



KNOWLEDGE OF CLIMATE CHANGE AMONG SOME SELECTED SECONDARY SCHOOL STUDENTS IN JALINGO LGA, TARABA STATE.

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ABSTRACT

Climate change is a global issue resulting from diverse anthropogenic activities. This study assessed the knowledge of climate change among some selected secondary schools in Jalingo metropolis, with the objectives to assess the knowledge level on climate change among students of secondary schools in Jalingo metropolis, to identify the sources of information on climate change among secondary school students in Jalingo Metropolis. The population of the study constitutes 400 students out of 7437 secondary school students in Jalingo. The study adopts a cross-sectional description survey design, data collection was done using KoboCollect and analyzed using SPSS. The finding of the result shows a positive response from the respondents with 80.8% knowledge level. The study showed that there is a relationship between gender of students and climate change knowledge ($P=0.293$), There is no significant relationship between the Parents/Guardian occupation and that of climate change knowledge among the secondary school students in Jalingo metropolis ($p=0.709$), the analysis shows that there is a significant relationship between age of students and the knowledge of climate change ($p=0.001$) The study recommended climate should be introduced into primary and secondary curriculum as an independent subject of its own, climate change should be integrated into general studies in the universities, ministry of education should develop teaching and learning materials in the field of climate change for education and instruction.

Keywords: Climate Change, Knowledge, Secondary School, Jalingo

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INTRODUCTION

Climate, usually defined as the "average weather," is more rigorously, defined in terms of the mean and variability of relevant

quantities over a period ranging from months to thousands or millions of years. The classical period is 30 years, as defined by the World Meteorological Organization (WMO).

These quantities are most often surface variables such as temperature, precipitation, and wind. Climate change is a global issue resulting from diverse anthropogenic activities. Health, as defined by the World Health Organization (WHO), is "a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity.

Worldwide observed and anticipated climatic changes for the twenty-first century and global warming are significant global changes that have been encountered during the past 65 years. Climate change (CC) is an inter-governmental complex challenge globally with its influence over various components of the ecological, environmental, socio-political, and socio-economic disciplines (Adger *et al.*, 2005; Leal Filho *et al.*, 2021; Feliciano *et al.*, 2022).

Scientific findings have indicated that a changing climate has a significant impact on our planet. Climate change is one of the most important environmental issues facing the world today. This evidence can be shown by the number of conferences, campaigns, reports and researches on climate change in the last 20 years (Agenda 21 of Rio declaration 1992, Intergovernmental Panel on Climate Change (IPCC), 2001, Copenhagen, 2009) etc.

According Newsham. (2014) it is predicted that climate changes affect both the environment and the humankind, whereas human health is affected by the ecological condition. Climate changes adversely affect humans, including their health, in several ways. The rising global temperature causes problems to people who have respiratory diseases such as asthma. A research reported

an increase of severe asthma incidence during a thunderstorm in the pollen season due to allergy (D'Amato *et al.*, 2007). Another case reported that high precipitation, high temperature, and wind influence people's outdoor physical activities, including young people (Chan and Ryan, 2009). Physical activity is one of the health determinants. Another climate change effect on health is related to vector-borne diseases. Thus, due to climate variability, economic status, vector control ability, and drug resistance (Githeko *et al.*, 2000), according to that evidence, climate change and human health are interrelated (Sulistyawati *et al.*, 2018).

The human symptoms of climate change are unequivocal and potentially irreversible affecting the health of populations around the world today (Watts *et al.*, 2017). Climate change is no longer a looming threat but rather a destructive reality with dire predictions for the future. The World Health Organization (WHO) estimates an increase of 250,000 excess deaths per year between 2030 and 2050 due to the "well-understood impacts of climate change". Impacts include man-made diseases heat-related morbidity and mortality, increases in vector-borne diseases (e.g. Dengue fever, malaria), increased respiratory illness, and morbidity and mortality due to extreme weather events (Hayes *et al.*, 2018).

