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Climate Change and Health Outcomes in Afghanistan: An Analysis of Temperature Anomalies and Disease Burden (2010–2019)

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Abstract

Aim: The purpose of this study is to investigate the association between average temperature anomalies and the burden of selected climate-sensitive diseases in Afghanistan between 2010 and 2019, in order to inform climate-resilient health planning. In particular, it examined trends in disability-adjusted life years (DALYs) linked to ambient and household air pollution for acute lower respiratory infections (ALRI), chronic obstructive pulmonary disease (COPD), ischemic heart disease (IHD), stroke, and trachea, bronchus, and lung (TBL) cancers. It also looked for statistical correlations between temperature anomalies and disease burden.

Methodology: Secondary national data from 2010 to 2019 were used in a quantitative, retrospective ecological approach. DALY data from the Global Burden of Disease Study and climatic datasets were used to determine annual average temperature anomalies. Using IBM SPSS Statistics, descriptive statistics, trend analysis using line graphs, and Pearson correlation analysis were carried out to assess the direction and strength of relationships at a 5% significance level.

Findings and Conclusion: The majority of Afghanistan's temperatures were above normal, with a mean anomaly of 0.486°C and peak warming from 2016 to 2018. ALRI DALYs declined by approximately 42%, while COPD, IHD, Stroke, and TBL cancer burdens increased steadily by 20–32% over the decade. Pearson correlation analysis revealed no statistically significant association between temperature anomalies and any health outcome (ALRI $r = -.381$, $p = .277$; COPD $r = .449$, $p = .193$; IHD $r = .468$, $p = .172$; Stroke $r = .466$, $p = .174$; TBL $r = .411$, $p = .237$). The null hypothesis was therefore retained. Findings suggest temperature anomalies alone did not explain disease burden changes, and factors such as air pollution, healthcare access, and population aging may be stronger drivers. Climate-resilient public health planning should integrate air quality management, NCD prevention, and heat-health surveillance.

Keywords:

Climate change, Temperature anomaly, Disease burden, DALYs, Air pollution, Afghanistan; Public health; Climate adaptation

INTRODUCTION

One of the biggest threats to global public health in the twenty-first century is climate change. Global environmental conditions, food security, water availability, and human health have all been impacted by rising temperatures, shifting precipitation patterns, and a spike in the

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frequency of extreme weather events. The Intergovernmental Panel on Climate Change (IPCC) claims that rising global average temperatures have increased the burden of climate-sensitive illnesses, especially in low- and middle-income nations with little ability for adaptation. Afghanistan's fragile ecosystems, dependence on climate-sensitive livelihoods, prolonged droughts, rapid growth in population, and limited health care systems make Afghanistan one of the countries most in danger of climate change. The nation has experienced rising temperatures, altered rainfall patterns, and an increase in the frequency of extreme weather events during the past several decades. Both human health and the ability of the health system to effectively deal with the problems related to climate change are at risk due to these environmental changes.

Climate change influences health through both direct and indirect pathways. Direct effects include heat stress and heat-related illnesses, while indirect effects involve changes in air quality, water resources, food production, and the transmission of infectious diseases. Increasing temperatures may also aggravate chronic respiratory and cardiovascular diseases by intensifying air pollution and exposing vulnerable populations to prolonged environmental stress.

In Afghanistan, household and ambient air pollution remain to be serious public health issues. Rapid urbanization, rising environmental pollution, and the extensive use of biomass fuels for heating and cooking all significantly increase the nation's illness burden. A substantial proportion of disability-adjusted life years (DALYs) linked to household and ambient air pollution are triggered by diseases like acute lower respiratory infections (ALRI), chronic obstructive pulmonary disease (COPD), ischemic heart disease (IHD), stroke, and trachea, bronchus, and lung (TBL) cancers.

Although numerous international studies have reported associations between climate change and adverse health outcomes, empirical evidence from Afghanistan remains limited. Most existing studies focus on climate variability, drought, or air pollution independently, while relatively few have examined the relationship between temperature anomalies and multiple health outcomes simultaneously. This knowledge gap limits the evidence available for designing effective climate adaptation and public health policies in Afghanistan.

PROBLEM STATEMENT

Particularly in vulnerable nations like Afghanistan, where rising temperatures and environmental changes may alter disease patterns, climate change poses significant risks to public health. Acute lower respiratory infections, chronic obstructive pulmonary disease, ischemic heart disease, stroke, and malignancies of the trachea, bronchus, and lungs are some of the primary health effects for which there is no evidence, despite a rise in temperature anomalies in recent years. The creation of successful public health and climate adaption policies is hampered by this lack of evidence. In order to offer data that might guide climate-resilient health planning, this study examines the relationship between temperature anomalies and certain health outcomes in Afghanistan from 2010 to 2019.



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RESEARCH QUESTIONS

How did average temperature anomalies change in Afghanistan between 2010 and 2019?

What were the trends in the burden of selected diseases (ALRI, COPD, IHD, Stroke, and TBL) during 2010–2019?

Is there an association between average temperature anomalies and selected health outcomes in Afghanistan?

Research Objectives

To explain Afghanistan's yearly trends in average temperature anomalies.

To look at patterns in DALYs for ALRI, COPD, IHD, Stroke, and TBL that are related to household and ambient air pollution.

To use correlation analysis to ascertain the direction and strength of the association between temperature anomalies and specific health effects.

RESEARCH HYPOTHESES

Null hypothesis (H_0)

Between 2010 and 2019, there was no correlation of statistical significance found between average temperature anomalies and the rate of specific diseases in Afghanistan.

