduced through improved access to clean water and sanitation and maternal health, because unsafe water can harm the nutritional status of the mother, and also reduce pneumonia among children through improvement in indoor air quality.

The target of the millennium goals to reduce environmentally-related health problem is to combat Human Immune-deficient Virus and Acquire Immune-deficient Syndrome, malaria and other related diseases. Environmental improvements can reduce the breeding grounds for malarial mosquitoes and vectors of some of other diseases, such as schistosomiases, typhoid, and dengue fever. There is need to ensure environmental sustainability through improved water supply, sanitation and personal hygiene especially when they are carried out in community-based ways as part of the millennium goals towards improving environmental health.

Environmentally-related burden of disease

Globally, everyone deserves to live a long life in full health. In order to achieve this goal, it requires a comprehensive picture of what disables and kill people across countries. The Global Burden of Disease (GBD) provides a tool to quantify health loss from various diseases, injuries and significant health risk factors so that health system can be improved and eliminated disparities. In order to align health systems within the populations they serve, policymakers need to understand the true nature of their countries health challenges and how those challenges are shifting over time. Disease burden is the impact of a health problem caused by a disease as measured by financial cost, mortality, morbidity or significant other indicators. The overall disease burden can be thought as a measure of the gap between current health status and the ideal health status (where the individual lives to old age free from disease and disability). It is quantified in terms of Quality Adjusted Life Years (QALYs) or the Disability Adjusted Life Years (DALYs) (WHO, 2015) which quantify the number of years lost especially when consider the environmentally-related disease. GBD incorporates both the prevalence of a given disease or risk factors and the relative harms it causes. This will enable the decision-makers compare especially the effects of environmentally-related disease and the use of information at home (Sub-Sahara regions) with the developed countries (Brazil, USA, Saudi Arabia, China, Mexico, United Kingdom etc.) for measuring population health and how it varies in different regions considering demographic variables such as socio-economic status, religions, age, sex, time and ethnic groups.

The most recent important risk factors considering environmentally-related diseases in low and middle income countries include unsafe water, sanitation and hygiene, outdoor and indoor pollution. These factors take a disproportionate toll on the health of low income people in the developing world and the enhancement of their health status will require important gains in environmental health.

Sanitation, water and hygiene

Water is a simple compound which can be found naturally in large quantities from the ground and surface,

household, connection, stand-post, borehole, shallow and deep well, and rainwater collection. It is an excellent universal solvent, the basic human right and essential need. Some sources of water may harbour infective bacteria and other parasites, as well as dissolved and suspended substances which are injurious to man. Considering human health, it is very significant in agricultural and industrial purposes, power production from hydropower and steam power, for transport such as canals, carrying away wastes from all manners of establishments and institutions, for public purposes: cleaning streets, recreational purposes like swimming pools, public fountains and ornamental ponds, fire protection and public parks and domestic use for drinking, cooking, washing, and bathing, flushing of toilets and gardening etc. For human consumption, water must be easily available, adequate in quantity, free from chemicals and biological contamination, and readily available throughout the year and been acceptable in terms of guidelines on the quality of drinking water (WHO, 2005). Water is also integrated with other Primary Health Care (PHC) components because it is an essential part of health education, food and nutrition and also Maternal and Child Health (MCH) (WHO, 2006). There can be no state of positive health and well-being without safe water.

Water is not only a vital environmental factor to all forms of life, but it has also a great role to play in socio-economic development of human population. Generally speaking, considering the costs and benefits, reasonable access to water is considered to be access to an individual at least 20-40 litres per day from not more than one kilometer distance away from water sources for drinking, personal hygiene and cleaning (Adam, 1999; Ustinov, 2011). There are many different levels of technology employed on water supply considering sanitation issue. Obviously, surface water sources need a great deal more protection than ground water sources. Each source still needs protection from contamination and in developing countries the main type of contamination to protect from is human faeces (a major source of pathogenic organisms and animals).

