

Awareness And Perception of Global Warming Among Undergraduate Medical Students in A Nigerian University.

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ABSTRACT

BACKGROUND: Increase in the emission of green house gases and the attendant climatic changes have led to the phenomenon of global warming with all its catastrophic consequences.

OBJECTIVE: To assess knowledge and perception of the concept of global warming among undergraduate medical students

METHODOLOGY: A cross sectional descriptive study was carried out among 380 undergraduate medical students who were selected by a systematic sampling method. A semi-structured, self-administered questionnaire was used to collect data on their demographic attributes and their knowledge and perception of global warming after a verbal informed consent was obtained from them.

RESULTS: All the respondents had heard of global warming with 7.1% having excellent knowledge, 45% good knowledge, 43.7% fair knowledge and 13.2% poor knowledge of global warming. Most (82.1%) had the misconception that ozone layer depletion was responsible for global warming. A majority (94%) believed the earth was actually warming up, with 73% believed they contributed to global warming. Only 16.1% perceived that global warming will affect the future generations. Though 198(52%) felt they were already taking actions to conserve energy, only 34(9.0%) would rather use public transport than buy a car in order to conserve energy.

CONCLUSION

The knowledge and perception of the concept of global warming among the respondents were good. However, most confused the concept of global warming with ozone layer depletion. Continuous education on issues of global warming especially the misconceived aspects is advocated

INTRODUCTION

Global warming is the increase in the average temperature of the earths near surface and oceans in recent decades and its projected continuation¹. This century, the earth has warmed by about 0.5 degree Celsius and the mid range estimates of future temperature change and sea level rise are 2.0 centigrade and 49 centimeters respectively by the year 2100². Global warming and attendant climate changes have been a controversial issue for at least a decade now largely because of its varied environmental and societal implications³. Climatologists have long remarked that global warming will not simply manifest itself by a gradual rise in average temperatures, but rather, in the frequency and intensity of extreme climatic events such as heat waves,

drought, floods and storms that are expected to occur⁴. The evidence that climatic changes can be attributed to human activities has become stronger in recent years⁵.

The green house effect is the process by which absorption and emission of infra red radiation by atmospheric gases warms a planets atmosphere and surface¹. Without this trapping of heat, the earth would freeze. This phenomenon which was first discovered by Joseph Fourier in 1824 was first investigated by Svante Arrhenius in 1896¹. These atmospheric gases popularly known as “green house gases” include carbon dioxide responsible for 21% of the green house effect, methane 8%, Ozone 6.5% and water vapour which is the major green house gas contributing 68% of the green house effect⁶.

An increase in the green house gas concentration with the subsequent increase in the green house effect is responsible for global warming. The problem of global warming therefore is not the presence of these green house gases but rather an increase in their amount and concentration in the atmosphere⁷. The release of the green house gases by the activities of human will do more than simply raise the global temperature; it will also trigger a variety of feedback loops that will accelerate the global warming process⁸. While debates about energy choices, long term climate change impacts and the capacity to adapt to these impacts continue to evolve, there is little doubt that air pollution from current patterns of fossil fuel used for electricity generation, transport, industry and housing are already sickening or killing millions through out the world⁹.

Global warming has serious implications for infectious diseases, diarrhoeal diseases and malnutrition as environment that were too cool to sustain vectors become more conducive for them thus affecting their population and distribution¹⁰(ref). Crop failures and famine may reduce host resistance to infections and disease transmission may be enhanced through the scarcity and contamination of potable water supply¹¹(ref). Public health infrastructure may be damaged leaving mankind poorly prepared for unexpected epidemics and changes in the environment may trigger human migration causing disease patterns to shift^{2,12}.

Global warming is a current and topical global issue, which affect all aspects of the ecological system worldwide. It is like a time bomb waiting to explode and has serious socio-economic consequences and effects on the health care system of communities. It is therefore expedient to assess the awareness and perception of this global phenomenon among individuals, especially undergraduate students who are the potential future leaders and policy

makers. Again this study will provide the much-needed literature on the issues of global warming which is lacking especially in sub Saharan Africa.

METHODOLOGY

Benin City, the capital of Edo State, Nigeria is a low lying area located in the heart of the tropical rain forest and has two major seasons - the rainy and dry seasons. A descriptive cross sectional study was carried out among undergraduate medical students of the University of Benin, in Benin City, Edo State of Nigeria, after obtaining verbal consent. They were also assured of confidentiality and the possible benefits of the study explained to them.

