Journal of Environment and Earth Science
ISSN 2224-3216 (Paper) ISSN 2225-0948 (Online)
Vol. 3, No.2, 2013

The Impact of Environmental Contaminants on Women's Reproductive Health

NKIRU EDITH OBANDE OGBUINYA
DEPARTMENT OF HUMAN KINETICS AND HEALTH EDUCATION, EBONYI STATE UNIVERSITY, ABAKALIKI EBONYI STATE

ABSTRACT
Individuals are exposed to many environmental toxins daily in their home, workplace, community and farmland. Several studies have demonstrated that women in their physical, biological, social, cultural and technological interactions with the environment, are exposed to various harmful environmental contaminants which act as endocrine disrupters in their bodies. They tend to affect endocrine homeostasis and impair reproductive functions. When they gain access into the body , they interfere with the production, release, transport, metabolism and other actions performed by the body's natural hormones leading to hormonal disorders, reduced fertility, preterm delivery and uterine cancer later in life. Lifestyle modifications through health education programmes could help to minimize the level of exposure and risks to these environmental chemicals.
Key words: Environment, Contaminants, Women, Reproductive health

Introduction

Evidence continues to accumulate suggesting that environmental exposures adversely impact human reproductive function. Chemical exposures in the work place, homes, farms and ambient environment have demonstrated effects on women's reproductive health and concerns have been raised about a broad spectrum of factors that affect women's health including the social, biological and physical environment (Woodruff, Tracey, Janssen, Guilette and Guidice, 2012). Environment refers to everything around, both indoors or outdoors. The air One breathes, water drunk , the ground walked on, and food eaten, are all part of the environment. It comprises all the biotic and abiotic factors that act on an organism, population or ecological community and influence its survival and development (Farlex, 2011). Biotic factors in this regard refer to living organisms, their food and interactions while abiotic factors refer to non living organisms like air, water, soil, pollution, sunlight and climate (Falex, 2011). Both the biotic and abiotic factors surrounding a given population have a significant influence on the health and wellbeing of any given population (Adeola, 2004).

It is important that individuals become aware of those things in the environment which can affect their health and what can be done to help protect oneself and family. This is because, in accordance with Adeola (2004), different aspects of the environment such as physical, biological, cultural, social and technological tend to affect the health status of human population. In women, chemicals and other substances in the environment can cause serious health problems, such as cancer, lung disease, or reproductive system problems. Recent studies have revealed, that toxins in the environment play a role in conditions such as breast cancer, endometriosis, and menopause (Women's Health. Gov, 2012).

Exposure to some toxic substances including lead, mercury, arsenic, cadmium, pesticides, solvents, and household chemicals can increase the risk of miscarriage, preterm birth, and other pregnancy complications in women. These and other environmental toxins or contaminants can also harm the developing bodies of fetuses and infants (Women's Health. Gov, 2012).Contaminant is regarded as any potentially undesireable substance physical, chemical or biological that is harmful to human and other living organisms, while environmental contaminants refer to the presence of these substances in the environment mostly caused by human activities (Ka'bu, 2011). They are substances that when accidentally or deliberately introduced into the environment, may have the potential to harm people, wildlife and plants (Health Canada, 2012). According to them, these contaminants enter the environment often but not always as a result of human activities.

Polluted environments increase the risk of exposure to the environmental contaminants or toxins, diseases and other agents capable of inducing illness in humans (Adeola, 2004). In his word, both the organic and inorganic pollutants affect human health. In this regard, Women's Health . Gov (2012) cautioned that Women who are pregnant or nursing or who plan to become pregnant should take special care to avoid exposure to certain chemicals. Zavos, Zarmakoupis and Zarmakoupis - Zavos (1999) identified some of the most common contaminants which are frequently encountered in the environment and which are associated with abnormal reproductive system/ function. They include arsenic, cadmium, lead, methylmercury and radio polonium (Robert, 2009). Others are pesticides, herbicides, volatile organic compounds like benzene,brominated flame retardants, bromates, chlorinated naphthalenes, dioxins and furans, perchlorate, perfuorinated chemicals in food,

toluene and chloroform, carbon monoxide, environmental tobacco smoke (ETS), dioxins and polychlorinated biphenyls (PCBs), (Association of Reproductive Health Professionals, 2010; Woodruff, Janssen, Gillette , Giudice 2010 and Health Canada, 2012). Other contaminants recognized include asbestos, ammonia, asbestos naturally occurring, chlorine, blue- green algae, ozone, pfiesteria and trichloroethylene (TCE) (Department of Health and Human Services, 2012).