Man's health may be affected by the ingestion of contaminated water either directly or through food; and by the use of contaminated water for purpose of personal hygiene and recreation. Much of the ill-health which affects humanity through heavy burden of water-related diseases such as diarrhoea, especially in the developing countries can be traced to lack of safe and wholesome water supply. Water as environmental related burden of disease in form of pollution is a more serious aspect that is caused by human activity (urbanisation and industrialisation). The sources of water pollution resulting from sewage, industrial and trade wastes, agricultural pollutants, physical pollutants and radioactive substances are very significant. Water pollution may still occur as often happens due to corrosion of pipe lines, leaky joints and cross connections between water supply pipes and sewage drainage pipes.

Sanitation could be ranged from the simple technology of bucket latrine to different modern approaches to excreta disposal in towns, cities and villages. The urban sewage system may be toilets owned by individual and public shared by many individuals and the family members. All these system can be operated in a hygienic manner that addresses health concerns. However, lack of knowledge, cost, construction and local laws particularly in the urban areas and cultural values, norms and standards are constraints to their judicious use. Promotion of improved sanitation can be done with a public and private partnership. The largest impact of improved sanitation is in the reduction of food-water borne diseases such as cholera, diarrhea and typhoid especially among children. It is very important to note that having a toilet seems to also increase the hand-washing habits of family which itself brings benefits. Only about 65% of the people in the world ranging from Latin America region to slightly above 50% in the Africa region have access to safe excreta disposal (Yassi, Kjellstrom, deKok & Guidotti, 2001). Many of large cities in Africa have no modern sanitation system, and in Asia large shares of the populations in some areas also have no access to sanitary disposal of human waste.

It is good evidence that improved disposal of human waste is associated with reduction in diarrhoea disease, intestinal parasites, and trachoma. Failure to dispose properly of human waste contaminates water and food sources and lead to an increase in transmission of pathogens through the oral-fecal route. Failure to improve sanitation is associated with the spread of parasitic worms such as ascaris and hookworm (Cairncross & Valdmanis, 2006). Water-related infections may occur due to the ingested pathogens through water-washed and person to person transmission because of lack of water for hygiene, transmission via an aquatic intermediate host through water based, and by water-related insects that breed in water or bite near water. These pathogens are associated with severe diarrhea, typhoid and a host of others gastro-intestinal problems that affect child health and deadly infectious diseases leading to dehydration.

Improved sanitation reduces the burden of trachoma, because the flies that are significantly involved in the spread of that disease breed, among other places in human waste (WHO, 2006). More than one billion people, mostly in low and middle income countries, lack access to safe water sources within a reasonable distance of their home (World Bank, 2014). Access to improved water source range from below 50% in Sub-Sahara Africa to about 70% in Asia to almost universal access in developed countries and estimated that about 400 million children lack access to safe water (United Nations, 2006). Water-borne diseases are among the most important considering the burden of disease and they are numerous in low and middle income countries. Such diseases are especially risk for the very young, the very old and people who have compromised immune systems, such as people living with HIV and AIDS.

In recent years, several attempts have been made to access the global burden of disease as a result of environmental pollution. About 8-9% of the total burden of disease may be attributed to pollution but considerably more in developing countries WHO, 2015). However, unsafe water, poor sanitation, poor hygiene, outdoor and indoor air pollution are seen to be the major sources of exposure to environmentally-related burden of disease. Globally, exposures to environmental pollution (outdoor and indoor pollution) remain a major source of health risks globally though risks are generally higher in developing countries where poverty, lack of investment in the modern technology and weak environmental legislation combine to cause high pollution levels (British Council, 2013).

Indoor air pollution

At the individual level, indoor air pollutants are perhaps the most important for those people living in the developing countries. Friis (2007) reported that in the past fifty decades, half of the people in the world depended on unprocessed solid fuel for their cooking and heating. Such fuel included fossil fuel, coal, wood, logging and crop wastes through the use of open stoves that were not vented to the outside by the poor segment of the society. Recently, people moved to kerosene for stoves and gas for cooking as their family income dictates. Biomass fuels produce breathable particles of variety of gases and chemical products especially in a poor ventilated home producing gases and smokes resulting in cardiovascular diseases, chronic obstructive pulmonary diseases, adverse reproductive outcomes and cancer, upper respiratory irritations and infections among women and children (Yassi, Kjellstrom, deKok & Guidotti, 2001). Other important indoor air pollutants include environmental tobacco smoke, biological particles, non-biological particles, volatile organic compounds, carbon monoxide, lead, ozone, smog, sulphur dioxide, nitrogen oxide, radon, and asbestos with various health effects. such as cough, irritation of the nose and throat, shortness of the breath by reducing the oxygen-carrying capacity of blood, brain damage, digestive problems, damage to the lungs, and respiratory system and considerable excess mortality in a very short time. (Bruce, Rehfuess, Mehta, Hutton & Smith, 2012).