Alternative hypothesis (H_1)

The burden of various diseases in Afghanistan from 2010 to 2019 is statistically significantly associated with average temperature anomalies.

LITERATURE REVIEW

According to Masood, W., Aquil, S., Nadeem, A., Mehmood, H., Islam, Z., Essar, M. Y., & Ahmad, S. (2022). Which says that Climate change is profoundly affecting ecosystems and altering the distribution of fungal pathogens worldwide. Rising temperatures and Heat waves, droughts, and floods are examples of extreme weather conditions that promote fungus survival, adaptation, and spread.. Many fungal species are developing thermotolerance, allowing previously non-pathogenic or less significant fungi to emerge as potential human pathogens. Climate-sensitive fungal infections, such as candidiasis, dermatophytosis, mold infections, and deep fungal diseases, are increasingly spreading into new geographic regions. Understanding these climate-driven changes is essential for predicting disease outbreaks, improving epidemiological surveillance, and developing effective prevention and control strategies.

In this articles Samadi, A. (2024) says that Climate change is significantly influencing the transmission and distribution of vector-borne diseases by altering the interactions among vectors, pathogens, and their hosts. Rising temperatures and changing environmental conditions have contributed to the emergence and expansion of diseases into new areas, include lumpy skin disease, bluetongue virus, Rift Valley fever, West Nile virus, and malaria. Developing countries, particularly Afghanistan, remain highly vulnerable due to limited surveillance systems,

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inadequate vector control, and weak adaptation strategies. The increasing development of drug resistance in both pathogens and vectors further complicates disease prevention and control efforts. Strengthening early-warning systems, improving surveillance, promoting integrated research, and implementing effective mitigation measures are essential to reduce the health and socioeconomic burden of vector-borne diseases.

On the base of Salehi, S. A., Rahimee, I., & Azami, A. (2024) Climate change is increasing the burden of diarrheal diseases in eastern Afghanistan by affecting water availability, sanitation, and hygiene conditions. Seasonal variations and rising temperatures are strongly associated with higher diarrhea incidence, with the greatest number of cases occurring during the summer months. The study reported a substantial increase in acute watery diarrhea cases in 2023 compared with previous years, indicating a growing public health concern. Climate-related events such as flash floods and prolonged aridity further elevate the risk of waterborne disease outbreaks by contaminating water sources and reducing access to safe drinking water. These results highlight the necessity of better water and sanitation infrastructure, climate-informed public health strategies, and efficient disease surveillance to lower future health risks.

According to Tiwari, I., Tilstra, M., Campbell, S. M., Nielsen, C. C., Hodgins, S., Vargas, A. R. O., ... & Yamamoto, S. S. (2022) which says that Climate change disproportionately affects vulnerable populations, particularly children and women, by increasing their exposure to air pollution, harsh weather, and shifting weather patterns. These environmental factors have a high correlation with poor health outcomes in South Asia, such as undernutrition, acute respiratory infections, diarrheal illnesses, low birth weight, and early mortality. There are substantial gaps in our knowledge of how climate change affects female populations since the evidence that is currently available shows that children receive more study focus than women. Research on the effects of climate change on mental health and practical adaptation measures is still scarce in the region, despite mounting evidence of health hazards associated with climate change. To increase public health readiness and lessen future health burdens associated with climate change, it is imperative to expand research on vulnerable populations and strengthen climate-resilient health systems.

In this paper Chalise, P. P., Kostandini, G., & Smith, T. A. (2025) says that Climate anomalies, particularly unusual increases in temperature and precipitation, have significant adverse effects on child health in South Asia from the prenatal period through early childhood. Exposure to these climatic changes is associated with reduced birth weight and poorer growth indicators, including lower weight-for-age and weight-for-height scores during the first two years of life. The combined effects of extreme weather, chronic food insecurity, and limited adaptive capacity increase children's vulnerability to malnutrition and poor developmental outcomes. The health impacts are more severe among economically disadvantaged, socially vulnerable, and marginalized populations, highlighting existing inequalities. These findings emphasize the importance of climate adaptation policies, nutritional support, and targeted maternal and child health interventions to protect vulnerable children from climate-related health risks.

According to Xu, C., Nie, X., Xu, R., Han, G., & Wang, D. (2025) which says that Climate change-related temperature extremes are increasing the risk of hypertensive heart

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disease (HHD) among older adults. Although cold temperatures currently contribute to a higher HHD burden, heat-related effects are rising due to global warming, especially in vulnerable regions. The study found gender differences, with women more affected by cold exposure and men by heat exposure. Climate adaptation and targeted health interventions are needed to reduce future cardiovascular risks.

In this paper Yar, F. G. M., ZAHID, S., & MIAKHIL, J. M. (2024) says that Climate change is becoming an important factor affecting Afghanistan's geopolitical stability by increasing challenges such as water scarcity, food insecurity, poverty, migration, and resource conflicts. This study found that climate change negatively influences development, which in turn reduces Afghanistan's geopolitical strength. Drought, poverty, and social problems were identified as major climate-related factors. Strengthening adaptation strategies, improving irrigation systems, and promoting clean energy are essential to reduce climate impacts and support national development.

Based on the assertion made by Hahad, O. (2024) that air pollution poses a serious threat to Afghanistan's public health and is a major cause of illness and early mortality. According to the study, air pollution was linked to thousands of deaths and high DALYs in 2019, primarily from lung cancer, diabetes, heart disease, stroke, respiratory infections, and COPD. Afghanistan has a high air pollution-related health burden compared with other affected countries. These findings highlight the urgent need for effective policies, pollution control measures, and public health interventions to reduce air pollution impacts.

