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Original Research Article

Awareness and practices regarding climate change and its effects on health, in an urban community: a cross sectional study

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ABSTRACT

Background: Aim was to assess the level of awareness and practices related to climate change and its effects on health among urban population in metropolitan city. To recommend awareness programs regarding climate change and its health hazards for urban population based on results.
Methods: Community based cross sectional study was conducted among 180 adults from January 2022 to March 2022. The data was entered in MS Excel and was analyzed by using SPSS-16 software.
Results: The awareness about climate change was 63%. 76% of the respondents did not agree that climate change is related to extreme weather phenomenon. All the participants believed that climate change affects health, but none of them were aware that it is causing increased incidence of cancer. 73% of the participants always adopted climate friendly alternatives to using own motor vehicles. None of the participants practiced garbage segregation. Only 19% always used climate friendly alternatives to plastic bags. 74% respondents were unable to give concrete solutions to control climate change. 14% participants suggested planting more trees, 10% called for control of industrialization and population explosion. 66% obtained their information from newspapers. None of them viewed scientific journals. There was no significant association between educational status and awareness of climate change.
Conclusions: The population is moderately aware of climate change. They are not well aware of its long-term impacts on health. There is an urgent need for them to be well informed with verified sources of information. Appropriate campaigns must be initiated.

Key words: Climate change, Floods, Health, Awareness

INTRODUCTION

Climate change refers to long-term changes in temperatures and weather patterns. Climate change due to human activities is causing dangerous disruption in nature and is affecting the lives of billions of people. Populations are already experiencing its effects, like floods and heat waves. Greenhouse gases are choking the earth and it is a code red for humanity. Populations in developing countries are expected to suffer the most as they have fewer resources to adapt. India's average temperature has risen by around 0.7°C in the last century. In 2019, India was the 7th most affected country due to climate change led extreme weather events both in terms of the mortalities (2,267 deaths) and the economic losses (66,182 million US$ PPP). Extreme weather phenomena due to climate change have led to 17 out of 20 people in India being vulnerable to extreme hydrological and meteorological (or "hydromet") disasters. These in turn have downstream effects on human health.[1-3]

There have been many initiatives to spread awareness on climate change, but there's scope for much improvement. There is an urgent need to measure the level of awareness on climate change of the public and educate them accordingly, so that they may adopt climate friendly practices.[4] In response to this, the present study was conducted to assess the knowledge, awareness and practices about global climatic change (GWCC) of the urban general population residing in the urban field practice area in Chennai.

METHODS

Descriptive cross-sectional study was conducted from January 2023 to March 2023 among general population more than 18 years of age permanently residing in urban field practice area attached to Tertiary care center in a metropolitan city.

Sample size

As there were no standard reference articles related to awareness of climate change, assuming the prevalence to be 50%, with absolute precision of 7.5%, by applying the formula N = 4pq/d^2, we get N = 177.78. Hence by rounding off, sample size is taken as 180.

Study tool

Study tool used was semi-structured, pretested Validated Questionnaire. It was prepared in English, translated to Tamil by expert scholar and again retranslated to English to ensure Linguistic validity.

Inclusion criteria

Inclusion criteria were; persons >18 years of age, those willing to participate in the study and both sexes.

Procedure

After obtaining clearance from the Institutional Ethics Committee and permission from the Dean of the institution, persons who satisfy the inclusion criteria and were willing to participate were included for this study. Informed written consent from the participants was obtained before enrolling the participant or using their data in this research. They were then given a questionnaire to be filled by themselves to collect the preliminary data for this study. If the participants faced any difficulty in reading or comprehending the questions or difficulty in language, information was collected by a face-to-face interview using the questionnaire under full privacy and confidentiality. The participants were thanked for their participation in the study.

Questionnaire

Demographic information Q1-Q5, Awareness regarding climate change and its effects on health Q6-Q21, Practices regarding climate change Q22-Q25, Sources of information Q26.

Statistical analysis

The data were collected in MS Excel and analyzed. Percentages of each response was calculated. Data was then analyzed using SPSS-16 software.

RESULTS

63% responded as being 'moderately aware' of climate change, 38% were unaware and none of them could say they were well aware.[5-8] 77% respondents were unable to explain what climate change is. 11% defined climate change as 'changing climatic conditions', while 12% defined it as extreme weather and increased natural disasters. 63% of the respondents felt that human activities are the main cause for climate change, while 37% believed climate change is a natural process.

Table 1: Demographic information.