Outdoor air pollution

This is a major environmental health problem in both developed and developing countries. The air pollutants which discharge from different sources may thereafter persist in atmosphere transform deposited or degraded. Increasing the amount of gases and particles are being emitted into the atmosphere resulting in damage to human health and the environment. Outdoor air pollution may be divided into anthropogenic (man-made) and natural sources (e.g. dust storms and volcanic action) (Adams, 1999).The pollutants are broadly classified into suspended particulate matters (smoke and dusts), gaseous pollutants (sulphur dioxide) and odours (hydrogen sulphide) with sources such as stationary sources (e.g. industry and generation electricity), mobile sources (e.g. automobiles), domestic source (combustion of coal, wood or oil) and miscellaneous which comprises of burning refuse, incinerators, insecticides, fungicides and pesticides spraying into the air from airplane, natural sources (wind-borne dusts, fungi, molds, bacteria and nuclear energy programmes (Fitzpatrick & Kappos, 1999).

Apart from the chemical pollutants, there are biological and atomic outdoor air pollutants such as allergies the pollens that blow over wide areas and produce allergic reaction. Radioactive wastes pollute the air in the form of gases and dusts from mining operations, fuel fabrication irradiation, processing and reactor operation (Lopez, Mathers & Murray, 2012). In addition, testing weapons underground instead of an open air has increased the source of atomic pollution. The most direct and important source of outdoor air pollution affecting human health is tobacco smoke. Even those who do not smoke may inhale the smoke (passive smoking) produced by the active smokers

The most outdoor air pollution episode is classified as photochemical smog (a complex mixture of products formed from the interaction of radiant energy of the sun on the emission of the major components of automobile exhaust, nitric oxide and hydrocarbon (Santra, 2013). This episode occurs in cold winter months in areas where coal is a major fuel for both industry and heating. They are characterized by high level of sulphur dioxide and smoke particulate which build up under stagnant weather conditions lasting three days or more (Ostro, 2006).

Consequences of environmental health problems

The adverse health effects of pollutants vary according to the concentration of pollutants, the weather prevailing at the time of exposure and the population exposed. The elderly, especially those with pre-existing cardio-respiratory disorders and the very young are most susceptible. Air in a closed room may become stagnant and unhealthy. Thus, there is a fall in the level of oxygen and a rise in the concentration of both carbon dioxide and water vapour in the air (Bruce, Rehfuess, Mehta, Hutton & Smith, 2006). There will also be an unpleasant odour from bodies and skin particles which cause the air to lose its freshness. Body heat will also cause a rise in room temperature which could result in over-heating, pollution from heating devices and possibility of contamination of air by bacterial droplets suspended in expelled breath. However, the most common dangers encountered in an

unventilated room are the effect of high level of humidity, and an increase in the risk of infection.

Injury to human health from outdoor pollution is of course, a phenomenon of urbanisation and industrialisation. Many countries of the world are fighting atmospheric pollution by toxic substances which later sufficient to cause eye irritation, physical discomfort, and lowered working efficiency, with occasional periods when the poisoning is so severe as to produce disease and death. The cases of severe illness, impairment of judgment and vision, headache, dizziness, loss of consciousness and death were more common in older persons and individuals with pre-existing heart or lung difficulties, but younger persons in good health exhibited the typical symptoms of severe cough and irritation of the respiratory tract (Allan, 2003). In general, both the death rate and the amount of air pollution increase as the city size increases. The harmful effects of smog occur mainly in the areas of human health and comfort, damage to materials, effects on the atmosphere, and toxicity to plants. For instance, pungent smelling smog produced ozone is known to be toxic resulting in mortality and illness that are significantly increased particularly among the elderly and the young, among the individuals with a history of cardio-respiratory illness (Bridgeman, 1991).