According to Kadhem, G., Aljenaid, S., & Naser, H. (2025) which says that Climate change poses a growing challenge to sustainable development by increasing temperature anomalies and their associated health risks. The study found that Bahrain has experienced a significant rise in average temperatures over the past decades, contributing to a higher risk of heat-related illnesses and cardiovascular diseases. Summer temperatures frequently reach extreme danger levels, threatening public health and well-being. These findings emphasize the importance of climate adaptation, heat mitigation measures, and sustainable policies to protect human health and achieve the Sustainable Development Goals (SDGs). On the base of Aborode, A. T., Otorkpa, O. J., Abdullateef, A. O., Oluwaseun, O. S., Adegoye, G. A., Aondongu, N. J., ... & Komakech, J. J. (2025) which says that Climate change-induced flooding has become a major public health concern by increasing waterborne diseases and malnutrition in vulnerable communities. Floods harm sanitation as well as water infrastructure, which makes it easier for illnesses like diarrhea, cholera, and malaria to spread. Insecurity with food and nutritional issues are made worse by the depletion of agricultural resources and displacement of populations. The capacity to successfully adjust to and respond to the effects of climate change can be diminished in conflict circumstances. To lower these health risks, it is crucial to improve disaster preparedness, improve healthcare systems, and develop climate adaption techniques.

According to Bayram, H., Konyalilar, N., & Akpınar-Elci, M. (2024) which claims that the Middle East, where increasing temperatures are predicted to climb dramatically by the end of the century, is being severely impacted by global warming. Sand storms as well as extreme

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temperatures, drought, and desertification all contribute to poor air quality and an increase in respiratory conditions including COPD and asthma. Higher temperatures and environmental degradation may also increase the risk of wildfires, food insecurity, and ecosystem disruption. Climate-related changes could influence the emergence and spread of infectious diseases by affecting environmental and ecological conditions. Effective adaptation strategies are needed to reduce these growing health risks. According to Hussain, A., Shoaib, M., & Latif, M. (2025) which says that In tropical and subtropical areas, populations of mosquitoes and risk of disease are predicted to be impacted by climate change, which will shift the patterns of malaria transmission. This study evaluated the possible effects of Stratospheric Aerosol Injection (SAI) on the spread of malaria in Afghanistan and other South Asian nations. The results suggest that SAI may reduce overall malaria transmission compared with uncontrolled warming scenarios, but regional differences remain with some areas experiencing increased risk. Changes in temperature and rainfall patterns influence mosquito survival and seasonal transmission cycles. These findings highlight the need for climate-based, region-specific strategies to improve malaria prevention and control.

Mokdad, A. H., Forouzanfar, M. H., Daoud, F., El Bcheraoui, C., Moradi-Lakeh, M., Khalil, I., ... & Roshandel, G. (2016) carried out The Eastern Mediterranean region faces diverse health challenges due to differences in socioeconomic conditions, healthcare capacity, and ongoing political instability. Conflicts, wars, and displacement have significantly affected population health by increasing disease burden and reducing access to healthcare services. This study used Global Burden of Disease (GBD) data to examine the burden of diseases, injuries, and hazards in the area between 1990 and 2013. The findings highlight the major impact of conflict and social instability on public health outcomes. Strengthening health systems and addressing political and socioeconomic challenges are essential to improve health conditions in the region.

Corvetto, J. F., Simion, R., Boutros, P., Kassem, N., Belesova, K., Bärnighausen, T., ... & Barteit, S. (2026) presented Climate change contributes to increasing health risks through heat exposure, extreme weather events, and air pollution. The review found strong links between climate-related hazards and higher cardiovascular, respiratory, and overall mortality. However, evidence from low-income regions remains limited. Strengthening climate health monitoring and adaptation strategies is essential to reduce future health impacts. Vollset, S. E., Ababneh, H. S., Abate, Y. H., Abbafati, C., Abbasgholizadeh, R., Abbasian, M., ... & Ariffin, H. (2024) conducted study and presented the findings, which indicate that while life expectancy would rise in the future, the burden of disease will shift from infections to non-communicable diseases like diabetes, heart disease, stroke, and COPD. Climate change and environmental risks will continue to influence global health. Reducing major risk factors and improving prevention strategies can significantly decrease future disease burden.

MATERIALS AND METHODS

This study conducted in Afghanistan, a country in South Asia which is highly vulnerable to the impacts of climate change. The country has experienced increasing temperatures, recurrent droughts, and changing precipitation patterns over recent decades, which pose significant

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challenges to environmental sustainability and public health. The analysis covers the period from 2010 to 2019 and focuses on national-level climate and health data.

STUDY DESIGN

This study employed a quantitative, retrospective ecological research design used secondary annual data. The analysis examined the relationship between average temperature anomalies and selected health outcomes in Afghanistan during the period 2010–2019.

DATA SOURCES

Secondary data gathered from databases that are open to the public. A recognized climate database provided the annual average temperature anomaly (ATE) data, and the Global Burden of Disease (GBD) database provided the disease burden data, which were reported as disability-adjusted living years (DALYs) related to household and ambient air pollution. Ten annual observations from 2010 to 2019 were included in the dataset.

Table 1 presents the annual average temperature anomalies and DALYs for the selected diseases included in this study.

Table 1. Annual Average Temperature Anomalies and Household and Ambient Air Pollution-Attributable DALYs in Afghanistan (2010–2019).

