

ORIGINAL RESEARCH

Study of Awareness and Responsibility Towards Global Climate Change (GCC) Among Students in a Medical College

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ABSTRACT

Background: Climate change has emerged as one of the most devastating environmental threats in 21st century. The United Nation's Intergovernmental Panel on Climate Change (IPCC) stated that there is overwhelming evidence that humans are affecting the global climate. Human behaviour is integral not only to causing global climate change but also to responding and adapting to it. As medical students will impart their knowledge to future society so that study was done among them to assess their knowledge levels towards climate change and their responsibility to tackle this.

Objectives: To assess the knowledge levels towards GCC among 1st year medical students, To assess their responsibility towards mitigating the GCC.

Materials and Methods: First year medical and dental students of Siddhartha medical college, Vijayawada who had given the verbal consent were included in this study. A self-administered, pre-tested, questionnaire was used. Responses were analysed by using SPSS v.16 software.

Results: Majority of students were females. Among the students 75% came from urban background, 88.9% had schooling in private sector, 98.2% participants were aware that GCC is a major problem. However, only 57.3% were aware that GCC is induced by human beings. Knowledge on causes (94.2%), effects (91.2%), and control measures (98.8%) of GCC was appreciable and 33.1% were participated in public awareness activities.

Conclusion: Males are knowledgeable regarding the fact that humans are responsible for GCC, and they were active in taking up the responsibility to prevent it. Students studied in Government were aware of recyclable materials.

Keywords: Awareness, Global climate change, health hazards.

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INTRODUCTION

The current warming trend is of particular significance because it is unequivocally the result of human activity since the mid-20th century and proceeding at a rate that is unprecedented over millennia.^[1] It is undeniable that human activities have warmed the atmosphere, ocean, and land and that widespread and rapid change in the atmosphere, ocean, cryosphere, and biosphere have occurred.

Earth-orbiting satellites and other technological advances have enabled scientists to see the big picture, collecting many different types of information about our planet and its climate on a global scale. This body of data, collected over many years, reveals the signals of a changing climate.

The heat-trapping nature of carbon dioxide and other gases was demonstrated in the mid-19th century.^[2] Their ability to affect the transfer of infrared energy through the atmosphere is the scientific basis of many instruments flown by NASA. There is no question that increased levels of greenhouse gases must cause Earth to warm in response.

Ice cores drawn from Greenland, Antarctica, and tropical mountain glaciers show that Earth's climate responds to changes in greenhouse gas levels. Ancient evidence can also be found in tree rings, ocean sediments, coral reefs, and layers of sedimentary rocks. This ancient, or paleoclimate, evidence reveals that current warming is occurring roughly ten times faster than the average rate of ice-age-recovery warming. Carbon dioxide from human activity is increasing more than 250 times faster than it did from natural sources after the last Ice Age.^[2]

Climate change has emerged as one of the most devastating environmental threat. The United Nation's Intergovernmental Panel on Climate Change (IPCC) stated that there is overwhelming evidence that humans are affecting the global climate and highlighted a wide range of implications for human health. As evidence of climate change and its impact continues to be amassed, it has become clear that many of the causes of climate change are anthropogenic in nature through lifestyles, consumption, and choices that pollute and exploit resources in an unsustainable manner. The future health hazards of climate change are well documented, with forecasts made of increasing health problems caused by heat waves, storms, floods, fires, droughts, and infectious diseases. It is also predicted that climate change will have detrimental effects on agriculture and fisheries and may even result in collapsing ecosystems. Future risks of pathogens and chemicals could therefore be very different than today, so it is important that we begin to assess the implications of climate change for changes in human exposures to pathogens and chemicals and the subsequent health hazards in the near term and in the future.^[3]

Now it is time to react everybody should become aware and responsible to mitigate this problem for protection from harmful effects of global climate change.

In response to this important issue, this study was conducted to determine the awareness and responsibility of 1st year medical students from Siddhartha medical college, Vijayawada, Andhra Pradesh.

Objectives:

- To assess the awareness on Global climate change among students
- To assess the responsibility to mitigate the GCC.

