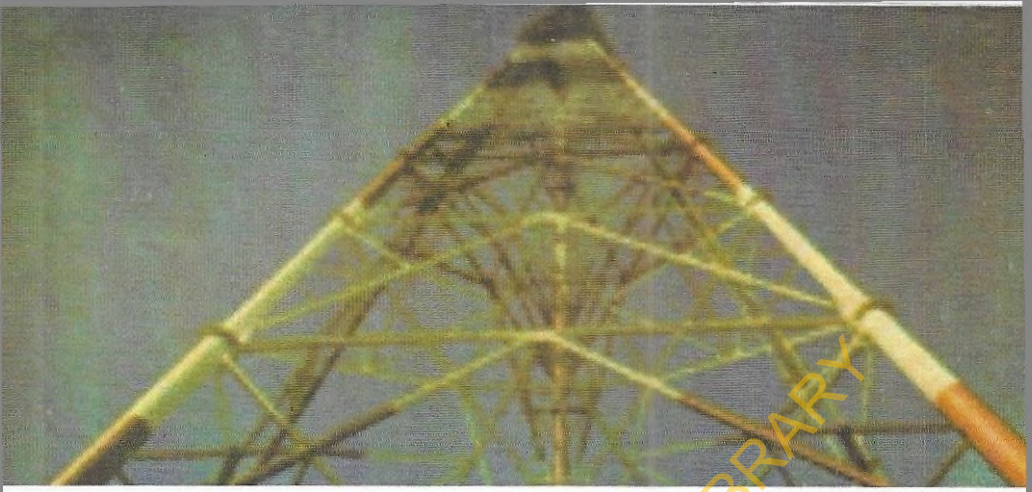

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Promoting Environmental Health Through Information Communication Technologies (ICTs) To Improve Quality of Life among Nigerians

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Abstract

Nigeria with a population of over 120 Million people is facing numerous environmental health challenges resulting from urbanization, over population and all kinds of pollution(air, water and soil) which are some of the resultant effects of man's interaction with his environment. "environmental pollution poses a challenge to the social and economic development of the regions and communities it affects". In other words, environmental challenges constitute a major issue that is affecting Nigeria and the issue of concern is promoting sustainable environmental development. This paper reviews the potential environmental health risks affecting the people like air pollution due to burning of waste and poor waste disposal system, lack of access to safe drinking water, poor urban development resulting into environmental health risk practices like open defecation, lack of proper sewage disposal system and waterways contamination with organic pollutants particularly pesticides. The paper explores the potential contribution of effective communication through information and communication technologies(ICTS) in promoting safe environmental health in order to improve quality of life among Nigerians. The paper, then recommends various benefits from the dissemination of safe environmental health practices, using ICTs- based approaches to improve the quality of life among Nigerians.

Introduction

Nigeria with a population of over120 Million people is facing numerous environmental health challenges resulting from urbanization, over population and all kinds of pollution(air, water and soil) which are some of the resultant effects of man's interaction with his environment (Omofonmwan and Osa-Edoh, 2008). Soskolne, Andruchow and Racioppi, (2008) observe that

"environmental pollution poses a challenge to the social and economic development of the regions and communities it affects". These environmental challenges constitute a major issue that is affecting Nigeria. They have become issues of concern in promoting sustainable environmental health development among Nigerians(Ibrahim and Babayemi, 2010). The environment, being the totality of all external conditions to which an organism is subjected, remains a composite of behavioural settings which greatly affects our health. Up till recently, mankind has been solely interested in exploiting the natural resources in the environment without much consideration on the effects of such exploitation and uses. With the efforts of the environmentalists, it has now been realized that human health stands a greater risk unless efforts to protect the environment receive serious attention(Owoeye and Sugbon, 2012). A healthy environment is essential to the health and well-being of the planet and its inhabitants who depend on it for the air they breathe, the water they drink as well as the food they eat (WHO/UNEP, 1986). Conversely, an unhealthy population produces less and may be forced into practices that will damage the environment. Inadequate or lack of access to regular supply of food and uncontaminated water, indiscriminate sewage and refuse disposal, laissez-faire attitude of the people and lack of government funding bring about unhygienic environment that culminate in ill health (Brundtland, 2003; Omole and Owoeye, 2006; Owoeye and Omole, 2012).