Socio demographic information		N	%
Age (years)	≤30	37	20.5
	31-40	35	19.5
	41-50	37	20.5
	51-60	36	20
	61-70	16	8.9
	≥71	19	10.6
Sex	Male	86	47.8
	Female	94	52.2
Education	Uneducated	18	10
	Primary	48	26.7
	Secondary	58	32.3
	Undergraduate	52	28.8
	Postgraduate	4	2.2
Occupation	Professional	3	1.7
	Semi-professional/ Clerical/ shop-owner	46	25.6
	Skilled worker	57	31.7
	Unskilled worker	22	12.3
	Unemployed	39	21.8
	Student	14	7.9

Total 63% of the respondents agreed that deforestation is a cause for climate change, and 61% of the respondents agreed that consumption of fossil fuels leads to climate change. Only 3 persons (2%) could correctly name Carbon dioxide (greenhouse gases) as the main causative gas for climate change and 177 persons (98%) were unaware of CO2. 80% did not believe that climate change is a serious issue and 40% did not believe that they were affected by climate change. 85% of the respondents were not even aware of the phenomenon of rising sea levels. 76% of the respondents did not agree that climate change is related to increased floods and extreme weather phenomenon. All the participants believed that climate change does affect health, but none of them were aware that it is causing

increased incidence of cancer. 78% of the participants were aware that climate change is causing more respiratory diseases, However, 92% of the participants were not aware that climate change is related to increasing incidence of infectious diseases. 77% correctly agreed that there was a causal relationship between climate change and malnutrition.

Table 2: Awareness.

Questions		N	%
How well do you understand climate change	Unaware	68	37.8
	Moderately aware	112	62.8
	Well aware	0	0
What is climate change	Changing climatic conditions	20	11.1
	Extreme weather	11	6.1
	Increased Natural disasters	11	6.1
	Unable to explain	138	76.7
Main cause of climate change	Natural causes	66	36.7
	Human activities	114	63.3
Is deforestation a cause for climate change	Yes	113	62.8
	No	67	37.2
Does consuming fossil fuels cause climate change	Yes	110	61.1
	No	70	38.9
Main gas causing climate change	CO2	3	1.7
	Not aware	177	98.3
Is climate change a serious issue	Yes	37	20.5
	No	143	79.5
Does climate change affect me	Yes	108	60
	No	72	40
Is climate change related to rising sea levels	Yes	12	6.6
	No	16	8.9
	Not aware	152	84.5
Increased floods and cyclones are due to climate change	Yes	136	24.5
	No	44	75.5

Total 74% of the respondents were unaware of or unable to give concrete solutions to control climate change. However, 14% participants suggested planting more trees, 10% called for control of industrialization and population explosion. 66% of the population obtained their information from newspapers, 25% from Television, 9% from the internet, and none of them had viewed scientific journals for the same. 101 respondents (56%) felt that climate change is not controllable. 73% of the participants always adopted climate friendly alternatives to using own motor vehicles, while 15% of them adopted these alternatives sometimes. They instead used public transport or walked/bicycled when possible.

Table 3: Awareness regarding climate change and health.

Questions		N	%
Does climate change affect health	Yes	180	100
	No	0	0
Is climate change causing increased incidence of cancer	Yes	0	0
	No	180	100
Is climate change causing increased incidence of respiratory diseases	Yes	141	78.4
	No	39	21.6
Is climate change causing increased incidence of infectious diseases	Yes	14	7.7
	No	166	92.3
Is climate change causing increased incidence of malnutrition	Yes	138	76.6
	No	42	23.4
Is climate change controllable	Yes	79	43.8
	No	101	56.2

Table 4: Suggestions given by participants and sources of information used by participants.

Parameters		N	%
Suggestions to control climate change	Plant more trees	26	14.4
	Lesser industrialization	9	5
	Control population explosion	8	4.5
	Adopt vegetarianism	4	2.2
	Not aware	133	73.9
Source of information	TV	45	25
	Newspaper	119	66.1
	Internet	16	8.9
	Scientific journals	0	0

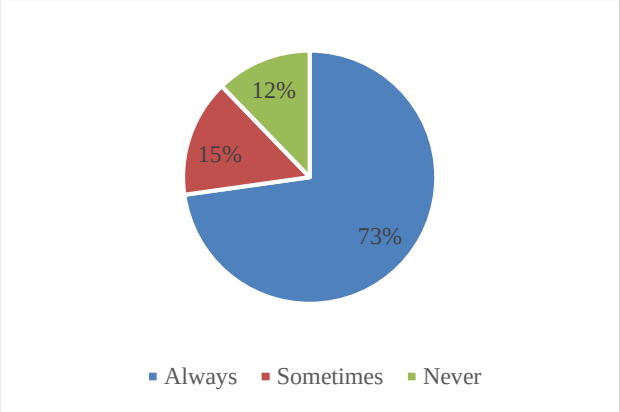

Figure 1: No. of persons who avoid motor vehicles and instead walk, use public transport, bicycle, electric vehicles.

None of them used electric vehicles. None of the participants practiced garbage segregation. With regard to using cloth bags/jute bags/baskets over disposable/plastic bags, 73% of the participants used them sometimes, while only 19% used them always.