Year	Average of Temperature anomaly	Gender	Household and ambient air pollution attributable DALYs				
	ATE		ALRI (FVN)	COPD (FVN)	IHD (FVN)	Stroke (FVN)	TBL (FVN)
2010	0.885817377	Both sexes	1140113	66243	467892	196222	13702
2011	0.470878443	Both sexes	1045285	66301	465975	195037	13979
2012	-0.901387164	Both sexes	988630	67491	471511	197392	14528
2013	0.312942565	Both sexes	1011248	69537	482100	202304	15160
2014	-0.234118984	Both sexes	886080	70427	487277	203983	15621
2015	0.446958618	Both sexes	794365	71840	500677	208502	16228
2016	1.243034316	Both sexes	763049	73779	514179	213341	16651
2017	1.004117154	Both sexes	718650	75475	525198	215040	17085
2018	1.205822095	Both sexes	665668	78673	547225	224543	18033
2019	0.425665813	Both sexes	674611	79643	559099	227838	18218

The above Table Abbreviation:

ATE: (Average of Temperature anomaly)

FVN: (Fact Value Numeric)

ALRI :(Acute lower respiratory infections)

COPD: (Chronic obstructive pulmonary disease)

IHD: (Ischaemic heart disease)

TBL: (Trachea, bronchus, lung cancers)



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Study Variables

The independent variable is the Average Temperature Anomaly (ATE), which served as an indicator of climate change.

The dependent variables were disability-adjusted life years (DALYs) attributable to household and ambient air pollution for the following health outcomes: Acute Lower Respiratory Infections (ALRI), Chronic Obstructive Pulmonary Disease (COPD), Ischemic Heart Disease (IHD), Stroke, Trachea, Bronchus, and Lung (TBL) cancers.

DATA ANALYSIS

For analysis, they were imported into IBM SPSS Statistics. The study variables were summarized using descriptive statistics, such as the mean, standard deviation, minimum, and maximum. Additionally,

Line graphs were used in the trend analysis to show how the average temperature anomalies and disease burden changed annually between 2010 and 2019. The degree and direction of the relationship between average temperature anomalies and each health outcome were evaluated using Pearson correlation analysis. The magnitude and direction of correlation coefficients (r) were interpreted, and statistical significance was assessed at the 5% significance level ($p < 0.05$).

Finding:

Table 01

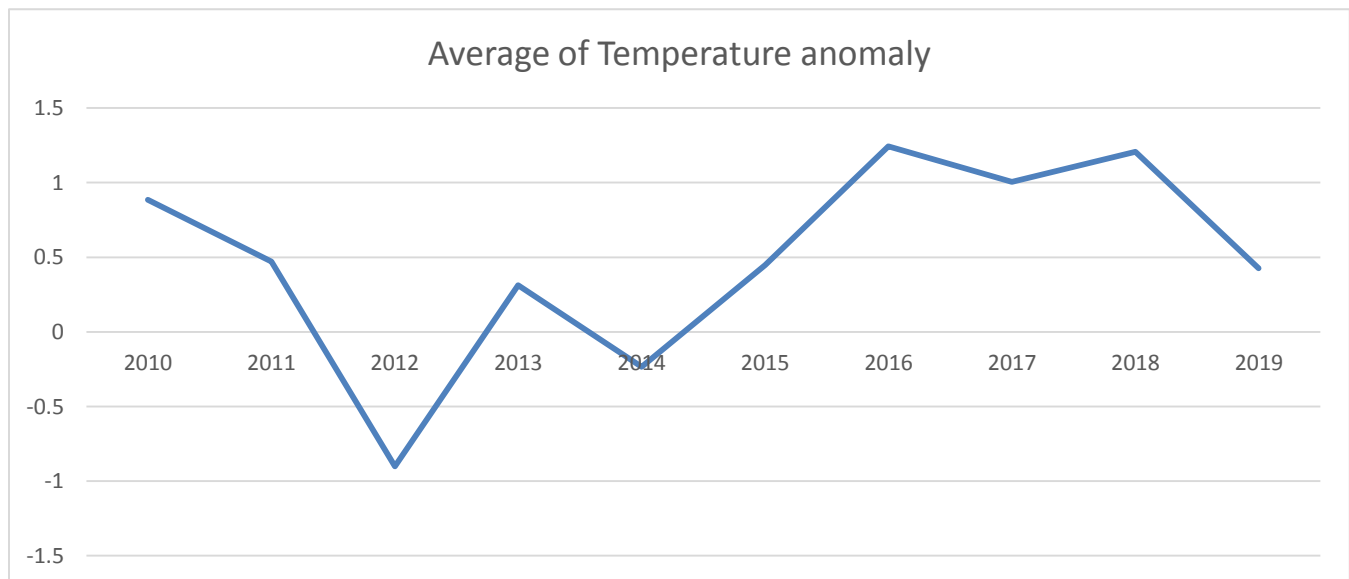
Descriptive Statistics					
	N of years	Minimum	Maximum	Mean	Std. Deviation
Average Temperature Anomaly	10	- .901387164 0	1.24303431 60	.485973023 300	.666525034 2775
Acute Lower Respiratory infections	10	665668	1140113	868769.90	169295.203
Chronic Obstructive Pulmonary Disease	10	66243	79643	71940.90	4861.058
Ischaemic Heart Disease	10	465975	559099	502113.30	33328.676
Stroke	10	195037	227838	208420.20	11602.980
Trachea Bronchus Lung Cancer	10	13702	18218	15920.50	1599.434
Valid N (listwise)	10				

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The above table 01 stated that the descriptive statistics for average temperature anomaly and the selected health outcomes in Afghanistan during 2010–2019. The average temperature anomaly had a mean of 0.486°C (SD = 0.667), ranging from −0.901°C to 1.243°C, indicating noticeable year-to-year variation in temperature anomalies over the study period.