Owoeye (2010) asserts that problems of environmental deterioration emanate from poor environmental sanitation. In a study of environmental health problems in Akure, Ondo, State, Nigeria, findings reveal that: "poverty tends to breed poor environmental and unhygienic conditions that have great impact on human health". This is because the poor are incapable of paying for the required amenities for a healthy living, most especially, quality housing, thus they become vulnerable to health hazards. Other essential indices to measure unhealthy environment include inadequate sanitary and waste disposal facilities, lack of coordinated health and environmental safeguard, air pollution, over-consumption of natural resources, population sprawl, intensive industrial development, climate changes, and stratospheric ozone depletion. The present level of poor sanitary conditions of the environment has subjected health and life sustainability to risk. The incessant and indiscriminate disposal waste is extremely hazardous to environmental health and has brought about environmental pollutions and an increasing ill-health and epidemic of diseases which have led to loss of human lives(Babanyara, Usman and Saleh, 2010). Hence, protecting the health of the environment is necessary due to rapid growth of urbanization. Thus, developing efficient environmental management is a step in the right direction.

Nweke and Sanders (2009) citing findings from World Health Organization (WHO), also reveal that about one-third of Africa's disease burden is attributable to environmental hazards. According to the finding, the major contributory risk factors to environmental disease burden in the continent are traditional environmental health hazards such as lack of access to safe water, indoor air pollution from solid fuel combustion, and lack of sanitation and hygiene. Current environmental health hazards from fast economic growth revolution due to rapid urbanization and industrialization have contributed to high environmental disease burden in the continent(World Bank, 2008). This is evidenced by the combination of preindustrial- and industrial-era environmental health issues confronting many African communities. Hence, promoting the health and well-being of the people will depend on strategies to prevent, control and manage environmental health hazards and risks.

Importance of Environmental Health

In a general term, environmental health has to do with the interactions between living beings (humans, animals, plants, bacteria, and others) and the environment (air, water, soil, sun, and others), and the subsequent impact on health and quality of life. Earlier studies from Olaniran, Akpan, Ikpeme, and Udofia, (1994) viewed "environmental health" as the area of Public/Community health that is primarily concerned with evaluating the relationship between environment and health. It thus seeks to prevent, control, disrupt or eliminate environmental conditions or factors inimical to human health or the environment. It includes sub-specialties like water supply and sanitation, solid waste (refuse) management, air pollution, water pollution, environmental toxicology, environmental epidemiology, radiation, health, toxic and hazardous waste management, occupational health and safety, food sanitation, noise pollution and environmental health administration.

World Health Organisation (1993) from another perspective viewed "environmental health" as those aspects of human health, including quality of life, that are determined by physical, biological, social and psychological factors in the environment. It also refers to the theory and practice of assessing, correcting, controlling and preventing those factors in the environment that can potentially affect adversely the health of present and future generations. Based on the views of studies above, we can understand that environmental health is human health and well-being in a safe and healthful environment affected by risks like air pollution, water pollution, noise pollution, solid waste disposal, and diseases related to uncleanness of the surroundings injurious to human health. Hence, the goal of environmental health, according to Butler (2003), is

to identify what in the environment is causing health concerns/problems, how and where people are being exposed, what can be done to eliminate or minimize the exposure and to ensure continued safety of the public. In Nigeria, knowledge of environmental health is crucial because there are many environmental health risks from air pollution, unsafe and contaminated water, sewage and waste disposal and other waste from industries and oil exploration (Butler, 2003).

Iwejingi, (2011) citing Asthana and Asthana, (2006) sees increase in population as a major factor affecting environmental health. He emphasizes further that:

Population impacts primarily on the environment through the use of natural resources and production of waste and is associated with environmental stress such as reduction of ecosystem complexity, loss of biodiversity and the alteration of the all important biogeochemical cycle.

Hence, environmental health in Nigeria is being affected by factors such as economic growth, population growth, urbanization, intensification of agriculture, rising energy use and transportation. Therefore, environmental health changes in Nigeria are a result of the dynamic interplay of socio-economic, institution and technological activities (Iwejingi, 2011).