The minimum sample size of 340 was obtained from a prevalence of 27.4% of awareness of global warming in previous literature¹³ among Norwegian students and assuming a 10% non response or attrition rate. A comprehensive list of all registered medical students (1023) for the current session obtained from the student affairs department of the university was used as a sampling frame. A sampling ratio of 1: 3 was then obtained by dividing the sampling frame by the minimum sampling size. Every third respondent was then chosen from the list using a systematic sampling method.

Data was collected using a semi- structured self-administered questionnaire that contained questions on respondent's demographic attributes and their awareness and perception of global warming. Data was analyzed using SPSS version 12.0 software and the results presented descriptively as frequency tables and graph. The Likert scale was used to assign scores to responses on awareness and perception of global warming. Correct answers scored 1 point, incorrect answers 0 while no value was assigned to questions that respondents answered as "don't know", thus giving a maximum obtainable score of 20. The awareness scores were thereafter graded as 16-20 = Excellent, 11-15 = Good, 6-10 = Fair and 1-5 = Poor and perception was graded as

“agree, disagree and indifferent”. The green house gases assessed were ozone, carbon dioxide, water vapour, chlorofluorocarbon and methane. Responses were correct if these gases were correctly identified and if oxygen and nitrogen were not identified as green house gases.

RESULTS

A total of 380 of the 392 questionnaires retrieved from the respondents were completely and correctly filled, giving a response rate of 96.9%. The mean age of the respondents was 23.6 ± 3.2 with the proportion of males as 67.6% and females 32.4%

Table 1 shows awareness and knowledge of respondents on global warming. All the respondents had heard of global warming with 312 (82.1%) wrongly identifying ozone layer depletion as a contributor to global warming. Green house gases and burning of fossil fuels were identified as contributors to global warming by 73.2% and 79.5% of respondents respectively. Only 27% of the respondents knew that the 'green house effect' is necessary for life on earth. Two hundred and seventeen (57.1%) of the respondents knew that the

'green house effect' does not protect man against ultra violet radiation. A majority (79%) of respondents erroneously said there is an increased amount of sun rays reaching the earth as a result of global warming. Two hundred and ninety-two respondents (76.8%) knew that global warming will lead to rising sea levels while only 141(37.1%) of respondents knew global warming could lead to outbreak of diseases like cholera and malaria. Increased incidence of flooding, hurricanes and tsunamis were identified by 69.2% of respondents, while reduction in food production, specie extinction and glacier retreat were identified by 65.3%, 67.1% and 56.8% of respondents respectively as the effects and consequences of global warming.

Figure 1 shows that only 27(7.1%) had an excellent overall awareness score, 45% had a good score, while 50(13.2%) had poor score of the phenomenon of global warming.

Table 2 shows the identification of the green house gases by the respondents, majority (79.7%) of whom correctly identified chloroflouorocarbon as a green house gas, this was followed by carbon dioxide with 68.2% and only 16.3% of respondents knew that