Assessing teenagers' understanding related to climate change impact on health is a critical section for some reasons. First, it is important to have a better adaptive capacity for teenagers. As a simple example, if teenagers understand that sun exposure damages their skin, they will apply appropriate protection (Sulistyawati *et al.*,

2018). Knowing the respondent's preference of climate change source information is an essential part to provide effective and efficient information. Second, a teenager or adolescent is a proper agent of change whose possible role is a climate change message carrier. Some researchers have successfully engaged adolescents as a message carrier ([The National Council of Swedish Youth Organizations, 2005]; [Nigatu *et al.*, 2014]). Nevertheless, a limited number of studies addressed the role of adolescents in climate change, including in Indonesia. Even though research was conducted to capture the adolescent perception in a similar topic (Sulistyawati and Nisa, 2016), it was organized in a small setting. Therefore, it is essential to generate research in a broader context (Sulistyawati *et al.*, 2018).

Considering the whole background, the perception of adolescents regarding climate change impact on health is important to observe. Thus, we refer to the IPCC guideline in the adaptation process where knowledge data became one out of six components in adaptation implementation (IPCC, 2017). In our setting, we engaged adolescents as one community element, which may play a role in bringing climate change messages to the community as part of climate change adaptation preparation. Our research was aimed at assessing formative knowledge of adolescents about climate change impact on health and at providing recommendations of appropriate action towards increasing the young people's knowledge (Sulistyawati *et al.*, 2018).

The risks and impacts of climate change, as well as the capacity to respond to it, vary considerably among countries. The baseline health status of a country, or a community, is

the single largest determinant of the likely impact of climate change and the cost of adapting to it, according to the World Bank, 2010. Population growth is linked to climate change vulnerability as an increase of people in areas that are resource poor and affected by climate risks will magnify harmful impacts, including those related to health, and this is exactly the case in Nigeria. Also changes in rainfall have altered distribution of some waterborne illnesses and disease vectors, and reduced food production for some vulnerable populations globally.

Climate change mitigation is a human intervention to reduce the sources or enhance the sinks of greenhouse gasses including but not limited to power plants, livestock/abattoirs, residential buildings, road transport, deforestation, commercial buildings, cement ceramics, landfill and other refuse dumpsites etc (Nzeobi *et al.*, 2020). Human interventions also reduce the sources of other substances that may contribute directly or indirectly to limiting climate change including, for example, the reduction of particulate matter (PM) emissions that can directly alter the radiation balance (for example, black carbon) or measures that control emissions of carbon monoxide, nitrogen oxides (nox), Volatile Organic Compounds (voc) and other pollutants that can alter the concentration of troposphere ozone (O₃) which has an indirect effect on the climate. Mitigation is relevant for the health sector, as reducing GHG emissions can be done in ways that promote and protect health (Adogu *et al.*, 2015).

Mitigation measures can also have beneficial health outcome. The WHO series, "Health in the Green Economy" has been reviewing evidence about health benefits or "win

outcomes from climate mitigation strategies in key economic sectors, including: housing, energy, transport, agriculture and health sector facilities, when these are adequately advocated by students to the general public, it will go a long way in mitigating the effect of climate change (Nzeobi *et al.*, 2020). Awareness of environmental issues is an effective aspect of the environment that allows pupils to treat the environment with extra care (Cui *et al.*, 2015).

RESEARCH METHODOLOGY

The study takes cross-sectional descriptive survey. A descriptive survey was deemed most appropriate for this study as it allows for identification and description of people's opinions about a phenomenon (Mugenda and

Mugenda, 2003), in this case climate change. This will involve a critical review of literature as well as field collection of data to provide the variety of information needed to assessing the knowledge of climate change among secondary school students in Jalingo Metropolis.

The study was carried out in both public and private secondary schools located in both urban and pre-urban areas within Jalingo metropolis with the total number of seven thousand, four hundred and thirty-seven (7437) students (Taraba State, Post Primary Management Board 2022). Of these 7437 registered students, four hundred (400) students were randomly sampled to answer the question using Taro Yamane's 1967 sample size estimation technique.