Theoretical Framework

Successful behaviour change strategies take many forms. Theory and research suggest that the most effective behaviour change interventions are those that use multiple strategies and aim to achieve multiple goals of awareness, information transmission, skill development, and supportive environments and policies. The emergence of information communication technology tools such as the Internet, wireless technology, and personal digital assistants have expanded the range of theory-based strategies available for effective behaviour change in health care and community settings. Behavioural interventions should be sensitive to audience and contextual factors, and recognize that most behaviour change is incremental and that maintenance of change usually requires continued and focused efforts(Glanz, Rimer and Viswanath, 2008) This study is concluded on two basic theories namely that of the social cognitive theory and the social ecological model.

Social Cognitive Theory

This theory draws attention to the social rather than the individual aspects of communication and behaviour, although it is still largely concerned with how

individuals make sense of the social environment and decide what to do. Social Cognitive theory says that people learn by observing what other people do; considering the consequences experienced by those people; rehearsing what might happen in their own lives if they followed the other peoples' behaviour; taking action by trying the behaviour themselves; comparing their experiences with what happened to the other people and confirming their belief in the new behaviour(Bandura, 2001).

Social Cognitive Theory (SCT) which evolves from research on Social Learning Theory describes a dynamic, ongoing process in which personal factors, environmental factors, and human behaviour exert influence upon each other. According to the theory, three main factors affect the likelihood that a person will change a health behaviour: (1) self-efficacy, (2) goals, and (3) outcome expectancies. If individuals have a sense of self-efficacy, they can change behaviours even when faced with obstacles. If they do not feel that they can exercise control over their health behaviour, they are not motivated to act, or to persist through challenges. As a person adopts new behaviours, this causes changes in both the environment and in the person. Behaviour is not simply a product of the environment and the person, and environment is not simply a product of the person and behaviour.

The Social Cognitive Theory asserts that people learn not only from their own experiences, but by observing the actions of others and the benefits of those actions. Hence, the theory in relation to environmental health asserts that providing information alone is not sufficient to change behaviour, rather, sustained behaviour change requires skills to engage in the behaviour and the ability to use these skills consistently and under difficult circumstances. It posits that behaviour change requires four components: (1) An informational component to increase awareness and knowledge of health risk and to convince people that they can change their behaviour (i.e. educating people about environmental pollution and showing them they can change it) (2) A component to develop the self-control and risk-reduction skills needed to prevent the behaviour (showing people what their risks are and how they can change them) (3) A component to increase an individual's self-efficacy in implementing these behaviours (specific efforts to show people how to promote environmental health) and (4) A component to build social support for the individual as s/he engages in the new behaviour (support groups) (Bandura, 2001).

Social Ecological Model

The social ecology of health model was developed to study the relationship

between human populations, disease and the physical environment in which people live and work. This model involves the social environment as fundamental contributors to health problems(Coreil, 2008). It also helps to understand factors affecting behaviour and also provides guidance for developing successful programs intervention through social environments. The model emphasizes multiple levels of influence (such as individual, interpersonal, organizational, community and public policy) and the idea that behaviours both shape and are shaped by the social environment(Sallis, Owen and Fisher, 2008). In social ecological model, healthy behaviours are developed through a complex interplay of determinants at different levels. These multiple levels of influence interact across levels to affect the environment (Coreil, 2008). The increase in population will lead to increase in environmental health hazards which will consequently affect the environmental health. Hence, the principles of social ecological model are consistent with social cognitive theory which suggest that creating an environment conducive to change through multiple information provision channels like ICTs is important to making it easier to adopt healthy behaviours that will promote environmental health.