Air pollutants also have deleterious effects on materials: stone, paintwork, stained glass, fibre or rubber materials and significant others (Ahluwalia, 2009). The soiling effects of particulates is obvious in industrial cities where buildings of light coloured stones and bricks soon take on the characteristics black colour. Other significant effects of outdoor air pollution are the faster deterioration of clothing, curtain and wood, the corrosion of metals and the soiling and subsequent cracking of paintwork (United Nations, 2012). Outdoor air pollution can affect plants to varying degrees. The entry of outdoor air pollutants by the stomata of the foliages may take place directly by gaseous diffusion or from the contaminated soil, acidic air pollutants in particular. Thus, various outdoor pollutants have different types of injuries on exposed sensitive plants. Suspended particulates after deposition on foliages cause a number of damages to leaf functions such as change in the sun energy falling on the leaf surface, affecting the energy exchange due to dust layer, decreased chlorophyll content, interruption in gaseous exchange due to clogging of stomata by dust particulates and dust deposition causes changes in the soil properties that support the plant growth (Ostro, 2011).

The indirect effect of outdoor air pollutants occurs near smelters treating non-ferrous ores, and near factories such as phosphate fertilizer works, brick kilns and aluminum smelters, where fluorides are emitted and are concentrated in the grasses in surrounding fields (Karpagam & Geetha, 2010). Identically, lead compounds from automobile exhausts are deposited near roads for toxicity to animals. With time, such metals accumulate in animals bodies through food chain and finally pose danger to animal health with perceived side-effects such as anaemia, stiffness, diarrhea and fluorosis which affects ruminants particularly dairy cows.

The socio-economic consequences of environmental health issues are enormous. First, they constitute 8.4% of the total death in low-and middle income countries and 7.2% of the total burden of disease (Levinton, 2011) and constitute about 25% more than unsafe sex and as twice as much as tobacco use (Lopez, Mathers & Murray, 2012). Secondly, the burden of disease causes fall disproportionately on relatively power people, who cook with biomass fuel and coal in low-and middle income countries more than on high income countries (WHO,2006). These environmental health burdens have very negative consequences in productivity. Yassi, Kjellstrom, deKok and Guidotti (2001) estimated that about 1.9 million died annually due to exposure to high concentration of suspended particulate matters in the indoor air environment. For instance, the health effects associated with poor indoor air quality are acute respiratory infections in children, lung cancer, cough, irritation of the nose and throat, shortness of the breath by reducing the oxygen-carrying capacity of blood, brain damage, digestive problems, and damage to the respiratory system and considerable excess mortality in a very short time (United Nations, 2006).

It is the women who suffer the ill-effects of indoor air pollution the most resulting very costly to women in terms of morbidity, disability and days of reduced productivity from both acute and chronic illness. In addition, the economic and social perceived side-effects of ill health for women in many low-and middle income countries go considerably beyond the poor health of the women. Rather, they spill-over onto the health of the rest of their family especially young children whose health status and survival depend in important ways on the health of the mother. Young children are especially at risk to all three forms of the environmental issues such as unsafe water, and diarrhea putting them into a cycle of infection, malnutrition, respiratory problems (pneumonia, asthma) and retarded growth and development. In addition to the direct impact of air pollution on health, there are other problems associated with the emission of pollutants into the atmosphere. Best known is the issue of global warming and associated impact plus the phenomena of acid rain.

Globally, the pollution of water supplies is probably responsible for more human illness than any other environmental influence. The diseases so transmitted are chiefly due to microorganisms and parasites (United Nations, 2012). Among the various water-borne diseases, the notably examples are malaria fever, dengue, hepatitis A and E, typhoid and paratyphoid fever, dysentery, cholera, schistosomiases, and diarrhoea which results rapidly in massive fluid depletion and death in very large percentage of untreated cases (United Nations, 2006). .