Most of the contaminants in the environment are associated with abnormal reproductive /system function in women and can also contribute to some illnesses that are more common in older women (Robert, 2009). In developing areas of the world, women are considered the primary users of natural resources (Land, forest, and water), because they are the ones who are responsible for gathering food, fuel, and fodder. These women, spend most of their time working on the farms to feed their households. They tend to have a closer relationship with land and other natural resources (wikipedia, 2012).

Repeated studies have shown that women have a stake in environment, and this stake is reflected in the degree to which they care about natural resources. Even from theoretical point of view, ecofeminism says that women are closer to nature than men (Wikipedia, 2012). Consequently, these women are exposed to a lot of environmental contaminants posing great health risks to them in their course of interaction with nature. This is seen mostly in indigenous women who are mostly farmers exposing themselves to ultraviolet radiation from sunlight. Also,Urban women living in poor quality houses in their desire to be good home keepers expose themselves to pesticides which they use as household pesticides to fight against rodents and as orchard farmers, they transport the pesticides on their clothings, boots and skins(Melissa, 2006).When it comes to drug abuse, Women often abuse more than one drug and the metabolites of these drugs including cocaine, opiates, amphatamines , marijuana and tobacco can enter the fetal blood stream if a woman is pregnant. Despite wide awareness that smoking is bad for both mother and developing fetus, some pregnant women still smoke thereby exposing them to risks such as ectopic pregnancy and placenta previa both of which increase the odds of maternal mortality (Adelaide, Mines and Singer, 2011).

Large numbers of women are affected healthwise, by either of the environmental contaminants in one way or the other. This is because, broader range of chemicals including many that are associated with everyday products such as household cleansers, personal beauty care products have much impact on women's reproductive health (National Infertility Association , 2006). Some food products such as canned foods consumed by everybody both women and men alike, contain chemicals such as mercury and lead which have harmful effects on women's reproductive functioning (Robert, 2009; John, 2009 and Issabell, Elly, Nelen, Mierop, Lareboke and Greet, 2012).Moreover, women in their quest for beauty endulge in applying chemicals such as dyes, relaxers, hair sprays and conditioners on their hairs which could be contaminated with heavy metals if certain darkening agents such as lead acetate are used (Tuberose.com, 2011). Despite the high risks associated with reproductive health of women as a result of the environmental contaminants, a good number of women are still at higher risk of exposures.

Types and Sources of Environmental Contaminants

There has been an increase in human exposure to environmental contaminants both natural and synthetic, present in the environment in which food is grown, harvested, transported, stored, packaged, processed, and consumed. The physical contact of the food with its environment results in its contamination(Woodruff, Carlson, Schwartz, Giudice, 2008 and Wikipedia, 2010) . Possible environmental contaminants and their sources of contamination include radionuclides (Caesium and Strontium), polycyclic aromatic hydrocarbons (PAH) found in the air ; arsenic and mercury found in water ; cadmium, nitrates and perchlorates found in the soil. Polychlorinated biphenyls (PCB), dioxins, and polybrominated diphenyl ethers (PBDE) are ubiquitous chemicals, which are present in air, water, soil, and the entire biosphere(Association of Reproductive Health, 2010 and Wikipedia, 2012) Other contaminants like antimony, tin, lead, perfluorooctanoic acid (PFOA), semicarbazide, benzophenone, isopropylthioxanthone (ITX), bisphenol A are all found in packaging materials. Copper, or other metal chips, lubricants, cleaning and sanitizing agents have their source in processing/cooking equipment. Phytohaemagglutinin, pyrrolizidine alkaloids, grayanotoxin, mushroom toxins, scombrotoxin (histamine), ciguatera, shellfish toxins (shellfish poisoning), tetrodotoxin, among many others exist as naturally occuring toxins (Wikipedia, 2012 and Ask Jeeves, 2012).