MATERIALS & METHODS

This study was carried out in the Siddhartha medical college situated in Vijayawada, Andhrapradesh, India. Medical students about 171 (1st year M.B.B.S. and 1st dental) who had given the verbal consent were included in this study. The purpose of this study and all the terms used in this study were explained to the respondents and confidentiality was maintained. Data was collected by using a self-administered, pre-tested questionnaire and responses were analyzed by using statistical software version-16.

Statistical analysis used: Proportions, percentage, Chi-square test.

RESULTS

Gender distribution in study sample is nearly two thirds are females (61.4%) and one third are males (38.6%). Nearly three fourth of them live in urban (76.6%) and one fourth of them live

in rural areas (23.4%). Majority of the sample had their schooling in private sector (88.9%), whereas remaining in government sector (11.1%). According to their socio-economic status, 43.3% of the participants were having per capita income (PCI) Rs. 10,000.00 or less and the remaining 56.7%, had PCI of greater than Rs. 10,000.00 per month.

When we assessed the knowledge of the participants regarding Global climate change (GCC), 87.7% were aware that incidence of GCC had increased nowadays and almost all of them were aware that it is a major problem (98.2%). However, only 57.3% were aware that GCC is induced by human beings. All of them were able to recall at least one greenhouse gas that is responsible for global warming. But, very few (15.8%) were only known about the recyclable materials. Whereas, knowledge on causes of GCC (94.2%), effects of GCC (91.2%), control measures (98.8%) were appreciable. Almost 95% opined those issues on GCC to be included in the modern curricula.

Table 1: Socio demographic and questionnaire details in the study population

Socio demography		N	%
Gender	Male	66	38.6
	Female	105	61.4
Residence	Rural	40	23.4
	Urban	131	76.6
Schooling	Government	19	11.1
	Private	152	88.9
Per capita income	10000 or less	74	43.3
	Greater than 10000	97	56.7
Knowledge			
Opinion about global climate change	Not aware	21	12.3
	Aware	150	87.7
Aware that gcc is a major problem	No	3	1.8
	Yes	168	98.2
Gcc is human induced	Not aware	73	42.7
	Aware	98	57.3
Aware of atleast one greenhouse gas that causes global warming	Aware	171	100.0
Awareness on recyclable material	Not aware	144	84.2
	Aware	27	15.8
Awareness on causes of gcc	Not aware	10	5.8
	Aware	161	94.2
Awareness on effects of gcc	Not aware	15	8.8
	Aware	156	91.2
Awareness on control measures	Not aware	2	1.2
	Aware	169	98.8
Issues on gcc need to be included in modern curricula	Disagree	9	5.3
	Agree	162	94.7
Responsibility			
Participation in public awareness activities	No	113	66.1
	Yes	58	33.9
Awareness to family members and adoption of preventive house hold strategies	No	111	64.9
	Yes	60	35.1
Contribution to organizations	No	158	92.4
	Yes	13	7.6

Satisfaction	Have done a little & have to do more	161	94.2
	Have done a lot	10	5.8

While assessing the responsibility of the participants regarding GCC, it was surprising that only one third (33.1%) were participated in public awareness activities like tree plantation and only 35.1% educated family members on global warming and adopted house hold strategies to prevent it. Only 7.6% had contributed for organizations/ agencies that are working for GCC and just 5.8% felt that they have done a lot to prevent Global warming.

Table 2: Association of Sociodemographic details with knowledge and Responsibilities

		Male	Female	P value
Residence	Rural	19	21	0.199
	Urban	47	84	
Schooling	Government	9	10	0.458
	Private	57	95	
Per capita income	10000 or less	30	44	0.751
	Greater than 10000	36	61	
Opinion about gcc	Not aware	15	6	0.002
	Aware	51	99	
Aware that gcc is amajor problem	No	0	3	0.285
	Yes	66	102	
Aware that gcc is human induced	Not aware	21	52	0.027
	Aware	45	53	
Awareness on recyclable material	Not aware	58	86	0.390
	Aware	8	19	
Causes of gcc	Not aware	6	4	0.187
	Aware	60	101	
Effects of gcc	Not aware	3	12	0.167
	Aware	63	93	
Control measures	Not aware	0	2	0.523
	AWARE	66	103	
Inclusion in modern curricula	Disagree	5	4	0.309
	AGREE	61	101	
Participation in public awareness activities	No	42	71	0.621
	YES	24	34	
Adoption of preventive house hold strategies	No	47	64	0.191
	YES	19	41	
Contribution to organizations	No	54	104	0.000
	YES	12	1	
Satisfaction	Have done little & have to do more	61	100	0.511
	Have done a lot	5	5	
		Rural	Urban	P value
Opinion about gcc	Not aware	8	13	0.102
	AWARE	32	118	
Aware that gcc is amajor problem	No	2	1	0.137
	YES	38	130	
Aware that gcc is human	Not aware	19	54	0.584