At least 98% of the people in rural areas use open field for defecation WHO (2005). This practice is time-

honoured and is considered harmless. An average Nigerian villager is averse to the idea of using locally-made latrines. They considered the use of modern toilets is mainly for city dwellers considering the level of their ignorance that faeces is infectious and pollute water and soil and promote fly breeding resulting in spread of diarrheal and dysentery diseases. The average villager is not aware of that mosquitoes breed in collection of waste water and later resulting in malaria fever. The solid waste (refuse) including the animals' dung is invariably thrown into the front of the houses where it is permitted to accumulate and decompose and result in environmentally burden of diseases. Epidemics of food-water borne diseases such as cholera, gastroenteritis, typhoid, and guinea worm have been due to the cultural practices of using dug wells or step-well for unsafe water sources in the towns and villages. Rural houses are practically the same all over the country in Nigeria. They are usually damp, ill-lighted and ill-ventilated with small hole as window if provided for security reason. Absence of separate kitchen, toilet, bathroom and drainage are characteristics features of an average rural house. Animal keeping is very common in villages. Infrequently, human beings and animals live under one roof resulting in filthy environment as routes for food-water borne diseases and air pollution problems for the inhabitants.

Reducing the burden of environmental related health problems

The most cost-effective measures that can be taken to enhance health in low-and middle income countries are to assess the outdoor air pollution by examining the amount and types of pollution and mode of dispersion, the health impacts of reduction in particulate matters, time and cost to implement reduction, the values of those health benefits, and how the benefit compared to the cost of the intervention (Downie, Fyfe & Tannhill, 1990). In the developing world and other cities, the first measure that are taken to reduce outdoor air pollution include the introduction of unleaded gasoline, low smoke lubricants for two stroke engines, the banning of two stroke engines, tightening emissions from public vehicles, inspection of vehicles and reducing the burning of garbage. It would also reasonable to ensure that governments use their regulatory authority to incorporate information about outdoor air pollution in their policies on transportation and industrial development. Furthermore, it will also much more cost-effective for developing countries to put in place cost-effective approaches to minimising outdoor air pollution considering health effects by taking into account domestic and industrial pollution.

Considering the sources of pollution, cooking devices can be improved by demanding for less polluting fuel at home and use solar cooking and heating. Mechanism for venting smoke can be built into the house by moving away the kitchen from the main part of the house. People can also change their behaviours to reduce pollution by using dried fuels, proper maintenance of their stoves and chimneys, and keep children away from the cooking areas. Public policy can also play a helpful role in trying to reduce indoor air pollution. The public health sector for example, information and education about indoor air pollution using the school system, the media and the community. The government can also use tax policy the cost of cooking appliances and fuel that will reduce air pollution. Government could also under surveillance of the problem set standard for the indoor and outdoor air pollution. However, this may go beyond the capacity of inhabitants in the low-and middle income countries. The most-cost effective approach to reduce indoor air pollution in sub-Sahara and South Asia will be to promote the use of improved and maintained stoves, promote the use of better fuels such as kerosene and gas with good qualities. There is need to involve women as the end-users to help assess need and design approaches towards uptake of better cooking appliances. There is need to promote demands for better stoves and fuels to encourage the development of competitive suppliers, market choice and establish national and local policies that encourage the needed behavioural changes in the domestic management of stoves and fuel.

In most cases, water pollution takes place by the industrial or domestic waste-water discharger or even by the surface run-off from the agricultural field and mined area. Thus, the principal method of water pollution control is centred on the waste water treatment process. The conventional waste-water treatment system has three major steps namely primary, secondary and tertiary treatments (WHO, 2006).The objective of the primary treatment is the removal of pollutants such as total solids (dissolved and suspended), nitrates and phosphate, oil and grease and toxic metals and significant others. The secondary treatment focuses on the removal of mushy mixture of living and dead organisms and their waste products at the bottom of a treatment tank constitute the biologically active sludge. The tertiary advanced treatment considers the purification processes by the time waste-water passes through the primary and secondary stages of treatment.

Improving sanitation reduces the prevalence of several intestinal worms including ascaris and hookworm. Improving water supply with good bacteriological quality, water quantity, sanitation and promotion of hygiene can reduce the number of diseases such as trachoma, schistosomiases and dracunculiasis. As noted earlier, many of the pathogens that are water-borne are also carried on food. Thus, sanitation has a large potential impact on reducing those pathogens. Another important impact is that the greatest effects of investment in water on health are realized when people have connections in their homes with less diarrhea in homes with an individual water connection than in homes that got their water supply from public stand-pipe (Cairncross & Valdmanis, 2006). Thus, hygiene promotion on simple message about hand washing habit in the families is highly essential. Studies have been revealed significantly the impact of washing on the reduction in acute respiratory infection (Cairncross

& Valdmanis, 2006).