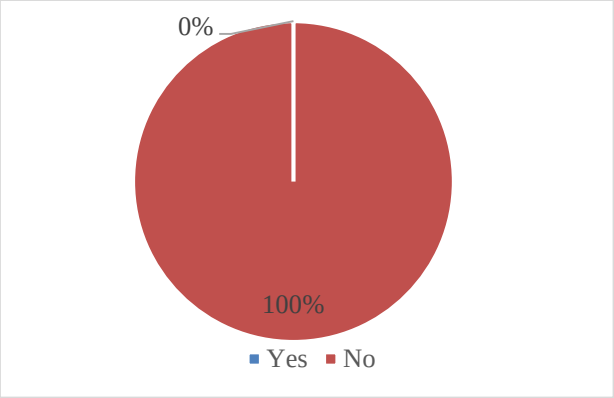

Figure 2: No. of persons practicing garbage segregation.

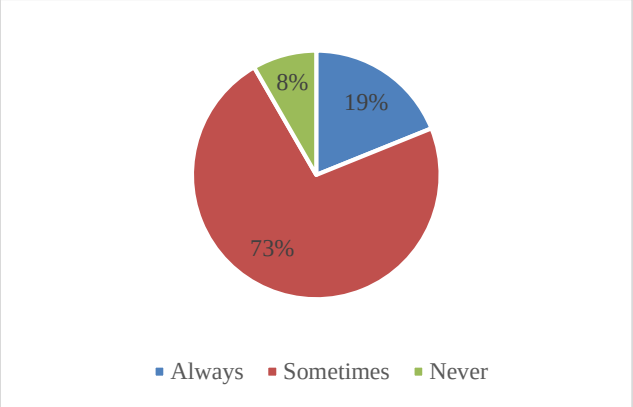

Figure 3: No. of persons who use reusable bags over disposable bags.

DISCUSSION

Climate change is an enormous part of life today. It is interlinked to all activities on the earth. Its impact on human life is ever increasing and this is causing growing concern among the global community. According to the World Health Organization, the impact of recent climate change has already caused the loss of 150,000 human lives and about 5 million DALYs (Disability Adjusted Life Years) throughout the world. Our study was aimed at an urban population above 18 years of age, presenting to a government medical college hospital. 38% of the respondents admitted to being largely unaware of climate change. While 63% were 'moderately aware', none could say they were well aware. When asked to simply explain climate change, 77% were unable to explain it. 11% explained it as 'changing climatic conditions', while 12% described it as 'extreme weather' or 'increased natural disasters'. This demonstrated that although the group had a moderate idea about this issue, they didn't understand this phenomenon completely. 37% of the respondents attributed climate change to natural causes, while 63% attributed it to increased human activities in recent times. This is in accordance with globally accepted information regarding carbon emissions and greenhouse gases causing climate change.[9,10]

Nearly 37% and 39% of the respondents weren't aware that deforestation and fossil fuel consumption respectively lead to climate change. And although 60% of the population were aware of the effects of deforestation and fossil fuels on the climate, only 2% of the respondents were able to correctly name CO2 (carbon dioxide and other greenhouse gases) as the primary causative gas for climate change. A staggering 98% were unaware of CO2 and greenhouse gases driving climate change. This again is an indicator that the public has a superficial knowledge of climate change and general awareness is lacking.[11] Nearly 80% did not believe that climate change is a serious issue, while 40% of the population did not believe that climate change affects them. 60% of the respondents believed that they are affected by climate change, drawing from personal experiences. These could be extreme weather conditions or health conditions like infectious diseases and respiratory diseases. While 9% of the respondents incorrectly believed that climate change isn't related to rising sea levels, 85% of the respondents were not even aware of the phenomenon of rising sea levels. 76% of the respondents did not agree that climate change is related to increased floods and extreme weather phenomenon.

A 2009 study conducted in California revealed that most public health officers feel that climate change poses a serious threat to public health but that they do not feel well equipped in terms of either resources or information to cope with that threat.[12] A 2007 study conducted by the IPCC in Spain acknowledged the increase in extreme weather events recently namely, floods, droughts, change in precipitation patterns due to melting ice reserves.[13,14] The health impacts of climate change and climate change induced floods have been expounded by these studies which shows how floods lead to injuries, drowning, diarrheal diseases, vector borne diseases, mental health issues and PTSD. This shows that these health impacts are not restricted to only the time of occurrence, but have longer lasting effects that are not easy to quantify.[15–17] Similar studies have demonstrated the health impacts of floods.[3,18]