Among the health outcomes, Acute Lower Respiratory Infections (ALRI) had the highest average disease burden, with a mean of 868,769.9 DALYs (SD = 169,295.2), followed by Ischaemic Heart Disease (IHD) (502,113.3 DALYs), Stroke (208,420.2 DALYs), Chronic Obstructive Pulmonary Disease (COPD) (71,940.9 DALYs), and Trachea, Bronchus, and Lung (TBL) cancers (15,920.5 DALYs).

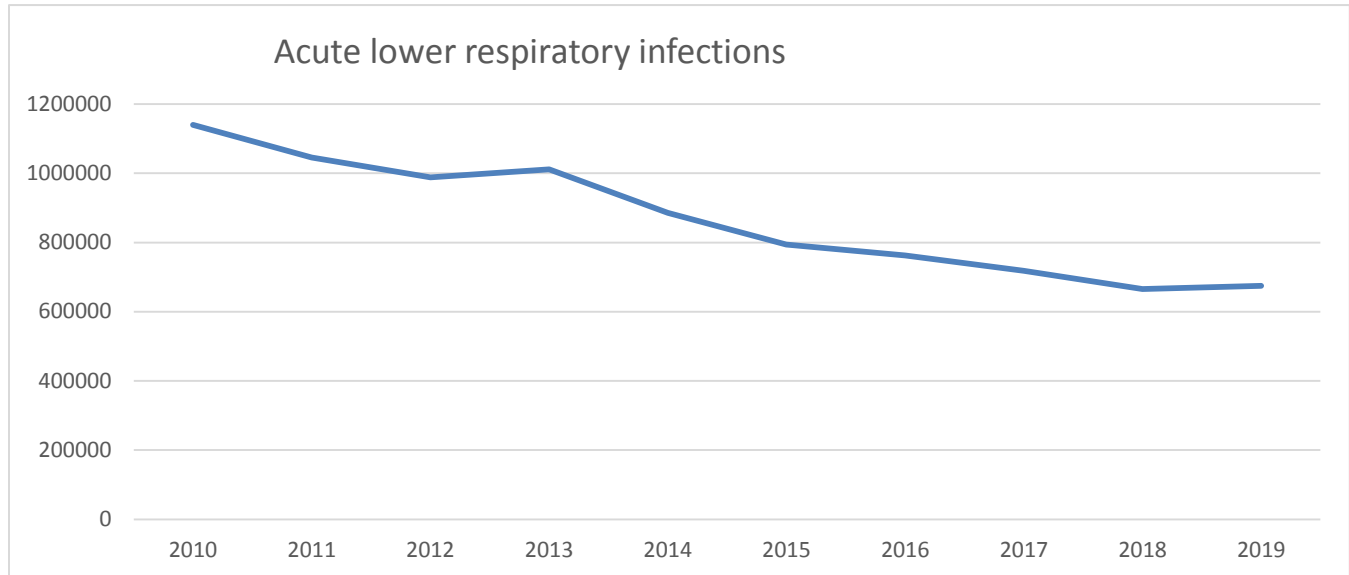
Chart 01



From 2010 to 2019, Afghanistan experienced predominantly warmer-than-average temperatures, with 8 out of 10 years showing positive temperature anomalies. The coldest year was 2012 at approximately −0.9°C below the baseline, while the warmest period occurred from 2016 to 2018, with anomalies exceeding +1.0°C and peaking at around +1.25°C in 2016. The data show considerable year-to-year variability, including a sharp drop after 2011 and a strong warming trend after 2014. Although 2019 saw a decline to +0.4°C, it remained above the long-term average. Overall, the trend indicates increasing temperature extremes and a tendency toward warmer conditions in Afghanistan during the latter half of the decade, consistent with regional drought and heat events reported in that period.

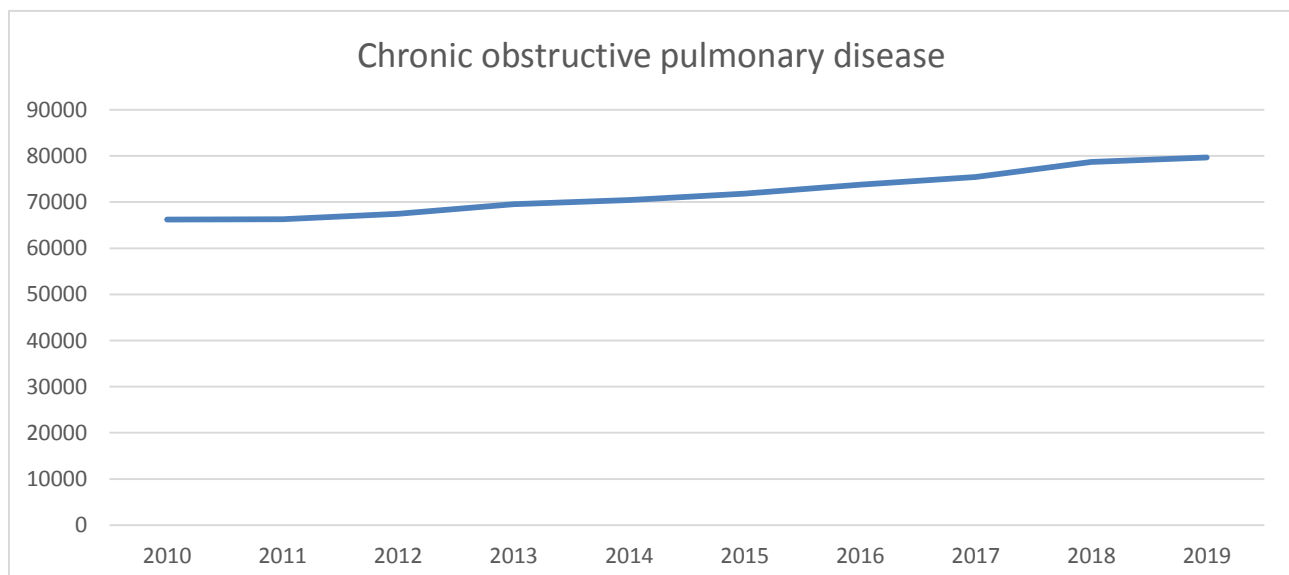
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Chart 02