induced	AWARE	21	77	
Awareness on recyclable material	Not aware	33	111	0.805
	AWARE	7	20	
Causes of gcc	Not aware	4	6	0.246
	AWARE	36	125	
Effects of gcc	Not aware	4	11	0.753
	AWARE	36	120	
Control measures	Not aware	0	2	1.000
	AWARE	40	129	
Inclusion in modern curricula	Disagree	1	8	0.687
	AGREE	39	123	
Participation in public awareness activities	No	32	81	0.037
	YES	8	50	
Adoption of preventive household strategies	No	29	82	0.344
	YES	11	49	
Contribution to organizations	No	38	120	0.735
	YES	2	11	
Satisfaction	Have done little & have to do more	37	124	0.701
	Have done a lot	3	7	

Females (94%) are well aware that global warming is increasing nowadays when compared to males (77%) and this is statistically significant with 'p' value $\ll 0.005$. However, males (68%) are knowledgeable than females (50%) regarding the fact that, Humans are responsible for global warming, this difference is statistically significant with 'p' value < 0.05 .

Males (18%) were very active in taking up the responsibility to prevent global warming by contributing to organizations compared to females (0.9%), this is statistically significant and 'p' value is $\lll 0.001$. Whereas, knowledge levels and responsibility of both males and females is similar for rest of the questions asked on GCC.

There was no major difference in the knowledge levels and taking up responsibilities among the people living in the rural compared to urban, except for participation in the public awareness activities. More people living in urban areas (38%) were participating in such activities compared to those who live in rural (20%). This difference is statistically significant and 'p' value is < 0.05 .

Table 3: government compared to private

		Government	Private	P value
Opinion about gcc	Not aware	1	20	0.474
	Aware	18	132	
Aware that gcc is a major problem	No	0	3	1.000
	Yes	19	149	
Aware that gcc is human induced	Not aware	9	64	0.806
	Aware	10	88	
Awareness on recyclable material	Not aware	12	132	0.015
	Aware	7	20	
Causes of gcc	Not aware	0	10	0.605
	Aware	19	142	
Effects of gcc	Not aware	4	11	0.067
	Aware	15	141	

Control measures	Not aware	0	2	1.000
	Aware	19	150	
Inclusion in modern curricula	Disagree	1	8	1.000
	Agree	18	144	
Participation in public awareness activities	No	11	102	0.448
	Yes	8	50	
Adoption of preventive house hold strategies	No	11	100	0.611
	Yes	8	52	
Contribution to organizations	No	17	141	0.641
	Yes	2	11	
Satisfaction	Have done little & have to do more	17	144	0.307
	Have done a lot	2	8	

There was no major difference in the knowledge levels and taking up responsibilities among the people studied government compared to private, except for knowledge on recyclable materials. More people studied in Government (37%) were aware of recyclable materials compared to those who studied in private (13%). This difference is statistically significant and 'p' value is <0.05.