The findings of our study were in contrast to a study conducted in USA, Canada and Malta to asses public perception of climate change as a human health risk factor. When asked directly about the potential impacts of climate change on health, a majority of people in all three nations said that it poses significant risks; moreover, about one third of Americans, one half of Canadians, and two-thirds of Maltese said that people are already being harmed.[19] While general awareness of climate change was lacking, all the respondents agreed that climate change does affect health. This was well proven with 78% of the respondents

agreeing that climate change is increasing the incidence of respiratory diseases (bronchial asthma, bronchitis, rhinitis, ARDS, COPD), as a majority of them had themselves suffered from any of these at some point in their lives. However, only 8% of the study group could say that climate change is increasing the incidence of infectious diseases. This is in stark contrast to similar studies conducted in India, New Zealand, and England which demonstrate that climate change is directly related to increasing infectious diseases, particularly diarrheal diseases, vector borne diseases, and the possibility of dormant organisms being released by the melting of glaciers.[1,3,16]

None of the participants believed that climate change is increasing the risk of developing cancer, with all 180 denying that climate change is linked to cancer. On the contrary, since 2020, a growing body of investigations have revealed that cancer risk is increasing with climate change. This may be due to increased UV radiation, higher exposure to carcinogens and interruption of cancer care.[20–23] Regarding climate change causing malnutrition, 138 persons (77%) agreed that climate change is leading to more malnutrition. The general consensus was that the unpredictable climatic conditions are affecting cultivation of food crops leading to shortage of food.[24] Opinions on whether climate change is controllable were split, with 56% disagreeing, and 44% agreeing that climate change could be controlled. This may be attributed to their limited awareness that many of their daily activities themselves were causes for climate change.

The next section was to assess climate friendly practices followed by the public. 73% of the participants answered that they always adopted climate friendly alternatives to using own motor vehicles, while 15% of them adopted these alternatives sometimes. They instead used public transport or walked/bicycled when possible. None of them used electric vehicles. However, these practices were largely adopted due to them not being able to afford own motor vehicles, rather than consciously practicing these to benefit the environment. None of the participants practiced garbage segregation. They did not have adequate knowledge of it, and also did not have suitable facilities to segregate garbage. Additionally, they felt that even if they did start segregating their garbage, the corporation did not collect them separately.

With regard to using cloth bags/jute bags/baskets over disposable/plastic bags, 73% of the participants used them sometimes, while only 19% used them always. Again, this was done more as a cost saving measure, than with the intention of protecting the climate. When asked to suggest measures to control climate change, 74% of the respondents were unable to give concrete solutions to control climate change. However, 14% suggested planting more trees, 10% called for control of industrialization and population explosion, while 2% believed that reducing meat consumption and adopting vegetarianism can control climate change. The impact of a non-vegetarian diet on global warming is a relatively new area of research, with recent evidence suggesting that it does burden the environment.[25-28] The last section of the questionnaire sought to find out sources for information for the participants. 66% of the population obtained their information from newspapers, 25% from Television, 9% from the internet, and none of them had viewed scientific journals for the same.[10] In this current digital age, where the internet is the biggest and most easily available source of updated information, it is unexpected to see 66% of the population still dependent on newspapers, with only 9% accessing the internet and none referring scientific journals. As the study population was persons presenting to a government hospital, this finding could be a reflection of their educational status and their accessibility to internet. Even if they do have access to internet, they do not prefer to gather information on climate change, which is consistent with the finding that 80% of the participants do not believe climate change is a serious issue. However, seeing as internet access will improve with increased smartphone usage, internet and newspapers could be vital tools in spreading awareness to educate the public on climate change.[4,29]

Limitations

Limitations of current study was the descriptive nature of study.

CONCLUSION

The findings of this study indicate that the population is moderately aware of climate change. They are not well aware of its long-term effects on health. They are more familiar with local manifestations of climate change (like floods and asthma) but not aware of the global picture. This study is a reflection of the role of education, socioeconomic and demographic indicators and urban welfare and support systems, on awareness of climate change. The population must be empowered to adopt climate friendly practices in their capacity. Seeing as internet and social media is not being harnessed effectively, awareness campaigns and outreach programs must be initiated to educate the public and make them partners in this movement. In this regard, we propose the following recommendations: Improve basic education and climate literacy by awareness and sensitization campaigns. Harness internet, social media and school education to reach a wider audience. Emphasize the impact of climate on health and engage communities for climate friendly initiatives. The Government of India launched National Action Plan on Climate Change (NAPCC) on 30 June, 2008 outlining eight National Missions on climate change. It is important that this program reaches all levels of the community. it can be integrated in school curriculum and must use internet and social media effectively. It must also encourage the public to adopt climate friendly practices in daily life, to gain knowledge through verified sources of information and to make informed choices. Climate-resilient farming. Application of modern yet sustainable

waste management and soil conservation initiatives in all households. Scale up events like Climate Day, Earth Day to emphasize the importance of saving the environment. Incentivize families and commercial enterprises to adopt climate friendly practices. Improve quality and availability of public transport facilities, electric vehicles.

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