Gaseous air pollutants appear in different concentrations. The most common gaseous pollutants are carbon dioxide, carbon monoxide, hydrocarbons, nitrogen oxides, sulfur oxides and ozone. Different sources produce these chemicals but the major artificial source is the burning of fossil fuel.They can also be emitted from volcanoes, fires and industry (Ask Jeeves, 2012). Indoor air pollution is caused by the consumption of snuff, tobacco,the use of certain building materials, cleaning products and household furniture (Wiley Job

Network, 2012; Blue Point Environmental, 2012; Department of Health and Human Services, 2012; Caren, 2012 and Adrian Environmental, 2012).

The greenhouse effect that prevents a part of the heat received from the sun and let the air back into space, heats the earth's surface in what is known as the greenhouse effect. There is a certain amount of greenhouse gases in the atmosphere that are absolutely necessary to heat the Earth, but in due proportion. Activities such as burning carbon based fuels increase the proportion of the greenhouse effect consequently leading to global warming (Wikipedia, 2012). Other gases that contribute to the problem include chlorofluorocarbons (CFCs), methane, nitrous oxides and ozone which are all emitted from carbon based fuels (Energy Information Administration, 2oo4).

Acid rain is formed when moisture in the air combines with nitrogen oxide or sulfur dioxide emitted by factories, power plants and vehicles that burn coal or oil to form water vapor containing sulfuric acid, nitric acid that fall into the ground as precipitation or acid rain (Wikipedia, 2012). When rain droplets contain high concentration of hydrogen ions ,then its pH is reduced (below7) tranforming it to acidic. As a result of high pollution in the environment, chemical gases evaporate and mix with the water molecules of the atmosphere forming acids. Thus the rain water becomes acidic in nature (Vallero, 2012 ;Squiddo, 2012 ; Buzzle, 2012 and Vallero, 2012).

Ozone is a form of oxygen that is in the upper atmosphere of the earth. The layer of ozone molecules in the atmosphere absorbs some of the ultraviolet (UV) radiation before it reaches the earth's surface, which makes life possible on earth. Ozone depletion produces higher levels of UV radiation on earth, thus endangering both plants and animals(Brown,2009 and United States Environmental Agency, 2011). Atmospheric dust (or particulate matter) is the term used to designate a combination of solid particles and liquid droplets that are in the air. Some particles are large and dark enough to be seen as soot or smoke. Others are so small they can only be detected with an electron microscope. When dust is inhaled, it can irritate and damage the lungs which would produce respiratory problems. Fine particles are easily inhaled deeply into the lungs where they can be absorbed into the bloodstream or remain embedded for long periods of time (Abdel, 2000; United States Environmental Protection Agency, 2011 and Wu, 2012).

Common biological contaminants include mold, bacteria, mildew, viruses, pollens, dust mites, pet dander (skin flakes), droppings and body parts from cockroaches, rodents and other pests or insects, viruses, and bacteria. They are produced by living things. Biological contaminants are often found in areas that provide food and moisture or water. For example, damp or wet areas such as cooling coils, humidifiers, condensate pans, or unvented bathrooms which can be moldy. Draperies, bedding, carpet, and other areas where dust collects may also accumulate biological contaminants. There are actually many sources of the contaminants. Pollens originate from plants; viruses are transmitted by people and animals; bacteria are carried by people, animals, and soil and plant debris; and household pets are sources of saliva and animal dander. The protein in urine from rats and mice is a potent allergen. When it dries, it can become airborne. Contaminated central air handling systems can become breeding grounds for mold, mildew, and other sources of biological contaminants and can then distribute these contaminants through the home(US Environmental Protection Agency, 2012; Health Link BC, 2012 and LivSpace, 2012). Mercury's most problematic form is methylmercury since it tends to persist in animal tissue and concentrate in food chains. Exposure commonly occurs by fish consumption (Zavos, Zarmakoupis, Zarmacoupis-Zavos,1999; John,2009 and United States Environmental Protection Agency, 2012).