Factors that Contribute to Environmental Health Problems

Human health and wellbeing is appreciably affected by the environment. Iwejingi, (2011) citing Asthana and Asthana (2006) asserted that malnutrition and diseases caused by contaminated environment, human wastes and airborne diseases form the core of the disease pattern of the developing world, including, Nigeria. This means that several cases of ill-health, morbidity and shortening of lifespan were as a result of contaminated environment due to human activities. Therefore, environmental degradation exerts significant pressure on human health. Exposure to them can cause cancer, respiratory, cardiovascular and communicable diseases, as well as poisoning and neuropsychiatric disorders (OECD, 2008). Hence, environmental health problems experienced today can be largely attributed to human activity and/or nature. There are several factors affecting environmental health which are common in Nigeria and other developing countries like air pollution and lack of sanitation and hygiene, poor waste disposal system, open defecation practices, lack of accessibility to safe drinking water, lack of proper sewage disposal system, poor preparation of food and eating habit and waterways contamination with organic pollutants particularly pesticides. Environmental pollution can be categorized into three groups. These are air or atmospheric pollution, aquatic or water pollution and land or surface area pollution (Omofonmwan, and Osa-Edoh, 2008). We shall review these four factors and their risk to environmental health.

Air Pollution

Air pollution is one obvious environmental health threat contributing to a number of illnesses, such as asthma and in some cases leading to premature death. There is concern among health professionals that children are more vulnerable to air pollution than adults, and increased rates of infant mortality have been recorded in highly polluted areas. Global statistics show that air pollution is estimated to be responsible each year for approximately 800, 000 premature deaths, or 1.4% of all deaths worldwide and 6.4 million years of life lost, or 0.7% of the world total. This burden of disease is more prominent in developing countries (OECD, 2008).

Studies reveal that issues on air pollution have become worrisome in the last few decades, particularly in Africa's urban centers because of increased rates of urbanization and industrialization (UNEP 2002). One of the most contributors to air pollution in Africa's cities including Nigeria is automobile emissions. Finding of a study conducted in Dares Salaam, Tanzania by Jackson, (2005) as cited by Nweke and Sanders, (2009) reveals that

the measured sulfur dioxide (SO2) levels (hourly mean SO2 concentration range, 127–1,385 μg/m3) in parts of the city (eight locations) exceeded the 1987 WHO daily hourly average guideline for SO2 (350 μg/m3). High levels of SO2 and suspended particulate matter (PM) were both correlated with traffic flow. Other air toxics typically emitted from automobile exhausts include volatile organic compounds and nitrogen oxides.

Several studies reveal that most communities or populations in developing countries like Nigeria are exposed to high levels of air pollution that exceed recommended limits. Another contributory factor to air pollution is industrial activity. The air pollution from this sector is profound in areas with industries involved in high production, processing and mining activities. An environmental assessment for the World Bank's Copper Environment Project in the Zambia copper belt reported that exposure to SO2 and PM was the "primary environmental health issue" in certain communities within the region due to Cusmelter plants which release an estimated 300,000–700,000 tons of SO2 annually. Another earlier finding from a study in South Africa attributed widespread asbestos contamination of communities located around mills and mines to asbestos mining activity due to exposure to airborne asbestos fibers from abandoned, unrehabilitated mines and randomly discarded asbestos fiber dumps (Nweke and Sanders, 2009).

Other types of industry with potentially significant contributions to air pollution include pulp and paper mills, cement industry, organic chemical industries, battery production, metallurgical industry, energy production, and oil and gas production and refining which are especially concentrated in the South South region of Nigeria and in Ibadan and Lagos which are in the Western part of the country. Studies also reveal the contribution of other domestic factors to air pollution is the burning of domestic fuels used in the home like charcoal, wood, coal etc.

Air pollution is a major environmental problem in developing countries which have adverse health effects resulting from short-term exposure or chronic health impacts resulting from long-term exposure. Health problems linked to air pollution range from minor eye irritation to upper respiratory symptoms, chronic respiratory diseases such as asthma, cardiovascular diseases and lung cancer which may be fatal during medical treatment. The concentration of pollution in the air, length of exposure, the synergy with other air pollutants, as well as individual susceptibility will determine the level of risk that affect each person. Hence, environmental risk like air pollution can have adverse effect on the health of people particularly those vulnerable to environmental pollution like children, pregnant women, young people, adults and physically challenge people(OECD, 2008).