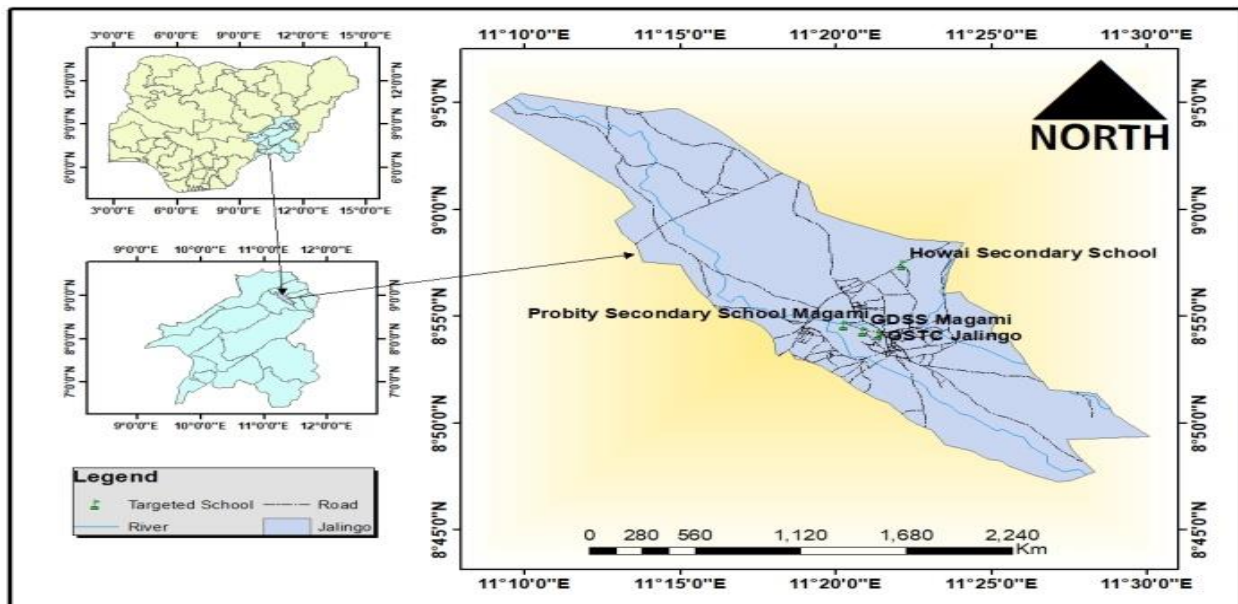


Plate 1: Map of Jalingo Local Government Area (Source: Adapted from Administrative Map of Taraba State, 2021).

RESULTS

Table 1: Participants responses to knowledge on climate change (n=400)

Item	Responses	Frequency	Percentage %
Have you ever heard of Climate Change?	Yes	398	99.5%
	No	2	0.5%
Climate is the change of weather over a long period of time.	Yes	387	96.8%
	No	13	3.3%
Climate change is happening right now.	Yes	377	94.3%
	No	23	5.8%
The global temperatures have changed compared to the previous years.	Yes	375	93.8%
	No	25	6.3%
Climate change threatens your personal health and safety	Yes	377	94.5%
	No	22	5.5%
Climate change is caused by human activities	Yes	309	77.3%
	No	91	22.8%
Climate change is global	Yes	365	91.3%
	No	35	8.8%
Climate change increases water shortage problem	Yes	364	91.2%
	No	35	8.8%
Climate change increases the incidence of flood	Yes	354	88.5%
	No	46	11.5%
Climate change will be more severe in the future if nothing is done	Yes	356	89.0%
	No	44	11.0%
Climate change causes loss of plants and animals	Yes	373	93.3%
	No	27	6.8%
The human community can control climate change	Yes	311	77.8%
	No	89	22.3%

Table 1 shows the responses of the student's questions. Have you ever heard of climate change: we have 398 that responded Yes with 99.5% and 2 that responded No with 0.5%.

Climate change is the change of weather over a long period of time: we have 387 that responded Yes with 96.8%, while 13 responded No with 3.3%. Climate Change is happening right now: we have 377 responded

Yes with 94.3% while 23 responded No with 5.8%.