Synthetic organic contaminants are industrially manufactured and include pesticides, chlorinated solvents, hydrocarbons and poly-chlorinated bi-phenols (PCBs). Pesticides are classified into many groups, of which the organochlorine and organophosphate groups are the most common. The organochlorines (e.g. DDT, dieldren, toxaphene) were discontinued about 20-30 years ago due to their high toxicity. Unfortunately, due to their high persistence in soils and ground water, they continue to be detected in low concentrations both below agricultural and urban areas (where they are used on lawns, golf courses among others). The organophosphates are slightly less toxic and persistent but are still detected in many areas (US EPA, 2012 and South Dakota, 2012).

Chlorinated solvents, hydrocarbons, PCBs, and other synthetic organic chemicals are classified into many groups and have various levels of toxicity, mobility and persistence in the environment. They are mainly introduced to water resources by industry, however, small businesses and households are secondary sources.(Alabama, 2001). The most problematic compounds for ground water are the chlorinated solvents (e.g. trichloroethylene, methylene chloride), which are commonly used as degreasing agents by industry and dry cleaners. They are toxic and are used as heavy oily liquids. When released to ground surface, they tend to migrate downward though soil and sediments where the heavy oils remain as long-term sources of ground water contamination (Alabama, 2001 ; EPI, 2012 ; Lapworth, Baran, Stuart and Ward, 2012) .Perchlorate is a chemical

found in blasting agents, fireworks, military munitions and other manufacturing processes (Toxics and Harzards, 2007).

The Impacts of Environmental Contaminants on Women's Reproductive Health

Reproductive health and the environment focus on exposures to environmental contaminants during critical periods of human development. These periods of human development are directly related to reproductive health throughout the life course, including the period before conception, at conception, fertility, pregnancy, child and adolescent development and adult health. Contamints such as methylmercury can lead to spontaneous abortion. Lead can lead to still birth; polychlorinated biphenyls can lead to low birth weight; polycyclic aromatic compounds can lead to preterm delivery. The organic solvents can lead to birth defects like hearing and visual deficients and some pesticides can cause chromosomal abnormalities Chemicals and other substances in the environment can cause serious health problems in women, such as cancer, lung disease, or reproductive system problems (Women Factsheet, 2012). Perchlorate can interfer with thyroid function and, consequently, can impair human development and metabolism(Toxics and Harzards, 2007).According to Genius Pregnancy (2012), Lead is a toxic metal that may be stored in bones. In postmenopausal women who were exposed to Lead early in life, bone loss can release Lead into the bloodstream. This may cause kidney damage, increase the risk of high blood pressure, and decrease cognitive functions. A report by Pub Med (2008) concluded that reproductive function in adult females is impaired by Lead exposure. It also concluded that pesticides and persistent pollutants can alter hormone function resulting in adverse reproductive health effects.

A series of researches has led Polish Scientists to sad conclusions that **air pollution** levels directly impact fetus growth. For instance, even small increase in air pollution levels (like the difference between the lake air and the busy street air) will reduce the weight of newly born by 5-7 per cent below normal. The same research was conducted in the U.S. and was related to miscarriages in women (Genius Pregnancy, 2012). American scientists found that pregnant women who live in the environment with high air pollution levels have the risk of premature birth increased by 7 per cent. According to them, if a woman breathes in the air polluted by sulfurous gas during the last weeks of pregnancy, the risk increases by as much as 15 per cent(Genius Pregnancy,2012).Poor ventilation, operating household appliances and **smoking** have a very negative effect on fetus. It becomes especially important on the second months of pregnancy when internal organs of fetus start forming (Association of Reproductive Health Professional (ARHP), 2012). Use of hormonally active compounds in humans has unfortunately revealed that developing fetus can be exposed to and affected by endocrine disrupters which might take decades for adverse effects to manifest (National Center for Biotechnology Informati vcon (Heather, Heather and Adewale, 2009).

Mechanism of Impact

Studies have revealed that exposure to endocrine disrupting compounds (EDCs), either naturally occuring or manmade, can profoundly alter reproductive physiology and ultimately impact entire populations. Research within the field of of environmental endocrine disruption has also contributed to the general understanding of how EDCs can alter reproductive physiology and behaviour through non-genomic, epigenetic mechanisms such as DNA Methylation and histone acetylation (Heather, Heather and Adewale, 2009).