Nweke and Sanders, (2009) documented some epidemiologic studies conducted to evaluate the health effects (particularly respiratory effects) of indoor and outdoor air pollution exposure on African populations. Some of the findings reveal facts of relationship between air pollution and the common health problems discovered in the studies. consequently, air pollution is associated with a lot of health problems which have adverse effects on the people living in countries that have been associated with increased mortality and morbidity from cardiovascular and respiratory diseases (International Agency for Research on Cancer (IARC), 2006). Some other health effects are also associated with exposure to smoke from solid fuel combustion like acute lower respiratory infections (ALRI), chronic obstructive pulmonary disease (COPD), and asthma. However, despite national and international interventions in major pollutant emissions, the health impacts of air pollution are not likely to decrease in the years ahead, unless appropriate action is taken (WHO, 2006).

Water Pollution, Sanitation and Hygiene

Studies reveal that almost 70% of the Earth's surface is covered by water, hence water is an important issue to environmental development. However, the

Earth's water resources and potable water supply are in danger of becoming contaminated. When water becomes contaminated, it is considered polluted. There are essentially two different forms of water pollution: "oceanic water pollution and drinking water contamination". These sources of water provision are important to human survival. Studies reveal that over one billion people in the world lack access to clean water and more than twice lack access to basic sanitation. Inadequate water and sanitation services, the second most common cause underlying medical conditions that lead to child mortality, impose considerable illness and coping costs on households in developing countries. These costs fall disproportionately on the poor, women and children. One of the Millennium Development Goals (MDGs) is to reduce the number to half of people in the world who live without access to adequate water and sanitation services (Pattanayak, Poulos, Yang, and Patilc, 2010).

In a study by Guinness and Nagle (2002) as cited by Iwejingi, (2011) it was reported that the world's fresh water is closely linked to human health. It was further stated that 25,000 people die every day because of poor water. The 1,700 million people lack clean water (1200 million lack proper sanitation); 3 million people die of diarrhea each year and 200 million people suffer from schistosomiasis each year.

Water pollution is a key environmental health risk and unsafe drinking water and untreated water kill thousands of people a year, most of them children. One of the major environmental health risks in Nigeria comes from unsafe drinking water due to poor water supply. Studies show that sources of drinking water in Africa are ground-water, surface waters like streams, lakes, rivers and sometimes rainfall. The increase urbanization and industrialization is affecting the availability of some of these natural sources of water provision. Studies documented by Nweke and Sanders, (2009) reveal that "the extent to which surface water and groundwater quality in Africa is affected by development activities has not been extensively studied or reported". Nevertheless, other findings show that sources of pollution that affect both surface water and groundwater quality, including sewage-treatment facilities, pulp and paper mills, fertilizer factories, abattoirs, textile and cloth manufacturing entities, mining activities, agriculture, and chemical industries(WHO/UNEP, 2008). Hence, in Nigeria, as in many other countries, water pollution results from urbanization, industrialization and intensification of agriculture, and others. There is a wide spread pollution by sewage, nutrient, toxic metal, industrial and agricultural chemicals as well as domestic sewage (Iwejingi, 2011).

Akpabio, (2012) further stated that in Nigeria the records on general access to water supply, sanitation and waste disposal facilities by the citizens remain very poor. This situation shows gross inadequate waste disposal system, air and water pollution and inadequate water and poor sanitation services.

The Table 1 below shows the situation in 2007 by National Bureau of Statistics which might not have improved till now.

Indicators	NE	NW	NC	SE	SW	SS	National	Rural	Urban
Safe water source (%)	30.7	50.6	48.9	40.8	73.5	45.9	51.4	40.4	73.4
Safe sanitation (%)	45.4	61.6	46.6	69.5	62.1	55.0	57.6	47.6	77.0
Improved waste disposal (%	6.2	10.7	8.9	9.0	36.0	13.2	16.1	4.8	37.9
Water treatment before drinking (%)	4.6	7.5	14.1	11.4	20.4	5.8	11.3	14.5	9.7

Poor Urban development

The Nigerian environment today presents a grim litany of woes. Many Nigerian cities are especially vulnerable to flooding, erosion and storm damage. Invariably, natural disasters in cities kill or injure members of low-income groups disproportionately because the poor often live in unsafe housing on vulnerable lands (Lawanson, 2008). This is due to the shift of her populations from rural to urban areas. This rapid rate of urbanization has engendered several challenges and problems similar to situations in other parts of the world. According to the Human Development Report (2004) as cited by Lawanson (2008), 45.9% of the 120.9million population of Nigeria resides in urban centers. This population grow at the rate of 4.8% annually which means that by 2015, more than half of the nation's population would be urban dwellers.

