

CLIMATE CHANGE AND HEALTH: IMPLICATIONS ON OUT OF POCKET HEALTH EXPENDITURE WITH SPECIAL REFERENCE TO KERALA

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Abstract

The paper attempts to review the impact of climatic changes on physical and mental health status of people using the available literature. It discusses the channels through which climate variations influence human health and briefly explains about vulnerabilities and adaptive measures associated with the issue. The paper specifically addresses the issue of climate change and human health in the context of Kerala. It is organized into three parts; first part deals with different dimensions of climatic changes and its implications on health on the basis of available literature. Second part attempts to have an exploratory analysis of the issue in the context of Kerala based on the insights from the first section and third part concludes by making observations on probable impacts climate change on out of pocket health spending.

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Introduction

Global warming and the resultant increase in global temperature have triggered discussions on probable effects of climate change on various aspects of human life including human health. The frequent occurrence of extreme climatic events in various countries and projections about the future changes further fuelled the discussions on impact of climate changes on human life(Singh, 2012). Almost all climate related changes have direct or indirect consequences on human health. Climate influences human health through different channels(Barata, 2011). So any change in climatic conditions will have its repercussions on human health . Many of the climatic changes of today are the results of human activities. The effects of climate change arising out of different human activities cannot be confined to any particular location or region, rather no region across the globe cannot be insulated from the adverse effects of climatic change. The present paper attempts to make an overall view of impacts of climatic variations on human health in general and the implications of the same in public health sector of Kerala. The paper is organized into three parts; first part deals with

different dimensions of impact of climate change on health using available literature. Second part attempts to have an exploratory analysis of climate change and its impact on health with special reference to Kerala using the insights from the first section and third part concludes the study.

Part 1 : Climate change and human health

Climatic variations take different forms like increase in atmospheric temperature, rise in sea water level, change in pattern of rainfall, frequent occurrence of extreme weather leading to excessive heat, extreme cold events, floods, cyclones etc(Henderson,2018). These climatic variations influence human health through different channels. The immediate effect of climate changer on human health is change in mortality as a result of increased temperature, disasters end up in flood, loss of lives and infrastructure because of cyclones, spread of different communicable diseases etc(Singh, 2012). Most of these adverse effects are already experienced in India and many of them can be found in Kerala also. Effects of climate change on health can take any of the three forms explained below(WHO,2008);

- Direct effects : occur due to direct exposure towards changing weather patterns like increased temperature, precipitation, sea level and frequent extreme weather conditions
- Indirect effects through natural systems: in the form of vector borne and water borne diseases etc.
- Indirect effects/Effects heavily acted through human system : refers to occupational impacts of climate change, under nutrition and mental stress etc.

Operation of climate change through these channels ultimately results in death, disability or suffering. Compared to other determinants of health, the effect of a change in climate is small at present. But this impact is not negligible in this ground because IPCC projections of progressive increase of impact of climate change on human health points out the current impacts acts like a warning signal for the future(WHO, 2008).

Even though the most visible impact on health is the increased death toll due to extreme weather conditions, the indirect impacts in the form of increasing cases of asthma and allergic diseases becomes relevant even for the less industrialized nations also(D'Amato,2013). The major risk factor responsible for this case is urban air pollution resulting from increased number of motor vehicles which is not only relevant for metropolitan cities, but for State like Kerala where increasing number of motor vehicles put pressure on existing infrastructure. Along with the above discussed physical health impacts, the impact of climate change on mental health is equally important.

1.2 Climate change and mental health

The literature in the field reveals increasing evidences of positive association between extreme weather events and various psychological problems. The frequent, intense and complex occurrence of extreme weather events often result in Post Traumatic Stress Disorder

(PTSD), Major Depressive Disorder(MDD), anxiety, depression, survivor guilt etc. Along with these, even the slow progressing climate changes have its own impact on mental health in the form of financial and relational stress, increased risk of violence and aggression, displacement of entire community etc. Paradoxically, the disaster situation may encourage altruism, compassion and optimism(Hayes,2018). People may stand together to fight the disasters and to rebuild their habitat which was very true in case of Kerala during the last floods.