The global temperature has changed compared to the previous years: we have 375 that responded Yes with 93.8% while 25 responded No with 6.3%. Climate change threaten your personal health and safety: we have 377 responded Yes with 94.5%, while 22 responded No with 5.5%.

Climate change is caused by human activities: we have 309 responded Yes with 77.3% while 91 responded No with 22.8%. Climate change is global: we have 365 responded Yes with 91.3% while 35 responded No with 8.8%. Climate change increase water shortage problem: we have 364 responded Yes with 91.2% while 35 responded No with 8.8%. Climate change increases the incidence of flood: we have 354 which responded Yes with 88.5% while 46 responded No with 11.5%. Climate change

will be more severe in future if nothing is done: we have 356 responded Yes with 89.0% while 44 responded No with 11.0%. Climate change cause loss of plant and animals: we have 373 which responded Yes with 93.3% while 27 responded No with 6.8%.

Human community can control climate change: we have 311 responded Yes with 77.8% while 89 responded No with 22.3%.

Table 2: Respondents source of information on climate change/global warming. (n=400)

Item	Source of Information	Frequency	Percentage %
How did you hear about Climate Change/Global Warming?	Family and Friends	21	5.25
	Internet/Social Media	91	22.75
	Newspaper/Magazines	21	5.25
	Teachers/School	120	30.00
	Parents/Guardian	47	11.75
	Radio	44	11.00
	Television	48	12.00
	Worship Place	2	0.5
	Posters/Fliers	3	0.75
Others	3	0.75	

Table 2 above shows the responses of how the students heard about climate change/global warming: Family and friends 21(5.25%) respondents, internet/social media 91(22.75%) respondents, newspaper/magazine 21(5.25%) respondents, teachers/schools with 120(30.0%), Parents/Guardians having 47(11.75%) respondents, Radio has 44(11%) respondents, Television has 48(12%), Worship Places has 2(0.5%) respondents, posters/fliers and others share the same number of respondents which is 3 accounting to 0.75% each.

TEST OF HYPOTHESES

Pearson correlation shows that there is no significant relationship between gender of secondary school students in Jalingo (P=0.293), parents/guardian occupation (P=0.709) and their knowledge on climate change. There is a significant relationship between Age of students and the knowledge of climate change (P=0.001).

DISCUSSION

Climate change has become a global issue that requires the attention of everyone. The study is to assess the knowledge of climate

change among students in some selected secondary schools in Jalingo Metropolis, their source of information about climate change, parent/guardian occupation contribution to their knowledge about climate change, their efforts to control climate change.

The finding of the study indicates 99.5% of the respondent to have ever heard of climate change and this almost tallies with findings of Nzeobi *et al.* (2020) where the entire 100% students have heard about climate change. Malgwi & Joshua (2021) also reported students felt weather pattern changes in the past ten years. From this study, 96.8% knew the correct meaning of climate as the change of weather over a long period. This study revealed that majority 120 representing 30% of the students got the knowledge and awareness of climate change from their schools/teachers and this agrees with the work of (Bello, 2014) unlike the findings of (Deshiana *et al.*, 2022) where 75% of the students got their information on climate change via social media.

In the study conducted by Barimah *et al.*, (2015) in Ghana where most of the respondents were aware of changing trends in atmospheric temperatures and rainfall patterns and effects and consequences such as an increase in temperature, rainfall pattern, flood which is similar to the current study which shows 93.8% respondents said global temperature has increased over the years, and 77.3% also said that it is as a result of human activities. Likewise, the results of a cross-sectional study conducted 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 (Yang *et al.*, 2018).

This finding shows that 88.5% of the respondents agree that climate change increases the incidence of flooding which is similar to the findings of (Deshiana *et al.*, 2022) where more than 80% of the respondents agree that the weather pattern has changed in their environment and 85.9% agree that climate change causes natural disasters such flood droughts.

This study also reveals that 94.7% of students agreeing to the statement that climate change influences personal health.