The above chart shows a clear and consistent decline in acute lower respiratory infection cases from 2010 to 2019. Starting at a high of approximately 1,150,000 cases in 2010, the number decreased steadily each year, with a minor fluctuation in 2013 where cases briefly rose to just over 1,000,000 before resuming the downward trend. By 2018, cases had dropped to around 670,000, representing a reduction of nearly 42% over the eight-year period. The rate of decline slowed between 2018 and 2019, with cases stabilizing at roughly 680,000. Overall, the data indicate a substantial improvement in the burden of acute lower respiratory infections during this decade, suggesting possible impacts from public health interventions, improved healthcare access, vaccination programs, or better air quality and living conditions.

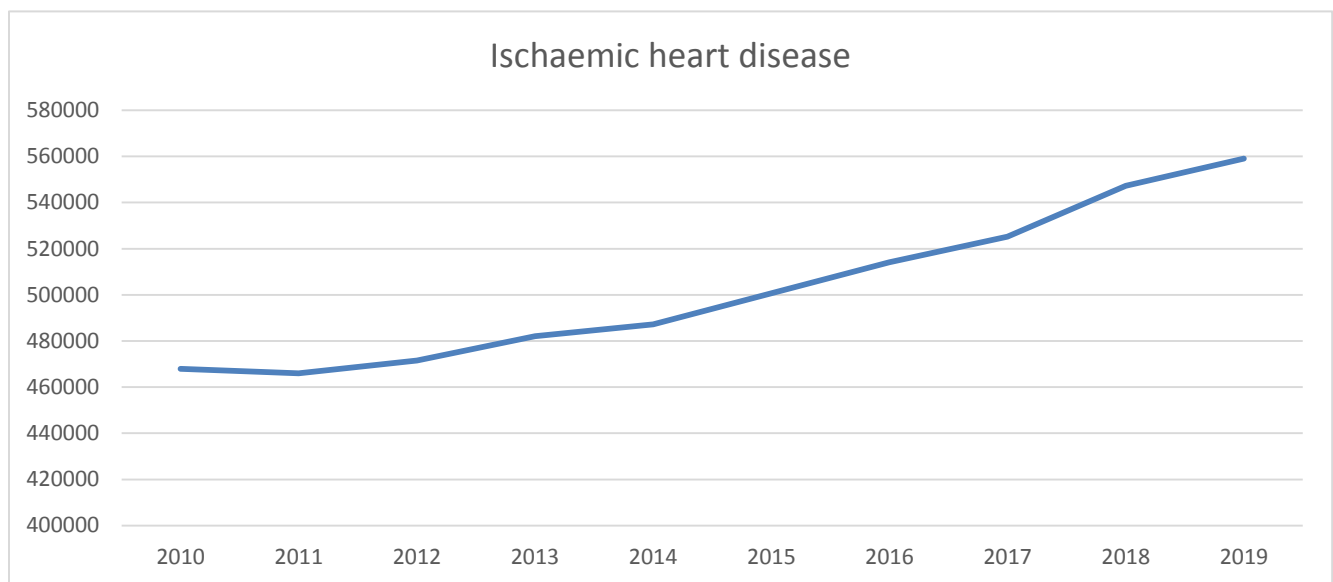
Graph 01



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The line graph shows a steady and consistent increase in chronic obstructive pulmonary disease (COPD) cases from 2010 to 2019. In 2010, the number of cases was approximately 66,000, rising gradually each year to reach about 80,000 by 2019. The trend indicates no major fluctuations or declines, with a relatively uniform growth rate across the decade and a slightly steeper increase after 2016. Overall, the data suggest a continuous upward burden of COPD during this period, reflecting either rising incidence, improved diagnosis and reporting, or an aging population with greater susceptibility to chronic respiratory conditions.

