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Climate Anxiety and Self-Rated Health and Happiness among Community-dwelling Older Adults in Ghana

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Abstract

This study examined the relationship between climate anxiety and self-rated health and happiness among community-dwelling older adults (≥ 60 years) in Ghana. Based on a cross-sectional research study, multiple sampling techniques were used on 1989 older adults. The descriptive statistics, Spearman correlation, and Ordinary Least Squares (OLS) were used to analyze the data. The study found that climate anxiety exerts a significant negative effect on self-rated health and happiness ($\beta = -0.5993$, $p = 0.0001$). The result implies that a one-unit increase in climate anxiety leads to approximately a 59.9% reduction in self-rated health and happiness. Further, the study found significant gender (coeff. = .1308976, std err. = .050248, $p < 0.005$) differences in self-rated health and happiness, with male adults reporting higher levels than female adults. Given the significant negative effect of climate anxiety on self-rated health and happiness, policymakers should integrate climate-related mental health concerns into public health planning and interventions. Furthermore, the government should move climate adaptation policies beyond physical infrastructure and environmental management to incorporate psychological wellbeing as a key component of resilience-building.

Keywords: Climate anxiety; Self-rated health; Happiness; Climate Change; Older Adults

Introduction

Climate change is emerging as the most pressing global challenges with far-reaching implications for human health, well-being, and socio-economic development. It poses a significant risk to human health and well-being. Under a high-emission scenario, 9.25 million excess deaths are predicted worldwide each year by the end of the century [27]. Without adaptation and economic growth, the estimated annual death toll could reach 24 million [50]. Additionally, according to the prevailing statistics, climate change is expected to cause approximately 250,000 additional deaths per year between 2030 and 2050, from malnutrition, diarrhoeal disease, malaria, and heat stress alone [57]. Notwithstanding, one in seven people globally do not have access to climate-friendly cooling solutions, putting them at potentially fatal risk from heat, especially in low- and middle-income countries [38,50]. In all these, Kemp et al. [27] have reported that approximately 30 million individuals currently reside in hot areas, primarily in the Sahara Desert and Gulf Coast, and by 2070, two billion people could live in extremely hot areas [27].

While much attention has been devoted to the physical impacts of climate change such as rising temperatures, extreme weather events, and environmental degradation, there is a growing recognition of its psychological and emotional consequences [18,9,45]. One such emerging concern is climate anxiety (encompassing feelings of fear, worry, helplessness, and uncertainty about the future of the climate situation). The psychological effects of climate change, as noted by Cianconi et al. [62], include both direct and indirect impacts, ranging from Post-Traumatic Stress Disorder (PTSD) caused by extreme weather events [23] to persistent mental health conditions, such as depression and generalized anxiety, especially among older adults 60 years and above [30, 33,35]. Meanwhile, almost 138 million people aged over 60 (close to 14% of the global over-60

age group) are already exposed to climate risks, many of whom live in low- and middle-income countries in the Global South [5,23]. Moreover, it has been established that by 2050, globally one in five people will be over 60 years of age [46].

The widely accepted etiological link between the climate crisis and poor mental health has led to the conceptualization of “eco-emotions”, including eco-anxiety, eco-guilt and solastalgia [42]. Rising temperatures appear to have a significant relationship with mental health difficulties, with a 1°C temperature rise reportedly associated with a 1% increase in the incidence of suicide [62] and a significant increase in mood disorders, organic mental disorders, schizophrenia, neurotic and anxiety disorders [33,49]. Various studies into the mental health impacts of climate change have identified that groups of people belonging to certain demographics are more vulnerable to developing mental health difficulties than others. For example, White et al. [55] found that indigenous people, children, older adults and climate migrants were among the most vulnerable populations to expressing solastalgia, suicidality, depression, anxiety/eco-anxiety, PTSD, substance use, insomnia and behavioral disturbances. Indeed, the significant negative impact of the climate crisis on older adults is consistently reported in the literature [7,22,24].