CONCLUSION AND RECOMMENDATIONS

The study concluded that the secondary students in Jalingo have an adequate level of awareness on climate change and effects of climate change on health and it also shows that majority of the students acquired the awareness on climate change from schools/teachers. It is recommended that students' awareness should be increased by involving them in project work activities such as doing researches on topics related to afforestation, reducing use of firewood, considerate use of non-renewable resource of energy, waste management, etc.

REFERENCES

- Adogu, P.O.U., Uwakwe, K.A., Egenti, N.B., Okwuoha, A.P. and Nkwocha, I.B. (2015). Assessment of Waste Management Practices among Residents of Owerri Municipal Imo State Nigeria. *Journal of Environmental Protection* 2015;6(5):10. Article ID:56212. DOI: 10.4236/jep.2015.65043
- Adger, W.N., Arnell, N.W. and Tompkins, E.L. (2005). Successful adaptation to climate change Across scales. *Glob Environ Chang* 15(2):77–86
- Akpomi, M.E. (2016). Promoting knowledge of climate change amongst Nigerians: Implications for Education Managers. *J Edu. Pract*,7(32): 132- 138.
- Barimah, P.T., Samuel, O. and Kwadwo, O.D. (2015). “Assessment of People's Knowledge and Perception on Climate Change: a Case Study of Asunafo North District, Ghana” Published 29 April 2015 *Political Science International Journal of Innovative Research in Science, Engineering and Technology*.
- Bello, T. (2014). Assessment of Secondary School Students’ Awareness of Climate Change. *International Journal of Scientific Research and Education*. 2. 2713.
- Chan C. B. and Ryan D. A., Assessing the effects of weather conditions on physical activity participation using objective measures, *International Journal of Environmental Research and Public Health*. (2009) 6, no. 10, 2639–2654.
- Cui, J., Jo, H., & Velasquez, M. G. (2015). The influence of Christian religiosity on managerial decisions concerning the environment. *Journal of Business Ethics*, 132(1), 203–231
- D’Amato, G., Liccardi, G. and Frenguelli, G. (2007) Thunderstorm-asthma and pollen allergy, *Allergy:European Journal of Allergy and Clinical Immunology*. 62, no. 1, 11–16,
- Deshiana, A., Sriyanti, I., & Ismet, I. (2022). High school student’s awareness and attitudes toward climate change. *Berkala Ilmiah Pendidikan Fisika*, 10(3), 255-239.
- Feliciano D, Recha J, Ambaw G, MacSween K, Solomon D, Wollenberg E (2022) Assessment of agricultural emissions, climate change mitigation and adaptation practices in Ethiopia. *Clim Policy* 1–18
- Githeko, A.K., Lindsay, S.W., Confalonieri, U.E., and Patz, J.A., Climate change and vector-borne diseases: a regional analysis, *Bulletin of the World Health Organization*. (2000) 78, no. 9, 1136–1147, 2-s2.0-0033813162.
- Hayes, K., Blashki, G., Wiseman, J. *et al*. Climate change and mental health: risks, impacts and priority actions. *Int J Ment Health Syst* 12, 28 (2018).
- Horton, G. and McMichael, T. (2009) Major adaptive strategies to lessen health risks associated with climate change. *Bayero Journal of Pure and Applied Sciences*. 2008;2(1):168-172 Received: February, 2009 Accepted: May, 2009

Intergovernmental Panel on Climate Change (IPCC) (2007). Impact, adaptation and vulnerability: Contributions of working group 11 to the fourth assessment report of the intergovernmental panel on climate change. New York: United Nations.

Intergovernmental Panel on Climate Change (IPCC) (2001). Third assessment report: climate change Retrieved March 10, 2014 from www.grida.no/publications/other/ipcc-tar/.

Kabir Russell, Hafiz T. A. Khan, Emma Ball, Kay Caldwell (2016), "Climate Change Impact: The Experience of the Coastal Areas of Bangladesh Affected by Cyclones Sidr and Aila", Journal of Environmental and Public Health, vol. 2016, Article ID 9654753, 9 pages, 2016.