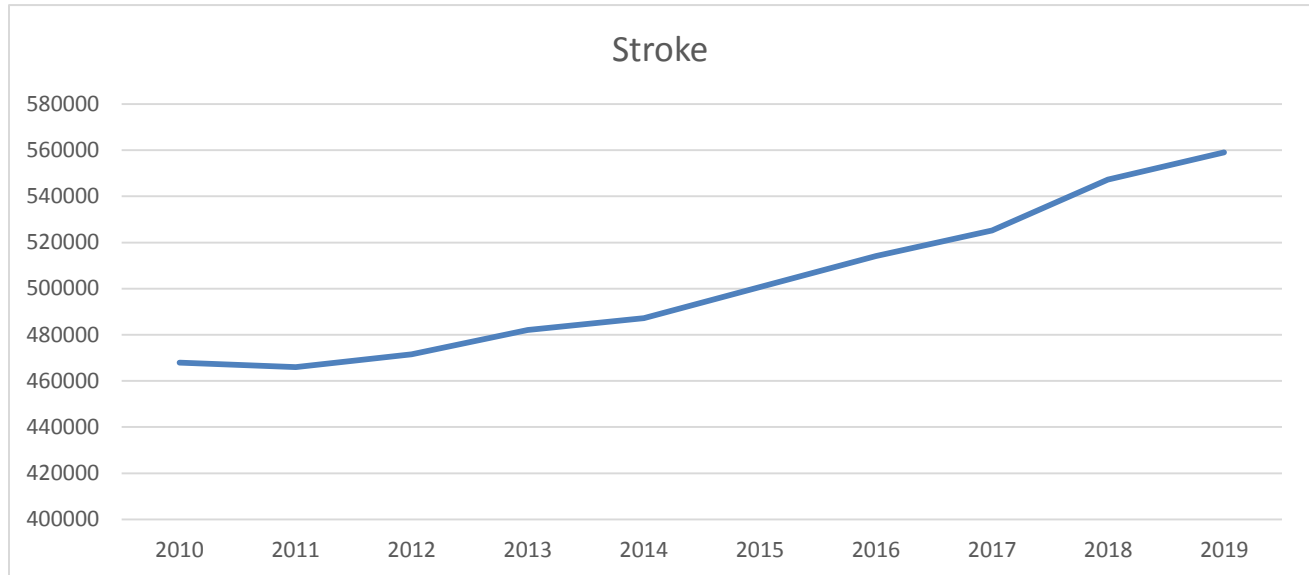
Graph 02



The graph illustrates a clear upward trend in ischaemic heart disease cases from 2010 to 2019. In 2010, cases stood at approximately 468,000, with a slight dip in 2011 before a steady and continuous rise throughout the decade. The increase accelerated after 2014, with cases growing from around 488,000 to nearly 560,000 by 2019. This represents an overall rise of about 92,000 cases, or roughly 20%, over the ten-year period. The consistent growth suggests an increasing burden of ischaemic heart disease, which may be linked to risk factors such as aging populations, lifestyle changes, hypertension, smoking, or improved detection and reporting of cases.

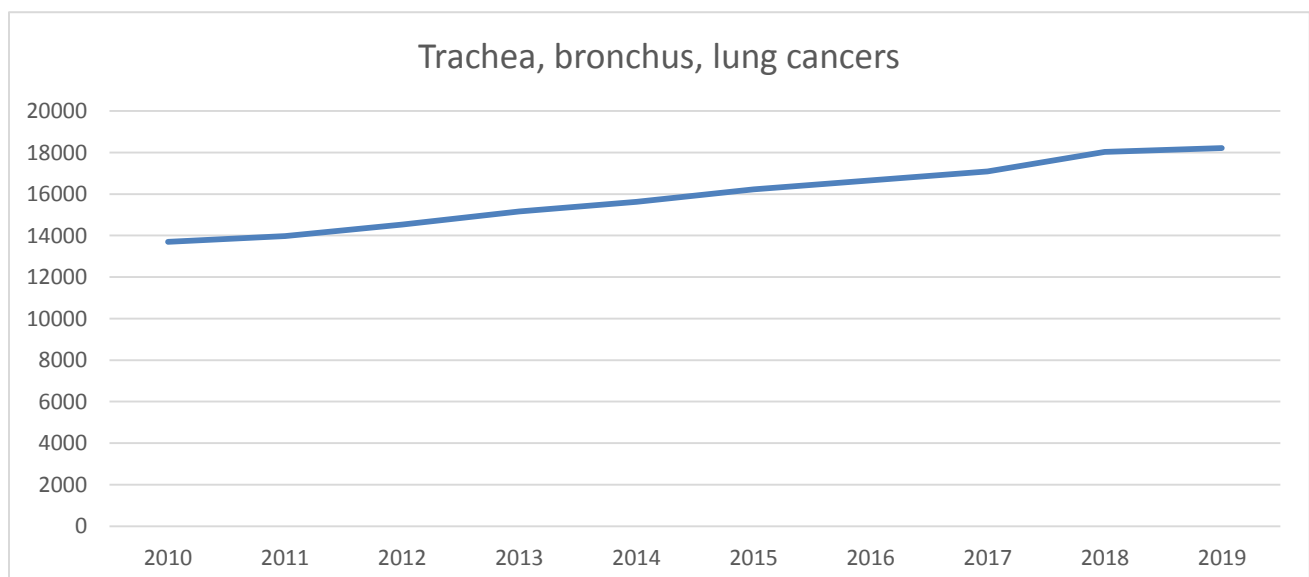
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Graph 03



The chart shows a continuous rise in stroke cases from 2010 to 2019. In 2010, cases were approximately 468,000, with a slight decrease in 2011 before an uninterrupted upward trend began. From 2012 onward, the number increased steadily each year, reaching around 560,000 by 2019. The growth rate appears to accelerate slightly after 2015, particularly between 2017 and 2018. Over the decade, stroke cases rose by roughly 92,000, an increase of nearly 20%. This sustained growth points to an increasing public health burden of stroke, potentially driven by factors such as population aging, rising prevalence of hypertension and diabetes, lifestyle changes, or improved case detection and reporting.

Graph 04



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The above graph shows a steady increase in cases of trachea, bronchus, and lung cancers from 2010 to 2019. Starting at approximately 13,800 cases in 2010, the number rose consistently each year, reaching about 18,200 by 2019. The trend shows no notable declines or sharp spikes, with a gradual but persistent growth across the decade and a slight leveling off between 2018 and 2019. Overall, cases increased by roughly 4,400, or about 32%, over the ten-year period. This upward pattern suggests a growing burden of lung-related cancers, which may reflect factors such as population aging, increased exposure to risk factors like smoking and air pollution, or improved diagnostic capacity and cancer registration.