Table 4: Association of PCI with Awareness and Responsibilities

		10000 or less	Greater than 10000	P value
Opinion about gcc	Not aware	8	13	0.647
	Aware	66	84	
Aware that gcc is amajor problem	No	3	0	0.079
	Yes	71	97	
Aware that gcc is human induced	Not aware	35	38	0.349
	Aware	39	59	
Awareness on recyclable material	Not aware	62	82	1.000
	Aware	12	15	
Causes of gcc	Not aware	5	5	0.748
	Aware	69	92	
Effects of gcc	Not aware	4	11	0.275
	Aware	70	86	
Control measures	Not aware	1	1	1.000
	Aware	73	96	
Inclusion in modern curricula	Disagree	5	4	0.503
	Agree	69	93	
Participation in public awareness activities	No	54	59	0.106
	Yes	20	38	
Adoption of preventive house hold strategies	No	50	61	0.628
	Yes	24	36	
Contribution to organizations	No	69	89	0.779
	Yes	5	8	
Satisfaction	Have done little & have to do more	71	90	0.517
	Have done a lot	3	7	

There was no major difference in the knowledge levels and taking up responsibilities among the people with PCI Rs.10000.00 or less compared to PCI with greater than Rs. 10,000.00. none of the variables were statistically significant.

DISCUSSION

A total of 171 medical students were included in this study (66 boys and 105 girls). In all, 168 (98.40%) students commented that global climate is changing, while 98 (57%) students opined those human activities are contributing to climate change. Similar findings were reported by Majra and Acharya in their study, which was conducted among the medical interns where majority of the respondents (113, 87%) were aware that there is a climate change.^[4]

In this study, the commonest source of information about climate change was newspaper and magazines followed by television, Internet and Radio. The study done by Carr et al. reveals that the most important source of information among the respondent was television (77.3%), followed by teacher, internet, textbook in school which clearly states that electronic media are more dominant source of information.^[5]

In present study majority of students (94.5%) were aware that GCC is caused by human activities such as air pollution, water pollution, industrialization, urbanization, deforestation, etc. In the study done by Majra and Acharya, majority of the respondents were aware of the various human activities, such as the ever increasing population (85%), industrialization (88%), urbanization (92%), deforestation (92%), increase in international trade or travel (85%), and our increasing dependence on carbon-based energy, such as fossil fuels (88%), which contribute to the climate change.^[4] In a study conducted by Pandve et al. 98.5% of the respondents said global climate is changing; 95.5% of the respondents also commented that human activities contribute to climate change.^[6] Likewise, the results of a cross-sectional study conducted by Yang et al. among medical, public health and nursing students in universities in China in 2017 among 1387 students sampled in five different regional universities in China showed only 58% students correctly identified the causes of climate change, 88% respondents believed that climate change is bad for human health and 67% of respondents believed that climate change is controllable.^[7]

In present study most of students (91.2%) aware of effect of Global climate change. The study conducted by Barimah et al. in Ghana where most of the respondents were aware of changing trends in atmospheric temperatures and rainfall patterns.^[8] Another study conducted by Kabir et al. in Bangladesh also illustrates similar effects and consequences such as an increase in temperature, rainfall pattern, flood which is similar to the current study which shows 91.8% respondents said climate change affects rain pattern, and 73.6% said increased temperature.^[9] In present study most of students (98.5%) have knowledge and understanding about its consequences and effects on humans. A study conducted by Sulistyawati et al. illustrates that 50.9% of the respondents perceived that climate change is an unbreakable process, 86.4% of the respondents perceived raise at sea level as one of the impact of climate change.^[10]

In this study, education and awareness regarding climate change are the most effective strategies in tackling climate change issues according to 88.5% of the students, followed by lifestyle changes (63.20%), international partnership (22.2%), and more research in climate change (18.4%). In the study conducted by Majra and Acharya, knowledge of the medical interns regarding health protection was limited to mitigation of climate change by means of decreasing the use and dependency on fossil fuels, more use of renewable sources of energy, decreasing air pollution, reforestation, training of the healthcare provider, and education of the masses.^[4] In the study by Pandve et al. about 54.5% of the respondents believed that youth could play a major role in combating climate change.^[6]

CONCLUSION

Participants have demonstrated that their knowledge levels regarding global warming is good, however their participation in taking up responsibilities is not satisfactory. Gender, schooling, residence and per capita income had little influence on the knowledge and responsibility of GCC. More activities need to be planned to make the people actively participate in adopting preventive strategies of global warming and also some stringent enforcements need to be brought in, to strengthen these activities such as Plastic free, smoke free public places, intensifying campaigns like swachh bharat.

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