In Ghana, climate change is already manifesting in diverse ways, including erratic rainfall, prolonged dry seasons, coastal erosion, and increased frequency of extreme weather events [3,6,52,]. These changes have significant implications for agriculture, water resources, health, and livelihoods sectors that are particularly relevant to older adults. Older adults represent a unique demographic group with distinct vulnerabilities and resilience factors [20,36]. On one hand, they may possess valuable indigenous knowledge and adaptive strategies that enhance their ability to cope with environmental changes. On the other hand, aging is often associated with declining

physical health, reduced mobility, and limited access to resources, which may exacerbate their vulnerability to climate-related stressors [21,40]. Furthermore, older adults may have limited access to information, healthcare, and social support systems, particularly in underserved urban communities [8,20]. These factors can interact with climate anxiety to influence their overall health and wellbeing.

Self-rated health is a widely used indicator in health research, reflecting an individual's perception of their overall health status [7,22,59]. It is a subjective measure that has been shown to be a strong predictor of morbidity and mortality [4,16]. In the context of climate change, self-rated health may be influenced not only by physical conditions but also by psychological factors such as stress, anxiety, and perceived environmental risks. For older adults experiencing climate anxiety, their perception of health may decline due to increased worry about their ability to cope with changing environmental conditions, access healthcare, or maintain their livelihoods [28,29,45,54].

Happiness, often conceptualized as a component of subjective well-being, is another important outcome that may be affected by climate anxiety. Happiness encompasses emotional states such as joy, contentment, and life satisfaction [17,26,37]. It is influenced by a wide range of factors, including health, social relationships, economic security, and environmental conditions [11,26]. In recent years, there has been growing interest in understanding how environmental changes and climate-related stressors impact happiness and wellbeing [47,48]. For older adults in Ghana, happiness may be closely tied to their ability to maintain social roles, engage in productive activities, and live in stable and supportive environments [31,41]. Climate anxiety may disrupt these factors, leading to reduced life satisfaction and overall well-being.

The relationship between climate anxiety, self-rated health, and happiness is complex and multidimensional. Climate anxiety may directly affect psychological well-being, leading to feelings of distress and reduced happiness [10,24]. It may also indirectly influence health by contributing to stress-related conditions, such as hypertension, sleep disturbances, and weakened immune function [1,15,60]. Conversely, individuals with poor health may be more susceptible to anxiety, creating a cyclical relationship between these variables. Understanding these interconnections is essential for developing holistic interventions that address both the mental and physical health needs of older adults in the context of climate change.

The significance of the subject matter has led to a growing global literature on climate anxiety [13,34,44,56,58]. Despite the proliferation of literature on climate anxiety, a significant gap remains in research focusing on older populations in sub-Saharan Africa. This leaves a critical gap in understanding how climate anxiety manifests among older adults in low- and middle-income countries, where the impacts of climate change are often more severe and adaptive capacities more limited. Ghana, with its diverse ecological zones and varying degrees of climate vulnerability, provides an important context for examining these issues, especially in an urban setting like Kumasi where much attention has not been given.

Methods

Study Design and sample

This study forms part of a larger study (Environment and Aging) which started in 2025. The research employed a cross-sectional quantitative research method to evaluate the relationship between climate anxiety, self-rated health, and happiness among older adults in the Ashanti region

sample size. The Yamane (1967) formula gave a sample size of 399.5 but for robust analysis and representation, the researchers increased the sample size to 1989 after getting the baseline sample.

The study further used cluster, stratified proportionate, and simple random sampling techniques to select the study areas and the respondents. The cluster sampling technique was applied to select the study areas. The study followed Taherdoost's [51] steps for cluster sampling, which involve selecting the cluster grouping according to the sampling frame and determining a sample size for each cluster through simple random sampling. The clusters and their respective population in the Ashanti region according to the Ghana Statistical Service [19] are shown in Table 1.