Table 02

Correlations							
		Average Temperatu re Anomaly	Acute Lower Respirator y infections	Chronic Obstructiv e Pulmonary Disease	Ischaemi c Heart Disease	Stroke	Trachea Bronchus Lung Cancer
Average Temperat ure Anomaly	Pearson Correlati on	1	-.381	.449	.468	.466	.411
	Sig. (2- tailed)		.277	.193	.172	.174	.237
	N	10	10	10	10	10	10
Acute Lower Respirator y infections	Pearson Correlati on	-.381	1	-.948**	-.931**	-.934**	-.975**
	Sig. (2- tailed)	.277		.000	.000	.000	.000
	N	10	10	10	10	10	10
Chronic Obstructiv e Pulmonar y Disease	Pearson Correlati on	.449	-.948**	1	.996**	.997**	.992**
	Sig. (2- tailed)	.193	.000		.000	.000	.000
	N	10	10	10	10	10	10
Ischaemic Heart Disease	Pearson Correlati on	.468	-.931**	.996**	1	.998**	.979**
	Sig. (2- tailed)	.172	.000	.000		.000	.000
	N	10	10	10	10	10	10

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Stroke	Pearson Correlation	.466	-.934**	.997**	.998**	1	.984**
	Sig. (2-tailed)	.174	.000	.000	.000		.000
	N	10	10	10	10	10	10
Trachea Bronchus Lung Cancer	Pearson Correlation	.411	-.975**	.992**	.979**	.984**	1
	Sig. (2-tailed)	.237	.000	.000	.000	.000	
	N	10	10	10	10	10	10

** . Correlation is significant at the 0.01 level (2-tailed).

The correlation analysis table for 2010–2019 shows no statistically significant relationship between Average Temperature Anomaly and any of the health outcomes, with Pearson correlations ranging from $-.381$ to $.468$ and all p -values > 0.05 . In contrast, the disease variables are highly intercorrelated. Acute Lower Respiratory Infections have strong significant negative correlations with all chronic diseases: COPD ($r = -.948$), Ischaemic Heart Disease ($r = -.931$), Stroke ($r = -.934$), and Trachea, Bronchus, Lung Cancer ($r = -.975$), all $p < .01$. Meanwhile, COPD, Ischaemic Heart Disease, Stroke, and Lung Cancer are all very strongly positively correlated with each other, with coefficients above $.979$ and $p < .01$. This pattern indicates that while temperature anomalies were not significantly associated with disease counts in this dataset, the chronic diseases moved together over time, and acute respiratory infections declined as chronic conditions increased during the study period.

HYPOTHESIS TESTING

Pearson correlation analysis was used to test the association between average temperature anomalies and the burden of selected diseases in Afghanistan from 2010 to 2019. No statistically significant correlations were found between temperature anomalies and ALRI ($r = -.381$, $p = .277$), COPD ($r = .449$, $p = .193$), IHD ($r = .468$, $p = .172$), Stroke ($r = .466$, $p = .174$), or TBL cancer ($r = .411$, $p = .237$). Therefore, the null hypothesis (H_0) of no statistically significant association was retained, and the alternative hypothesis (H_1) was not supported.

ETHICAL CONSIDERATIONS

The study used publicly available secondary data that contained no personal identifiers or confidential information. Therefore, ethical approval and informed consent were not required. The data used solely for academic and research purposes.

DISCUSSION

This suggests that, over this 10-year period, year-to-year variations in temperature alone were not linearly related to disease burden at the national level. However, the study period was



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marked by a general warming trend and a concurrent rise in chronic diseases, alongside a substantial decline in ALRI, indicating that other factors such as air pollution, healthcare access, socioeconomic conditions, and population aging may be stronger drivers of disease trends. The lack of association may also reflect limited statistical power with $n = 10$, the use of annual aggregates that mask seasonal or extreme event impacts, and potential lag effects not captured in same-year correlations. Despite no direct temperature–disease link, the observed increases in COPD, IHD, Stroke, and TBL cancers highlight the need for climate-resilient public health planning in Afghanistan that integrates air quality management, NCD prevention, and heat-health surveillance as temperatures continue to rise.

CONCLUSION:

This study investigated the association between average temperature anomalies and chosen health results in Afghanistan from 2010 to 2019 using descriptive statistics, trend analysis, and Pearson correlation analysis. The findings demonstrated that temperature anomalies generally rose during the study period, while the burden of acute lower respiratory infections (ALRI) decreased and the incidence of chronic illnesses, such as chronic obstructive pulmonary disease (COPD), ischaemic heart disease (IHD), stroke, and trachea, bronchus, and lung (TBL) cancers, increased.

However, correlation analysis indicated no statistically significant link among temperature anomalies and any of the specified health outcomes, leading to the adoption of the null hypothesis. These data show that temperature anomalies solely failed to significantly explain variations in disease burden between 2010–2019, and that other factors such as air pollution, population shifts, accessibility to healthcare, and socioeconomic status may have had a greater impact. Further study using longer time series and additional environmental and health variables is suggested in order to better comprehend the impacts of global warming on public health in Afghanistan.

LIMITATION

This study used annual national data from 2010 to 2019 which were accessible for one decade, resulting in only ten observations. Consequently, the statistical power to detect significant associations was limited. Additionally, the analysis considered temperature anomaly as the primary climate indicator and did not account for other climatic, environmental, demographic, or socioeconomic factors that may influence disease burden.



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