Leal Filho W, Azeiteiro UM, Balogun AL, Setti AFF, Mucova SA, Ayal D, . . . Oguge NO (2021) The influence of ecosystems services depletion to climate change adaptation efforts in Africa. Sci Total Environ 146414.

Malgwi, P. G., & Joshua, W. K. (2021). Assessment of the perception and awareness of climate change and the influence of information amongst tertiary education students in north-east Nigeria. *Library and Information Science Digest*, 14(1), 14–24.

Mugenda and Mugenda 2003 Effect of Science process skills, mastering learning approach on student's accusation of selected chemistry practical skills in schools (creative education, volume 3 No. 8)

Newsham, A. (2014). Climate change, knowledge and learning Retrieved June 30, 2014 from <https://www.ids.ac.uk/idsresearch/climate-change-knowledge-and-learning>.

Nigatu, T. A., Asnake, M., Lundstrom, L., and Mussa, A., *Experience of the Integrated Family Health Program (IFHP) Peer Educators as Agents of Change*, 2014, Addis Ababa, http://www2.pathfinder.org/site/DocServer/IFHP_Technical_Brief_on_Peer_Educators_2014.pdf?docID=20201.

Nzeobi, J.R., Chineke, H. N., Ubajaka, C. F. and Adogu, P. O. U. (2020). Knowledge of Health Impact of Climate Change and Practice of Preventive Measures among Students of a Nigerian Tertiary Institution. *Asian Journal of Environment & Ecology* 13(4): 77-87, 2020

Pandve, H.T., Chawla, P.S. & Pawar, S. (2011). Assessment of awareness regarding climate change in an urban community. *Indian Journal of Occupational and Environmental Medicine*, vol. 15(3): 109-112.

Sulistyawati, S., Mulasari, S.A. & Sukesu, T.W. (2018). Assessment of Knowledge regarding Climate Change and Health among Adolescents in Yogyakarta, Indonesia. *J Environ Public Health*. 2018 Feb 15;2018:9716831. doi: 10.1155/2018/9716831. PMID: 29666660; PMCID: PMC5832100.

Sulistyawati, S. and Nisa, I. (2016). Climate Change and Health Teenager's Perceptions as a Basis

The National Council of Swedish Youth Organizations, *The Role of Young People in Poverty*

Reduction, 2005, <http://www.un.org/esa/socdev/publications/TPTPublication.pdf>.

Watts, N., Amann, M., Ayeb-Karlsson, S., Belesova, K., Bouley, T., Boykoff, M., Byass, P., Cai, W., Campbell-Lendrum, D., Chambers, J., Cox, P.M., Daly, M., Dasandi, N., Davies, M., Depledge, M., Depoux, A., Dominguez-Salas, P., Drummond, P., Ekins, P., Flahault, A., Frumkin, H., Georgeson, L., Ghanei, M., Grace, D., Graham, H., Grojsman, R., Haines, A., Hamilton, I., Hartinger, S., Johnson, A., Kelman, I., Kiesewetter G, Kniveton D, Liang L, Lott M, Lowe R, Mace G, Odhiambo Sewe M, Maslin M, Mikhaylov S, Milner J, Latifi AM, Moradi-Lakeh M, Morrissey K, Murray K, Neville T, Nilsson M, Oreszczyn T, Owfi F, Pencheon D, Pye S, Rabhaniha M, Robinson E, Rocklöv J, Schütte S, Shumake-Guillemot J, Steinbach R, Tabatabaei M, Wheeler N, Wilkinson P, Gong P, Montgomery H, Costello A. The Lancet countdown on health and climate change: from 25 years of inaction to a global transformation for public health. *Lancet*. 2017. [https://doi.org/10.1016/s0140-6736\(17\)32464-9](https://doi.org/10.1016/s0140-6736(17)32464-9).

Yang, L., Liao, W., Liu, C., Zhang, N., Zhong, S., & Huang, C. (2018). Associations between Knowledge of the Causes and Perceived Impacts of Climate Change: A Cross-Sectional Survey of Medical, Public Health and Nursing Students in Universities in China. *International journal of environmental research and public health*, 15(12), 2650.