So climate change is contributing to global burden of diseases and premature deaths. Even though recent decades have witnessed increasing contribution of climate change to worldwide burden of levels of ill health, as mentioned earlier, its contribution is comparatively small while considering other stressors on health(Smith, 2014). Often, the impact of climate change on health is not well quantified. Researchers point out that in the long run, the greatest health impact of climate change may not be from the acute shocks of epidemics or natural disasters, but from gradual building up pressure on natural and socio economic system which sustain growth(Leonard, 2011). The pressure experienced on public health system due to climate change is very significant. Additional stress is felt on health care services from the increased demand which results from weather related natural hazards. Extreme weather events often leads to loss of income, fall in productivity, displacement of people, increased mental stain for families and mounted cost of health care(Leonard,2011). Especially in case of a public health system like India where major lion share of expenditure on health is paid by households themselves in the form of out of pocket expenditure, the disease burden and the resultant economic burden in the form of health payments for weather created health issues become very relevant.

1.3 Vulnerabilities and Adaptation towards climate induced health impacts

Climate changes affect public health disproportionately implying that different people adapt differently to climatic changes and the resultant health shocks. The most marginalized and vulnerable sections of the society are the most affected from the impact of climate change(WHO,2008;WHO,2012). The immediate impact of climate change is felt on those who are most marginalized on the basis of social and environment related factors like socio economic status, culture, gender, race, employment and education(Smith,2014). So, the mental and physical implications of the climate change especially affect the marginalized groups which include children, women, old age people, and people with pre existing health condition and those from low social and economic strata.

Adaptation to different climatic changes refers to interventions that respond to the effect of climate change by adjusting, moderating and surviving the risk and impacts of climate change. Adaptation is ultimately affected by the capacity to adapt. A number of different

factors determine adaptive capacity which includes governance, economics, infrastructure, technology, information and skill, institutions etc(Hayes,2018;WHO,2003). Adaptive measures ultimately make the societies capable of avoiding, preparing for and effectively responding to health impacts related to climate change(Leonard,2011). The most efficacious measures to limit vulnerabilities are those programmes which can improve basic public health requirements like provision of clean water and sanitation, essential healthcare and increased capacity for disaster preparedness and response(Smith,2014). Along with such programmes, much more efforts are required to cope up with the health impacts of climate changes which can be explained as follows.

Various efforts taken by societies across the globe to adapt to impacts of climate change on health can be categorized into three(Smith, 2014);

- i. Incremental adaptation: It refers to improvements in public health sector and healthcare services in addressing climate related health outcomes. These improvements need not necessarily consider possible impacts of climate change
- ii. Transitional : It refers to shift in attitudes and perceptions of authorities. Such adaptation measures may result in initiatives like vulnerability mapping, improvements in surveillance system integrating ecological factors
- iii. Transformational: It requires rudimentary shifts in the system

The section attempted to study different dimensions of climatic variations and its impact on health; the channels through which climate change influences health, who are the most affected and regarding the adaptive measures adopted. But the complexity of the two ways interaction between climate change and health leave so many implications of the interaction understudied(Herlihy,2016).

Part 2 : Impact of climate change on human health in the context of Kerala

The impact of climatic variations on human health is universal in nature. No region across the globe is insulated from the impact. This paper specifically looks at the case of Kerala for a number of reasons. The important factors determining vulnerability towards health impacts are geographic causes, present health condition, age profile and gender, socio economic status, public health and other infrastructure. Kerala is a geographically sensitive place to natural hazards. It is the State with highest prevalence of non communicable diseases and with a significant percentage of old age people. Along with these unfavourable factors of vulnerability, the high density of population in the State makes it further vulnerable to impact of climate changes. But the other two factors; socio economic strata and public health infrastructure seem favourable for the State. As there is very limited literature on the topic in India and especially in Kerala, the researcher finds it worth focusing the study in Kerala.

Kerala is well known for its natural beauty and tropical monsoon climate. But in the last few years, the State has experienced the impact of climatic vulnerabilities in the form of shortfall in

monsoons, extreme warm weather and rise in frequency of natural disasters like extreme heavy rainfall and cyclones(GoK,2018). Like any other region, Kerala is also facing the adverse impacts of weather change through both direct and indirect channels. The following section discusses the implications of climate change on health in the context of Kerala.