The endocrine disrupters or endocrine disrupting chemicals(EDCs) can interfere with the production, release, transport, metabolism, binding action or elimination of natural hormones in the body which are responsible for the maintainance of internal homeostasis (Woodruff et al, 2008). Some of the endocrine disrupting chemicals found in the external environment mimic or inhibit endogenous hormones.They mostly exhibit estrogenous effects while few are anti-estrogenic or anti-androgenic.Many of these compounds are industrial contaminants such as pesticides and plasticizers. Others are natural phytoestrogens found in plants such as Soys and in herbal supplements (McLachian, 2012).Human development can be feminized by exposure to such estrogenic chemicals leading to feminine sexual characteristics such as early initiation of puberty and the end of menopause; it can affect breast growth, lactation and have a role in uterine diseases such as fibroids and endometrioses (McLachian, 2012). According to Association of Reproductive Health Professionals (2010), the endocrine disrupters can actually exert negative reproductive impacts through many mechanisms such as damage to oocytes or sperm cells, interference with cell function, change to DNA structure/ gene expression.Some of the chemiicals kill or damage sex cells when individuals are exposed which can result to infertility (ARHP,2010).

Concluding, Woodruff ,et al (2008), maintained that many of the EDCs alter estrogen, androgen and thyroid signalling which are essential for normal embryonic development and reproductive activity in all vertebrates. They alter hormone synthesis, storage on plasma proteins and alter the regulation of gene expression (e.g DNA methylation, RNA stability and protein degradation(Hollander, 2012).

Summary

Different aspects of the environment tend to affect the health status of human popoulation.In women, environmental contaminants can cause serious reproductive health problems such as endometriosis,uterine cancer, low birth weight, preterm delivery, risk of miscarriage and so on. Some of the most common environmental contaminants associated with abnormal reproductive system/function include pesticides, herbicides, benzene , bromonated flame retardants, among others. These environmental contaminants cause harm by acting as EDCs, thereby altering reproductive physiology and behaviour through non-genomic, epigenetic mechanisms such as DNA methylation and histone acetylation. Adopting this mechanism, the EDCs interfere with the production, release, transport, metabolism or other actions being taken by the body's natural hormones responsible for maintaining internal homeostasis. In women, the EDCs kill or damage sex cells by altering estrogen, androgen and thyroid signalling which are all essential for normal embryonic development and reproductive activity in all vertebrates.

Conclusion

The direct relationship between women and natural resources draws its strenght not from biology but from gender and the socially created roles and responsibilities that continue to fall to women in households, communities and ecosystems throughout the world.They ensure sufficient supply of resources to meet their children's needs for nutrition, healthcareand schooling. In the rural areas, they are also the main managers of essential houshold resources like clean water, fuel for cooking and collecting fodder for animals. As economic opportunities are opening up, women in developing world are growing, processing and marketing food products made from natural resources for consumption at home and increasingly overseas. Consequently, such livelihoods also present new environmental health risks to these women as a result of their exposure to environmental contaminants, most of which act as endocrine disrupters, causing a lot of reproductive imbalance in the bodies of the women.

References

Adelaide, l., Mines, s., & Singer, L, (2011). Tobacco, marriana, stimulant and opiate exposure: outcomes and practice implications. Retrieved 0ctober 6, 2012 from www.ncbi.nlh.gov/... *pmc 3188261*

Adeola,F.O. (2004). Boon or Bane? The environmental and Health Impacts of persistent organic pollutants. Human ecology Review, 1(1), 27-35. Retrieved October 15, 2012 from *http://www.humanecologyreview,org/pastissues/her111/111adeola.pdf.*

Adrian(2012). Indoor environment environmental. Retrieved October 11, 2012 from *llc.http:www.Adrianenvironmental.com?common.html.*

Alabama (2001).) Pesticides and organixc contaminants. Retrieved October 13, 2012 from *www.aces.edu/water quality/.../0306010.p...*

Ask Jeeves (2012). Gaseous pollutants in indoor and outdoor environment. Retrieved October 11, 2012 from *http.//uk.ask.com/web?.1=se...*

Ask. Com (2012). Biological contamination. Retrieved October 13, 2012 from *www.ask.com/.../biological contamination...*