Future challenges on the global reduction of burden of environmental related health problems

One important challenge to reduce the burden of disease considering hygiene, water sanitation, outdoor and indoor air pollution has to do with population growth especially in many developing countries. As the population grows through urbanisation, the low-and middle income countries would not be able to provide the infrastructure needed for improved water supply and sanitation, manage the pollution that is related for example, to increased use of energy and greater use by better-off people of automobiles. The poorly governed societies may unable to manage and regulate industrial forms of pollution that could further harm air and water qualities.

Furthermore, more difficult problems of indoor air pollution and health impacts of unsafe water and sanitation exact a larger tool on rural people than urban people, on the poor rather than the better-off, and on women and children. Thus, many countries need to explore ways to reduce indoor air pollution and improve safety of the water supply through community-based approaches that could link the public, private and NGO's sectors with community focusing mainly on women and children.

People should be better informed about the burden of environmental related health problems .At the societal level, people and community need to understand more about links between their health and the environment. At natural, regional, local and family level, people also need to be more aware of the solutions to the environmental related health problems that might be available to them. The need for better and more information about environmental health issues and options for addressing them will be especially important among the poor, poorly educated and the rural populace especially women. Another challenge of addressing environmental health issues efforts to address them generally requires action out the health sectors. For instance, the danger of contamination of water supplies with the kind of bacteria which are to be found in sewage and its effluent is an ever-present problem which can be overcome only by the constant vigilance of the sanitary authorities and the cooperation of the public. Urban water supply systems and environmental sanitation programme are under control of both the public and private companies in the towns and villages. Indoor air pollution can best be addressed by working with families and communities to change the approaches to cooking and the use of fuel for cooking and heating. Outdoor air pollution comes from among other things, from industrial plants and vehicles, the control of which depends on an array of economic and health policy matters beyond the scope of the health ministry.

Conclusion

Environmental health issues have a large impact on the global burden of diseases. These impacts occur at the individual, household, community and global level. The risks of these environmental factors are greater for more women and their children due to their exposure to indoor air pollution largely from cooking on unventilated stove with the burning of solid biomass fuel or coal and to poor quality water. The risks of environmental impacts on health are greater in the low-income countries of Africa and Asia. The risk factors are significant causes of illness and untimely death from certain parasitic infections such as worms, diarrhea and acute respiratory infections among children. It is therefore that improvement be made in water, sanitation and hygiene towards meeting the MDGs in the 21st Century. The sources of outdoor air pollution are many and vehicle emission is among the most important in most cities. Poor sanitation allows pathogens in human wastes to spread and unsafe water carries pathogens. The inadequate safe water supply prevents people from engaging in appropriate hygiene practice. Poor hygiene practices including open defecation and failure to engage in hand washing, are common in the developing world, especially among functional adult illiterates, semi-literates and children.

Recommendations

Towards reducing the burden of disease as environmentally related-health issues, it was therefore recommended that:

1. Efforts should be made to reduce pollution and enhance health by eliminating leaded gasoline.
2. There should be an elimination of smoke engines that require the use of gasoline.
3. The strengthening emission standards and shifting vehicle fuel to natural gas need to be revisited.
4. People in the society should promote the use of improved stove using pressure or gas as the most cost-effective approach to reduce indoor air pollution.
5. There should be an investment in low-cost sanitation and stand-posts for water and promo hand washing to reduce the burden of food-water borne infections.
6. The Government should ensure to use their regulatory authority to incorporate information about outdoor air pollution in their policies on transportation and industrial development.
7. It will also much more cost-effective for developing countries to put in place cost-effective approaches to minimising outdoor air pollution considering health effects by taking into account domestic and industrial pollution.
8. There is need for better and more information about environmental health issues and options for

addressing them will be of importance among the poor, poorly educated and the rural populace especially women.

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