Table 1: Population and Housing Census by the Ghana Statistical Service

No.	Districts	Adult Populations (≥60 years)
1	Kumasi Metro	31,966
2	Kwadaso Municipal	11,125
3	Asokore-Mampong Municipal	13,780
4	Tafo Municipal	8,234
5	Suame Municipal	21,211
6	Ejisu Municipal	13,012
7	Atwima Nwabiagya Municipal	11,656
8	Kwabre East Municipal	21,370
9	Atwima Mponua District	11,178
Total		143,532

The study then applied simple random sampling to select the respondents from the sample frame. The study employed simple random sampling because it ensured that every element in the study population had an equal chance of being selected [51], thereby avoiding sampling bias [12]. Stratified Proportionate sampling technique was used to select participants from the various study areas, as shown in Table 2.

Table 2: **Sample selection of study participants**

No.	Districts	Adult Populations (≥60 years)	%	Sample = $\frac{\%}{100} \times 1989$
1	Kumasi Metro	31,966	22.27	443
2	Kwadaso Municipal	11,125	7.75	154
3	Asokore-Mampong Municipal	13,780	9.60	191
4	Tafo Municipal	8,234	5.73	114
5	Suame Municipal	21,211	14.78	294
6	Ejisu Municipal	13,012	9.07	180
7	Atwima Nwabiagya Municipal	11,656	8.12	162
8	Kwabre East Municipal	21,370	14.89	296
9	Atwima Mponua District	11,178	7.79	155
Total		143,532	100	1989

Tools of Data Collection

The study used a structured questionnaire for data collection. The questionnaire had three sections. Section I focused on personal data, including gender, ethnic group, marital status, educational level, religion, household size, and place of residence. Section II focused on climate anxiety and comprised 13 items measured on a five-point Likert Scale from Never (1) to Almost Always (5). Section III considered self-rated health and happiness. Self-rated health and happiness had two components, namely self-rated health (3 items) and self-rated happiness (6 items), all measured on a five-point Likert scale from Very Dissatisfied (1) to Very Satisfied (5).

The study piloted the instrument in Cape Coast on 50 adults to ensure that the instrument met validity and reliability principles. Also, the pilot study helped to overcome data administration challenges such as misinterpretation of questions and low response rate. The study subjected the pilot test data to reliability and construct validity tests. Using Cronbach's alpha, the instrument had alpha scores of 0.87 and 0.89 for climate anxiety and self-rated health and happiness, respectively, indicating higher reliability for each scale. Also, each item for climate anxiety and

self-rated health and happiness had a factor loading score of more than 0.7, signaling higher construct validity for each scale.

The study uploaded the instrument to the Google Survey Platform to aid data collection. Field officers were recruited and trained prior to the data collection exercise. Each field officer was provided with a Google link to the instrument, which was accessed using their smartphones. The field officers visited the respondents at their homes, where informed consent was obtained before their participation in the study. The field officers administered the online questionnaire on behalf of the respondents as the respondents provided answers to the questions. The respondents were allowed to ask for clarification on questions that seemed unclear to them. Each respondent used a maximum of 30 minutes to answer the survey questions.

Data Analysis

Model Specification

The Ordinary Least Squares (OLS) Regression Model was used for the estimation. The study used OLS for estimation because the main independent variable in this study (that is, climate anxiety) is exogenous. This is because climate anxiety arises from factors such as media reportage on the negative effects of climate change, scientific reports on climate change, and public discourse on climate change and its negative effects. The general form of OLS is shown in Equation 2.

$$y_i = \beta_0 + \beta_1 X_{i,t} + e_i \dots \dots \dots (2)$$

Where y_t is the dependent variable, $X_{i,t}$ is the independent variable. In this study, the dependent variables are self-rated health and happiness, and the independent variable is climate anxiety. However, aside from climate anxiety, socio-demographic factors (gender, marital status, educational level, religion, and ethnicity) can affect self-rated health and happiness; hence, the study controlled for these socio-demographic variables.