Association of Reproductive Health Professionals (2010). Environmental Impacts on reproductive health. Retrieved October 15 *from http://www.arcp.org/publications-and-resources/clinical-proceedings/RHE/introduction*

Blue Point Environmental (2012). Indoor air contaminants and pollution. Retrieved october 11,2012 from *http:www.bluepoint-environmental.com/indoor-air-quality-contaminants/sources.*

Brown, R.C. (2009). Ozone. The environment and women factsheet. Retrieved October 6, 2012 from *women'shealth.gov/.../environment..*

Buzzle (2012).Effects of acid rain. Retrieved October 12, 2012 from *htpp://www.buzzle.com/artic...*

Caren,T. (2012). Experimental investigation of indoor air pollutants in three residential buildings. *Retrieved October 12, 2012 from http;//ethese.whiterose.ac...*

Department of Health and Human Services (2012). Indoor air quality in home environments. Retrieved October 13, 2012 from *http://epi.pubichealth.nc.g...*

Department of Health and Human Services (2012). Occupational and ennvironmental contaminants. Retrieved October 5, 2012 from *http.//epi.publichealth.c.gov/.../hsfactsheet.h*

Energy Information Administration (2004). Green house gases, climate change and energy. Retrieved October 11, 2012 from *www.eia.gov/oiaf/1605/ggccebra/chapteri.html*

Environment and Workplace Health (2012). Environmental contaminants. Retrieved October 6, 2012 from *http.hc-sc.gc.ca/ewh...*

EPA (2012). Drinking water contaminants. Retrieved October 12, 2012 from *www.drinking water.utah.gov/.../drinking...*

Falex. (2011). Meaning of environment. American heritage science dictionary. Retrieved October 15 , 2012 from htpp.//www.thefreeedictionary.com/environment.houghtonmifflincompany.

Health Link (2012). Indoor air quality, moulds and other biological.....Retrieved october 12, 2012 from *www.healthlink bc.ca/.../infile 65b.stm.*

Heather, B.P ; Heather, B & Adewale,A. (2009). Long time effects of environmental endocrine disruptors.Retrieved October 16, 2012 from www.ncbi.nlm.nih.gov/.../*pmc2706654/*

Hollander, D.(2012). Environmental effects on reproductive health : The endocrine disruption hypotheses. Retrieved October 15, 2012 from *http://www.guttmacher.org/...*

John, J (2009). Heavy metal toxicity in human diet and effect on human health. Retrieved October 15,2012 from *http://www.mygreenpal.com-poisoning-exposure-health-effects/*

Isabelle, S., Elly, D.H., Nelen, V., Els, V. (2012).Prenatal exposure to environmental contaminants and health outcomes in children. Retrieved October 19, 2012 from *www.milleu-en-gezondheid.be/.../...*

Ka'Abu, M. (2011). Environmental contaminants and their effects on adolescent reproductive health. *Nigerian Journal of Health Education. 15(1)146-153.*

Lapworth, D.J., Baran,N., Stuart, M.E. & Ward, R.S. (2012)> Emerging organic contaminants in groundwater: A review of sources, fate and occurence. Retrieved October 10, 2012 from *nora.nerc.ac.uk/.../final-manuscript-pd...*

Livspace (2012). Biological contaminants in the home or office. Retrieved October 13,2012 from *www. Livspace.comau/../d30...*

McLachian, J.A. (2012). Endocrine disrupters and female reproductive health. Retrieved October 15, 20132 from *http://www.ncbi,nlm.nih.go...*

Melissa, L.P.(2006). Children's centers study. Kids and chemicals.Environmental Health Perspectives. Retrieved October 7 from *http:www.ncbi.nlm.nih.gov/.../pmc1281306/*

Pub Med.Gov (2008). Science linking environmental contaminants exposures with fertility and reperoductive health impacts on the adult female. Retrieved October 11, 2012 from *http:www.ncbi.nlm.nih.go..*

Ramzy, A.L.(2000). Effects of environmental pollution.Retrieved October 10, 2012 from www.family-clinics.com/women.../