The resultant effect of poor urban development will lead to other environmental health risk practices like open defecation, lack of proper sewage disposal system, poor preparation of food and eating habit and waterways contamination with organic pollutants particularly pesticides.

Importance of ICTs in promoting environmental health

The importance of information communication technologies (ICTs) in promoting environmental health cannot be overstressed. Ogbomo and Ogbomo, (2008) citing Crede & Mansell (1998), stress the crucial importance of ICTs for sustainable development in developing countries. The significant contribution of ICTs to developed countries is evident in the multi-dimensional changes of all aspects of their development in economics, education,

communication, and travel (Thioune, 2003 cited by Ogbomo and Ogbomo, (2008). These changes have been observed in the fast rate of sending and receiving information. According to their findings, ICTs have made it possible to quickly find and distribute information. Hence, Thoiune (2003) as cited by Ogbomo and Ogbomo, (2008) indicates that many initiatives have been taken at the international level to support Africa's efforts to develop a communication infrastructure and these efforts are designed to enable African countries, including Nigeria, to find faster ways to achieve durable and sustainable development.

Ogbomo, Obuh, and Ibolo, (2012) define "information and communication technology (ICT) as modern tools and equipment that are used for the processing, storing, disseminating and utilization of information. Information and communication technology include computers, monitors, moderm, keyboard, mice, scanner and printers, television, radio, mobile phones, internets, emails etc". According to Aina (2004), as cited by Ogbomo, Obuh, and Ibolo, (2012) "information and communication technology is concerned with the technology used in handling, acquiring, processing, storing and disseminating information". From another perspective, the Federal Ministry of Education, (2010) defines ICT as encompassing all equipment and tools (inclusive of traditional technologies of radio, video, and television and the newer technologies of computers, hardware, firm-ware, and others.), as well as the methods, practices, processes, procedures, concepts, and principles that come into play in the conduct of the information and communication activities. Hence, the importance of ICTs to human development cannot be over emphasized. In Nigeria, some of the objectives of the National Policy on information technology are to enhance the effectiveness of environmental monitoring and control systems, to create IT awareness and ensure universal access in order to promote IT diffusion in all sectors of our national life, to deploy IT for the study and control of epidemics, to deploy IT as a research tool and means of disseminating information, to use IT-based healthcare information system to educate on preventable diseases, to make tools available to predict environmental problems in advance for necessary action and to achieve environmentally clean cities and rural areas. These objectives show the importance of ICTs as an effective communication strategy in promoting information dissemination for environmental health sustainability.

Information communication technology is "the use of manmade tools for the collection, generation, communication, recording, re-management and exploitation of information. It includes those applications and commodities, by which information is transferred, recorded, edited, stored, manipulated or

disseminated" ICTs are also credited with the ability to transform and make significant changes in sustainable economic growth and support environmental health development(Ogbomo and Ogbomo, 2008). The use of ICTs contributes immensely in advancing information dissemination within a developing society. Annan (2002) as cited by Ogbomo and Ogbomo, (2008) notes that:

the information society is a way for human capacity to be expanded, built up, nourished, and liberated by giving people access to tools and technologies, with the education and training to use them effectively. There is a unique opportunity to connect and assist those living in the poorest and most isolated regions of the world.