2.1 Climate changes and the risk factors

As mentioned in the introductory part, Kerala is highly vulnerable and susceptible to climatic variations due to its high population density, dependency on climate sensitive sectors like agriculture, fisheries, long coastal line, presence of fragile ecosystem etc. Statistical data from official sources clearly indicates the changes taken place in the climatic situation of the State. IMD has estimated an increase in average temperature of the State by 0.6 degree celcius during the past 43 years and it is projected that the temperature is likely to increase to 20 degree celcius by 2050 and sea level would rise by 100 to 200mm by next 100 years(GoK,2018).

Along with the above mentioned natural risk factors, the morbidity scenario in the State also worsens the situation. Impact of climate change severely affects people already with some kind of ill health. The following section attempts to have an understanding of morbidity profile of the State.

Kerala has made significant advances in all three components of health transition-demographical, epidemiological and healthcare. The State was already in an advanced epidemiological transition with more prevalence of non communicable diseases rather than communicable diseases(GoK,2018). But in the recent past Kerala is experiencing an increasing prevalence of many communicable diseases. According to Economic Review 2018, Kerala is facing a dual burden from both communicable and non communicable diseases. Even though the State had a success history in preventing many of the communicable diseases, currently re emergence of various communicable diseases raises a new challenge to the State health system. Increasing number of dengue, chikungunya, leptospirosis, malaria, H1N1 reported in recent years has resulted in increased morbidity and mortality in the State.

2.2 Health system response

The section makes an attempt to understand the response of Kerala's health system to the climatic changes; how does the State's public health system respond to the impacts of climate change, both direct and indirect. Kerala has a comparatively developed public health system. Earlier, Government was involved in monitoring, provision and financing of various healthcare services. But now, its role is mainly limited to monitoring. Private players dominate in providing

health care and significant share of health payments are borne by households themselves in the form of out of pocket expenditure.

During the recent floods in the State, the performance of the public health was remarkable. In spite of severe damage to a large number of health facilities and resultant constraint in access to health services, service delivery was quickly restored and maintained by the Health Department. In association with Central Government, State health department successfully addressed medical emergencies during the flood time with the help of other organizations and local communities. Physical and mental health requirements of the affected persons were met to a possible extent(ADB,2018). System could prevent out break of post flood communicable diseases and death toll was comparatively low. In short, the existing health infrastructure in the State played a positive role in addressing the health impacts of recent floods.

Compared to the direct effects, the indirect effects often go unnoticed. Relevant literature clearly identifies existence of pre health condition as a factor determining vulnerability to climate changes. As Kerala tops in prevalence rate of many non communicable diseases, the State is much more vulnerable towards the impact of climate changes. Climatic variations add to the severity of health burden of people with non communicable diseases. Unlike in incidence of natural disasters and associated health effects, for these indirect impacts, the affected people may not get any type of assistance from the public health system.

2.3 Implications on Out of Pocket Expenditure

In the previous section, it was observed that indirect impacts receive less attention and assistance from the system when compared to the direct and immediate effects. So the additional financial burden in the form of health payments due to the impact of climate changes will ultimately borne by households or affected people. Among all the Indian States, average per person monthly OOP is highest in Kerala (Rs. 454). The total OOP constitutes upto 15-19% of all household expenditure across the quintile groups with an average of 17% of total household consumption expenditure(Karan,2016). It shows that the financial burden of health payments is higher in Kerala. These estimates are based on the existing definition of ‘medical expense’ which includes expenditure on medicines, diagnostic tests, bed charges during hospitalization, fee for doctor and ‘other expenditure’. ‘Other expenditure’ includes expenses on food, lodging, escorts etc(Karan,2016). Expenditure associated with climate change induced health impacts are-not the part of the definition of medical expenses neither explicitly nor implicitly. In the recent past, in the Delhi air pollution episodes, newspapers reported operations of ‘oxygen parlours’ where people pay for inhaling pure air. It explicitly shows the additional health payments arising out of climate change. So, if such costs can be added to health expenditure, current out of pocket payment levels will further increase. In the light of projections of increasing impact of climate change on human health, this must be taken care of by researchers and policy makers.