Therefore, based on equation 2, the OLS regression of the impact of climate anxiety on self-rated health and happiness was specified as shown in equation 3.

$$SRHH_i = \alpha_0 + \alpha_1 CA_i + \alpha_2 GEN_i + \alpha_3 MAR_i + \alpha_4 EDUL_i + \alpha_5 REL_i + \alpha_6 ETHN_i + \varepsilon_i \dots \dots \dots Eqn\ 3$$

Where SRHH is self-rated health and happiness, CA is climate anxiety, GEN is gender, MAR is marital status, EDUL is educational level, REL is religion, and ETHN is ethnicity. Also, the extent

to which climate anxiety can impact self-rated health and happiness can be influenced by some of the socio-demographic variables, particularly marital status. Marriage can provide social and psychological support; hence, the negative impact of climate anxiety among married individuals may be smaller than among divorced and single individuals.

The study approached data analysis in two different ways. The first was descriptive analysis, and the second was econometric analysis. The descriptive analysis focused on the description of study variables, where frequency tables, measures of central tendency (mean), measures of dispersion (standard deviation) were used. Secondly, the econometric analysis focused on estimating Equation 2 using OLS. Before estimating Equation 2, the study performed correlation analysis to determine the direction and degree of relationship between the study variables. This was done using Spearman Correlation Coefficients. STATA version 17.0 was used for the analysis, and the acceptable level of significance was set at 5%.

Results

Descriptive Analysis

The study variables (socio-demographic variables) of the respondents are described in Table 3.

Table 3: Socio-demographic characteristics

Items	Categories	Frequency	Valid Percent
Gender	Female	1223	61.5
	Male	766	38.5
Ethnic Group	Akan	1589	79.9
	Others	400	20.1
Marital Status	Married	1005	50.5
	Divorced/Separated	259	13.0
	Widowed	654	32.9
	Never married	71	3.6
Highest Level of Education	No formal education	499	25.1
	Primary school education	599	30.1
	O-Level/A-Level education	676	34.0
	College/Tertiary	215	10.8

Religion	Christianity	1709	85.9
	Islam	251	12.6
	Other Religions	29	1.5
Household Size	1-5	1641	82.5
	6-10	308	15.5
	11-15	40	2.0

Source: Field Data (2025)

In Table 3, the majority of the respondents were females with a frequency of 1233 (61.5%), and males were relatively fewer with a frequency of 766 (38.5%). Again, the table shows that the majority of the respondents were Akans with a frequency of 1589 (79.9%), followed by others with a frequency of 400 (20.1%). Table 3 further shows that 1005 (50.5%) of the respondents were married, 259 (13.0%) were divorced or separated, 654 (32.9%) were widowed, and 71 (3.6%) were never married. It is again shown from the results that 499 (25.1%) had not received any formal education, 599 (30.1%) had primary school education, 676 (34.0%) had received O-Level/A-Level education, and 215 (10.8%) had received college/tertiary education as their highest level of education, respectively. Again, respondents with 1-5 household size were 1641 (82.5), 6-10 were 308 (15.5), and finally those with 11-15 were 40 (2.0).

Description Climate Anxiety

The mean score and respective standard deviation for each item for climate anxiety is shown in Table 4. Moreover, Table 4 shows factor loading for each item as well as KMO and reliability score.

Table 4: Summary Statistics for Climate Anxiety

Climate Change Anxiety	Min	Max	Mean	Std. Deviation	Factor Loading
Thinking about climate change (CC) makes it difficult for me to concentrate.	1.00	5.00	2.6450	.98983	0.746
Thinking about CC makes it difficult for me to sleep	1.00	5.00	2.5827	.99044	0.855

I have nightmares about climate change	1.00	5.00	2.3018	1.09979	0.878
I find myself crying because of climate change	1.00	5.00	2.2557	1.13311	0.789
I think, ‘why can’t I handle climate change better?’	1.00	5.00	2.4802	1.10273	0.894
I go away by myself and think about why I feel this way about climate change	1.00	5.00	2.4880	1.08203	0.898
I write down my thoughts about climate change and analyze them	1.00	5.00	2.2719	1.14219	0.915
I think, ‘why do I react to climate change this way?’	1.00	5.00	2.4627	1.11341	0.829
My concerns about CC make it hard for me to have fun with my family or friends	1.00	5.00	2.3459	1.11851	0.917
I have problems balancing my concerns about sustainability with the needs of my family	1.00	5.00	2.5204	1.07347	0.878
My concerns about CC interfere with my ability to get work or school assignments done	1.00	5.00	2.3939	1.09778	0.881
My concerns about climate change undermine my ability to work to my potential	1.00	5.00	2.4796	1.08730	0.846
My friends say I think about climate change too much	1.00	5.00	2.4276	1.10876	0.916
KMO	0.817				
Cronbach’s Alpha Score	0.872				