Apulu and Latham, (2011) citing various studies define ICT as technologies that enable recording, processing, retrieving and the transmission of information or data. ICTs are technologies that support the communication and co-operation of "human beings and their organizations" and the "creation and exchange of knowledge (Herselman and Hay, 2003). ICT is a range of technologies that allow the gathering, exchange, retrieval, processing, analysis and transmission of information. In order words, ICT can be described as any tool that facilitates communication, process and transmit information and share knowledge through electronic means (Yu, 2010). ICT encompasses a range of electronic digital and analog devices such as radio, television, telephones (fixed and mobile), computers, electronic-based media such as digital text and audio-video recording, and the internet, but excludes the non-electronic technologies (Rwashana and Williams, 2006). ICT is "an umbrella term that includes computer hardware and software; digital broadcast and telecommunications technologies as well as electronic information repositories such as the World Wide Web or those found on CD-ROMs" (Selwyn, 2002). ICT is a strategic tool that allows users to become more efficient and effective (Ssewanyana, 2009). Hence, ICT increases the supply of information and plays a key role in information sharing and dissemination. It removes distance and time constraint in accessing required information flows and also reduces the cost of production as knowledge is produced, transmitted, accessed and shared at the minimum cost. There is a reduction in the degree of inefficiencies and uncertainty with the use of ICT because it enables businesses to interact more efficiently (Apulu and Latham, 2011).

Shanker (2008) as cited by Apulu and Latham, (2011) ascertains that the use of ICT in many organizations has assisted in reducing transactional cost, overcome the constraints of distance and cut across geographic boundaries,

thereby assisting to improve coordination of activities within organizational boundaries. ICTs play an important role in acquiring, creating and managing knowledge as they enable the diffusion of information and help to improve communication. ICTs have been seen by Ndukwe, (2002) as cited by Apulu and Latham, (2011) as the basis for human existence from time immemorial and this has driven man to continuously seek ways to improve the processing of information and communicating such information to one another, irrespective of distance and on a real-time basis. In addition, ICTs are the bedrock for the survival and development of any nation in a rapidly changing global environment. New ICTs can offer real opportunities to improve the quality of community life. It is also important to deepen the level of reflection on community dynamics and on the constraints encountered when introducing and using ICTs for development. A healthy information society is concerned with getting reliable and timely information to its members. Making people aware of the benefits derivable from the use of ICTs will help to make the society a healthy one (Apulu and Latham, 2011)

Benefits of ICTs Strategies in Environmental Health promotion

The importance of information cannot be overemphasized. People need information to plan and carry out their decisions. More than 90 percent of Africa's population could greatly benefit from information on better choice of food, safe water and basic nutrition, child care, family planning, immunization, prevention and control of endemic diseases. The combination of modern communication devices could play significant roles in the collection and dissemination of global information (Tiemo, 2006). There are two types of ICTs strategies: computing and telecommunication information technology. This paper shall examine the telecommunication technology systems of websites, Internet/electronic mail (e-mail) and mobile phone in environmental and health promotion.

Websites

Studies reveal that the use of websites is one of the newest and most popular mediums for distributing health information. Majority of people now use the Internet to access health information. Websites offer several advantages over traditional written materials. The advantage of using websites is that information stored on it can be updated by the web manager while information not available on one web can be accessed from another web (Berland, Elliott, Morales, et al, 2001). In a study of health information on websites by Berland, Elliott, Morales, et al, 2001, it was revealed that websites with health information generally provided about half the information experts felt was critical to specific health topics. Hence, web pages can be designed with

various environmental health massages for sustainable environmental development.

Internet

The Internet, according to Adesanya, (2002) as cited by Ogbomo and Ogbomo, (2008) is increasingly becoming the solution to many information, problems, information exchange, and marketing .The Internet is a mixture of many services with the two most commonly used being electronic mail (e-mail) and the World Wide Web (www). It plays a significant role in education, health, political processes, agriculture, economy, businesses and other development. Internet connectivity gives advantage of doing business all over the world without physical contact with the buyer or the need for a business intermediary. (Woherem, 2000 cited in Ogbomo and Ogbomo, 2008). These advantages show the opportunity of using internet services to promote environmental health in Nigeria. The Internet can be used to send messages to users on how to prevent environmental health risk behaviours like dumping of waste in drainages, public places like roads and water ways. Also, people can be educated to avoid the practice of open defecation in public places like express ways and open fields.

Mobile Phones

Mobile phones are telephone system that can move or be moved easily and quickly from place to place. Mobile phones are now the ICT that is reshaping and revolutionizing the communications globally. Its impact on the economic activities of nations, businesses, and small entrepreneurs is phenomenal. This new technology has been reshaping the material basis of the society as well as bringing about a profound restructuring of economic, political, and cultural relations in developing countries, including Nigeria(Ogbomo and Ogbomo, 2008).