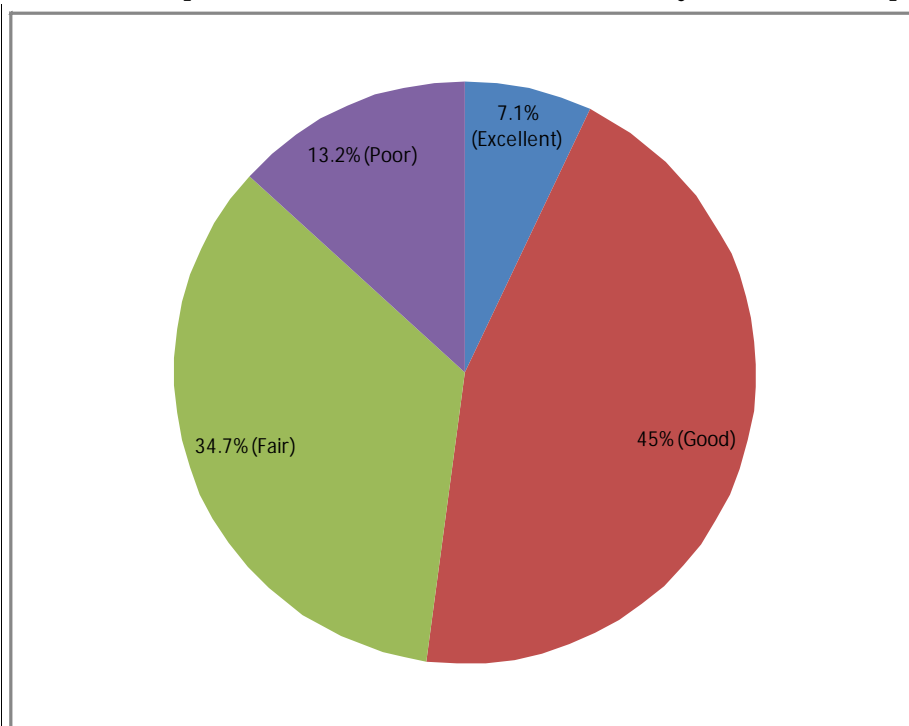


Figure 1: Level of awareness of respondents about global warming

Table 1: Knowledge of Respondents on Global Warming and Its Effects.

ASPECTS OF GLOBAL WARMING ASSESSED RESPONDENTS	PROPORTION OF WITH CORRECT ANSWERS	
	N	%
Have heard about global warming	380	100.0
Green house gases contribute to global warming	278	73.0
Burning of fossil fuel contributes to global warming	302	79.5
Ozone layer depletion causes global warming	312	82.1
Ultra violet rays from the sun cause global warming	217	73.2
'Green house effect' is necessary for life on earth	103	27.1
'Green house effect' does not protects man against ultra violet light	300	
78.9		
Global warming increases the amount of sunlight reaching the earth	301	
79.2		
Global warming causes rising sea/ocean levels	292	76.8
Global warming increases disease incidence	288	75.8
Global warming contributes to outbreak of diseases	141	37.1
Global warming increases incidence of flooding,		

Table 2: Respondents knowledge on green house gases.

GAS	IDENTIFICATION N(%)			Total
	Correct	Incorrect	Don't know	
Ozone	130(34.2)	119(31.3)	131(34.5)	380(100.0)
Carbon dioxide	259(68.2)	48(12.6)	73(19.2)	380(100.0)
Oxygen	211(55.5)	38(10.0)	131(41.8)	380(100.0)
Nitrogen	112(29.5)	109(28.7)	159(41.8)	380(100.0)
Water vapour	62(16.3)	175(46.1)	143(37.6)	380(100.0)
Chloroflourocarbons	303(79.7)	23(6.1)	54(14.2)	380(100.0)

Table 3: Perception of Global Warming Among Respondents (n= 380)

PERCEPTION OF GLOBAL WARMING	RESPONSE N (%)		
	AGREE	DISAGREE	
INDIFFERENT			
The earth is actually warming up	358(94.2)	22(5.8)	0(0)
I contribute to global warming	277(73.0)	99(26.0)	4(1.0)
Global warming is a result of man's activities	340(89.5)	39(10.2)	
1(0.3)			
Global warming is a natural process			
irrespective of man's activities	40(10.5)	339(89.2)	1(0.3)
Global warming is a sign of the end times	36(9.5)	334(87.9)	10(2.6)
Global warming will have a long term sequelae			
on me and my generation	296(77.9)	82(21.6)	2(0.5)
Global warming will not affect my generation			

Table 4: Respondent's Opinion on Ways to Conserve Energy (n= 380)

OPINION	FREQUENCY*	PERCENTAGE
Would take some action to conserve energy	198	52.0
Would take public transport than rather		
buy a car to conserve energy	34	9.0
Switching off lights	167	43.9
Planting of trees	127	33.4
Recycle waste	113	29.7
Avoid burning waste	4	1.1
Avoid use of wood for cooking	4	1.1

DISCUSSION

The issue of global warming is topical and of global magnitude. The fact that all the respondents had heard about it was therefore not surprising as the study population consisted of university students who would have most probably been exposed to various formal and informal sources of information about global warming.