3. Conclusion

The paper was an attempt to understand interrelationship between climate change and human health. Different channels through which climate change influence health was assessed using the relevant available literature. Vulnerabilities and adaptation towards climate change and resultant effects in human health was examined in general first and then specifically in the context of Kerala's health sector. The paper arrives at the conclusion that people get assistance to survive the health shocks of extreme weather events as the impacts of such events on public health are quite visible or observable. But in case of indirect effects, this need not happen. As the quantification of the impact of climate change on health is highly difficult, its strength as a determinant of health becomes tough to estimate. In such cases, burden of diseases which are aggravated or initiated due to climate change will be totally fell on the affected persons. As the impact of climate change on human health is on an increasing track, projected by experts in the field, policy makers should take necessary measures to assist the affected people in case of indirect impacts of climate change also. With the ongoing incremental adaptive measures and initiated transitional measures, more attention must be given to transformational adaptation measures which demand fundamental changes in the system, only then the adverse effects of climate change on human health can be minimized.

References

1. Singh P K, Dhinan R C (2012). Climate change and human health – Indian context. *Journal of Vector Borne Diseases*, , 49, 55-60.
2. Barata, M., E. Ligeti, G. De Simone, T. Dickinson, D. Jack, J. Penney, M. Rahman, R. Zimmerman(2011).Climate change and human health in cities. *Climate Change and Cities: First Assessment Report of the Urban Climate Change Research Network*, 179–213.
3. WHO (2008). *Regional health forum*,12,1,India,WHO.
4. D'Amato,G.,Cagnani,C.,Cecchi, L., Maesano,I., Nunes, C.,Ansotegui,I.,D'Amato, M.,Liccardi,G., Sofia, M.,& Canonica, W.(2013). Climate change, air pollution and extreme events leading to increasing prevalence of allergic respiratory diseases. *Multidisciplinary Respiratory Medicine*,8,1.
5. Hayes,K.,Blashki, G., Wiseman, J.,Burke, S.&Reifels,L.(2018). Climate change and mental health:risks,impacts and priority actions. *Inernational Journal of Mental Health System*, 12,28.
6. Smith, K.R., A. Woodward, D. Campbell-Lendrum, D.D. Chadee, Y. Honda, Q. Liu, J.M. Olwoch,B.Revich&R. Sauerborn, 2014: Human health: impacts, adaptation, and co-benefits. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Field, C.B., V.R.

Barros,D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada,R.C.Genova,B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 709-754

7. Leonard E G, Mboera, Benjamin K, Mayala, Eliningaya J, Kweka & Humphrey d. Mazigo.(2011). Impact of climate change on human health and health systems in Tanzania: A review. *Tanzania Journal of Health Research* ,13,1.

8.Herlihy N, BarHen A, Verner G,Fischer, H.,Sauerborn,R.,Depoux, A.,Flahault, A.&Schutte, S.(2016).Climate change and human health:what are the research trends? A scoping review protocol. *BMJ Open*,6.

9. Government of Kerala.(2018).*Economic Review*, Thiruvananthapuram ,State Planning Board.

10.Asian Development Bank,World Bank,European Union,United Nations & Govt of Kerala(2018). *Kerala- Post disaster needs assessment,floods and land slides*,Thiruvananthapuram,Govt of Kerala.

11. Karan A,Srivastava,S., Chakraborty,A.&Matela,H. (2016). Key indicators of health and morbidity- Kerala 2014,New Delhi, Public Health Foundation of India.

12.WHO.(2012). *Regional strategy for protecting health from climate change*,SEA/EHC-575(R.1),New Delhi,WHO.

13.WHO.(2003). *Climate change and human health:risks and responses-summary*,France, WHO.

14.Henderson,R.,Reinert, S.,Dekhtyar, P.&Mygdal, A.(2018).*Climate change in 2018:Implications for business*,317-032,Boston,Harvard Business School.