Ogbomo and Ogbomo, (2008) citing Oji-Okoro (2006) supported this view by stating that mobile telephony usage by individuals enables them to communicate with loved ones, clients and business associates. For large businesses, it is a means of providing a service that leads to an increase in profits. Mobile phones provide employment for many who could have been idle through selling of handsets and making calls at a cheap rate for people. Findings show that before 2001, Nigeria had one of the lowest telephone penetrations in the world 0.35% compared to the highest mobile phone penetration in the world. But since the digital telecommunication system was introduced in Nigeria in 2001, the tele density increased from 0.7% in 2001, to 24.2% by the end of 2006. Also the importance of telecommunication has led

educational institutions and other organizations to acquire different categories of ICTs like mobile set lines and modem cellular phones (Ogbomo, Obuh, Ozoemelem and Ibolo, 2012). This shows that a lot of opportunity abounds in the use of mobile phone in text messaging environmental health information among Nigerians.

Other Media Channels

The dissemination of environmental health information can be done using other media, such as video tapes, DVDs, Audio tapes, and CDs. These forms of communication are generally more easily understood by people of varying literacy levels. They can be used to communicate environmental health information to the populace. The accelerated increase in video film product consumption among Nigerian due to its emotional as well as educational strategy of dealing with sensitive or embarrassing health issues shows its influence as a channel of communication.

Osborne (2005) recommended that health information disseminated through these channels should use personal stories for message effectiveness and easy understanding rather than presentations of complex data and information. He emphasized further that key messages should be limited to not more than five key points which should each be emphasized at the beginning, middle, and end of the presentation. The tone of the message should engage the audience without being too emotional and the content of the messages should be culturally appropriate for the expected audience(s). The sound and visual quality should be audible and clear to achieve the required impact on the audience (Ogbomo and Ogbomo, 2008).

Conclusion

Information Communication Technology is an evolving technology especially in the developing countries like Nigeria. Everyone must be ready to upgrade his skills due to ICT dynamic nature. Hence, the environmental health through ICTs in Nigeria is desirable. There are various policy options for improving environmental health in Nigeria as practiced by other countries in the area of air quality policy, which will involve regulating fuel quality or imposing stringent standards on pollutant emissions. Many of such policies have been reviewed to see how effective they are in reducing air pollution. Countries like France and Mexico have tested the effectiveness of putting particle filters on private and public vehicles. In both countries, these interventions were found to induce significant health benefits, which were largely greater than their costs(Akpabio, 2012).

Recommendations

There is need to create awareness about ICTs usage among the populace, also there is a need for training so that these network experts acquaint themselves to the dynamics in network engineering to curb and reduce network fraud and other challenges related to computer networks.

Effective use of ICTs in promoting environmental health can, therefore improve quality of life, among Nigerians. Information on websites should be presented in a well-organized way, and the number of distractions, such as background patterns and links on the page, should be limited. There should be proper direction on information promoting various environmental health practices for possible adoption. Websites should undergo usability testing that demonstrates that the Nigerian users can find needed information without difficulty (Osborne, 2005). Application with novel ICTs techniques for studying environmental pollutions and potential link to human health is very important. Approaches to enabling an understanding of the impact of ICTs applications to environmental health to improve human health become necessary. Hence, Promoting environmental health in Nigeria needs appropriate and workable policy that will encourage innovation in the use of ICTs for information dissemination to enlighten the people on the negative impact of environmental hazards while encouraging positive behaviour toward environmental health values. People need to be sensitized in the use of Internet facilities for sourcing various information and services. Organizations in Nigeria where the power supply is poor and epileptic despite government continuous promise of providing regular power supply should endeavour to generate their own source of power supply. In addition, Nigeria government must endeavour to provide conducive atmosphere for organizations operating in Nigeria through steady and regular power supply for the smooth operations of ICTs activities. The government should also play a key role in improving ICTs infrastructure in Nigeria to curb online fraud and enhance the use of ICTs for positive information channels in promoting environmental health.

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