There was a low level of understanding and a high level of misconception among the respondents regarding the “green house effect” as a majority of them felt it was bad for man and not necessary for life on earth. The mere presence of green house gases in the atmosphere does not lead to global warming; rather it is the increase in the level of these gases that leads to global warming. The proportion

(27%) of respondents who knew that the green house effect is necessary for life on earth was similar to the proportion (23.3%) in a similar study⁶. The perception that the green house gases are only harmful and cannot be advantageous to man in any way was also evident from the fact that most (79.0%) of the respondents felt that the green house effect does not protect against ultra violet radiation, as there is an increased amount of sun rays reaching the earth as a result of global warming. This finding compares well with that of similar study⁶ in Norway where most of the respondents (63.9%) felt that the green house effect did not protect man against ultra violet radiation. There was also the general confusion among the respondents regarding the concept of ozone layer depletion being caused by global warming. Misconceptions

about climatic processes especially those involving confusions between the phenomena of ozone depletion and global warming are commonly observed^{14,15}. The reason for the low level of understanding and the various misconceptions could be that the various media and other informal sources, which are the major sources of information for many people including the students, have not distinguished the normal green house effect from the effects of the increasing levels of green house gases in the atmosphere. When discussing the greenhouse effect and other global environmental issues, these media often described them in the context of something abnormal and worrisome without highlighting any beneficial aspects; thus the general populace including students, are left with such erroneous ideas. This is therefore not surprising, as many people, by anecdotal report believe that the earth is warming as a result of more solar radiation entering the atmosphere through the ozone hole.

The similarity between ozone layer depletion and global warming is that both are caused by release of greenhouse gases from human activities such as burning of fossil fuels and the use of chlorofluorocarbons. The ozone layer depletion causes an increase in the amount of UV-B reaching the earth's surface thereby increasing the incidence of some diseases such as skin cancer, cataracts, slowing growth of plants and the subsequent depletion of crop output and causing imbalance of natural ecology¹⁴. The fact that a majority of the respondents (75.8%) said global warming will lead to increased incidence of skin cancers and cataracts, further buttressed the fact that they were confusing the effects of global warming with ozone layer depletion.

Disappointedly, in this study, only few (16.3%) of the respondents knew that water vapour was a contributor to the green house effect and about two-thirds of the respondents either did not know or had incorrect

knowledge that ozone gas contributed to the green house effect. This was similar to a study carried out among first year undergraduate biology students in Norway, where many of the students were unaware of ozone as a green house gas¹⁵. It was however encouraging that a majority of the respondents in this study knew that increased burning of coal gas and oil increased the green house effect.

Most of the respondents knew about the effects of global warming on different facets of life such as rising sea level, increased flooding, hurricanes and tsunamis, glacier retreat, specie extinction, and reduction in food production due to the destruction of forests as well as the increase in disease incidence. Various studies have linked climate changes to the increase in the incidence of some diseases like malaria infection^{16,17}. A low proportion of respondents (37.1%) in this study agreed to the fact that global warming contributes to disease outbreaks.

Majority of the respondents felt the earth was actually warming and that global warming will have effects on their generations, this might be because most of respondents were already experiencing various effects and consequences of global warming. This finding however contrast reports of a study carried out among 14 communities in Australia where most respondents felt that global warming did not have effects on their generation but will on their future generations¹⁸. A majority of the respondents who said global warming was a result of man's activities, corroborate the fact that chlorofluorocarbons, which is a man-made gas was identified by most of them as a green house gas. This gas has been popularized by various media as a contributor to global warming and climate change.

Though a majority of the respondents agreed to personally contributing to global warming by engaging in various environmental-unfriendly activities, only about half claimed they will take actions to conserve energy. Despite this claim, very few would rather take

public transport than buy a car to conserve energy. A majority of the respondents (80%) knew that driving a car contributed to global warming but only 19.2% knew that using electricity contributed to global warming. These figures are lower than the 98% and 55% obtained respectively in a similar study for these indices of global warming¹⁸.

It can thus be concluded that the knowledge of the concept of global warming among these university medical students was good, as majority of them knew the various causes and effects of global warming. However, there were some misconception about ozone layer depletion and global warming and the distinction between the normal green house effect and the increasing levels of green house gases with its consequent global warming. This needs to be addressed. The failure of the recent world summit on global warming and climate change in Copenhagen, to decisively address the control of emission of these green house gases and their attendant disastrous consequence is worrisome.

It is therefore recommended that continuous education on global warming, with emphasis on the various issues that are misconceived be intensified to enhance the awareness, knowledge and perception of these students. This will enable them seek ways to prevent both the immediate and long term effects of global warming, thereby making the earth a safer habitat for man.

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