Ritter, L., Solomon, K., Sibley, K., Hall, K., Mattu, G., & Linton,B. (2002). Sources, pathways and relative risks of contaminants in surface water and groundwater:a perspective prepared for the walker to inquiry. Retrieved October 10, 2012 from

Robert, J. (2009). Toxic effects of land and mercury. Medscape paediatrics. Retieved October 19, 2012, from *http://www.medscape.com/viewarticle/714387*

Sieon, I., Elly, D.H., Nelen, V., Els, V.M., Lareboke,N.V., & Greets, S. (2012). Prenanal exposure to environmental contaminants and health outcomes in children. Retrieved October 7, 2012 from www.milleu-en-gezondheid.be/.../

South Dakota (2012). Synthetic Organic contaminants. Retrieved October 13, 2012 from *denr.sd./gov/des/dw/soc.aspx.*

Squiddo (2012). Effects of acid rain. Retrieved October 13, from *http:/www.squiddoo.com/th...*

Tuberose.com (2011). Heavy metal toxicity. Retrieved October 15 from *Tuberose.com information for transformation.*

United States Environmental Agency (2012). Biological pollutants. Retrieved October 12, from www.epa.gov/iaq//biologic.html.

United States Environmental Protection Agency (2011). An introduction to Indoor quality (IAQ) biological pollutants. Retrieved from *http:/scorecard.goodguide.com../pollutant-desmog and particulates.pollutant descriptions.*

Us Environmental Agency (2011). Health and Environmental effects of Ozone. Retrieved October 5, 2012 from *htpp:/www.epa.gov/ozone/s...*

Vallero, D.(2012). Environmental contaminants: assessment control. Retrieved October 13,2012 from *http:books//www.google.com/bo...*

Wikipedia, the Free Encyclopedia (2012). Green house gas. Retrieved October 11, 2012 from *en.wikipedia.org/wiki/greenhouse-gas.*

Wikipedia,th Free Encyclopediat (2012). Women and the environment. Retrieved October 6, 2012 from http;//en.wikipedia.org/w/index.php?title=womenandtheenvironment&oldid=516296578

Wiley Job Network (2012). Organic pollutants in the indoor environment. Retrieved October 11, 2012 from http://onlunelibrary.wiley...

Wkipedia, the free encyclopedia, (2012). Food contaminnts. Retrieved October 10, 2012 from http://en.wikipedia.org/w/index=512853663.

Woodruff,T.J., Carlson, A., Schwartz, J.M., & Guidice, L.C. (2008). Proceedings of the summit on environmental challenges to reproductive healtg and fertility: executive summary. Retrieved October 19, *from* http://www.reproductivefacts.org/uploadedfiles/ASRM-content/News-and-publications/selected-articles-from-fertility-and-sterility/environmental *challenges.pdf*

Woodruff, T.J., Janseen, J., Guilette, L.J., Guidice,L.C. (2010). Environmental impacts on reproductive health and fertility. Retrieved October 7, from http://www.rcog.org.uk/catalog/book/environmental-impacts-reproductive-health-and-fertility.

Wu, J. (2012). Adverse reproductive health outcomes and exposures to gaseous and particulate matter . Air pollution in pregnant women. Retrieved October 5, 2012 from *www.health effects.org/..../wu-mon Am.p..*

Zavos, P.M., Zarmakoupis, C.N., & Zarmacoupis-Zavos, P.N. (1999). The impact of cigarette smoking on human reprodction: its effects on female and male fecundity. *Middle East F ertility Society Journal, 4(2),94-101.*

This academic article was published by The International Institute for Science, Technology and Education (IISTE). The IISTE is a pioneer in the Open Access Publishing service based in the U.S. and Europe. The aim of the institute is Accelerating Global Knowledge Sharing.

More information about the publisher can be found in the IISTE's homepage: http://www.iiste.org

CALL FOR PAPERS

The IISTE is currently hosting more than 30 peer-reviewed academic journals and collaborating with academic institutions around the world. There's no deadline for submission. **Prospective authors of IISTE journals can find the submission instruction on the following page:** http://www.iiste.org/Journals/

The IISTE editorial team promises to the review and publish all the qualified submissions in a **fast** manner. All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Printed version of the journals is also available upon request of readers and authors.

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digtial Library , NewJour, Google Scholar