Source: Field Data (2025)

The results in Table 4 show that each item has factor loading more than 0.7, indicating that the items best describe climate anxiety. Also, Cronbach’s Alpha score is 0.872, indicating a high reliability of the scale used for climate anxiety. Given the high reliability and validity of the scale, the study proceeded to analysis the level of climate anxiety of the adults in the study areas follows.

The results in Table 4 indicate that the majority of the respondents (M=2.6450; SD= .98983) sometimes thought about climate change, making it difficult for them to concentrate. Again, most of the respondents (M= 2.5827; SD=.99044) sometimes thought about climate change, which made it difficult for them to sleep. Also, most of the respondents (M= 2.3018; SD= 1.09979) rarely had nightmares about climate change, most (M= 2.2557; SD= 1.13311) rarely found themselves crying due to climate change, and the majority (M= 2.4802; SD= 1.10273) rarely thought of why they could not handle climate change better. Again, most of the respondents (M= 2.4880; SD=

1.08203) rarely went away by themselves to think about why they felt what they felt about climate change, majority (M= 2.2719; SD= 1.14219) rarely wrote down their thoughts about climate change and analyse them, most (M= 2.4627; SD= 1.11341) rarely thought, ‘why do I react to climate change this way?’, and majority (M= 2.3459; SD= 1.11851) rarely had concerns about climate change which make it hard for them to have fun with their family and friends.

Again, most of the respondents (M = 2.5204; SD = 1.07347) sometimes had problems balancing their concerns about sustainability with the needs of their family. It is further revealed that most of the respondents (M= 2.3939; SD= 1.09778) rarely had their concerns about climate change interfering with their ability to get work or school assignments done, most (M= 2.4796; SD=1.08730) indicated that they rarely had their concerns about climate change undermining their ability to work to their potential and majority (M= 2.4276; SD=1.10876) were rarely told by their friends that they thought about climate change too much.

Self-rated Health and Happiness

The mean score and respective standard deviation for each item for self-rated health and happiness is shown in Table 5. Moreover, Table 5 shows factor loadings for each item, as well as KMO and reliability scores for self-rated health and happiness.

Table 5: Summary Statistics of Self-Rated Health and Happiness

Self-Rated Health and Happiness	Min	Max	Mean	Std. Dev.	Factor Loading
In general, how would you rate your health status	1.00	5.00	3.1146	.85227	0.8731
How would you rate your overall quality of life	1.00	5.00	3.6721	.75323	0.8756
Taking all things together, how would you your health	1.00	5.000	3.1564	.92212	0.7723
How satisfied are you with your health	1.00	5.00	2.3063	.90073	0.7845
How satisfied are you with yourself	1.00	5.00	2.1661	.85564	0.8583
How satisfied are you with your ability to perform your daily activities	1.00	5.00	2.2901	.91287	0.8828
How satisfied are you with personal relationships	1.00	5.00	2.1700	.84571	0.8785
How satisfied are you with the conditions of your living place	1.00	5.00	2.1622	.83021	0.8673

Taking all things together, how satisfied are you with your life these days	1.00	5.00	2.1752	.85231	0.8785
KMO	0.8648				
Cronbach's Alpha	0.8751				

Source: Field Data (2025)

From Table 5, all the items under self-rated health and happiness had factor loadings more than 0.7, indicating high construct validity. Also, Cronbach's Alpha score is 0.8751, indicating a high reliability of the self-rated health and happiness scale. Given the high reliability and validity of the scale, the study proceeded to use the scale to assess the level of health and happiness of the respondents.

From Table 5, most respondents were neutral to their health. That is, they were not sure whether they are ok with their health or not. The respondents were neutral regarding general health status, quality of life, and health at the time of data collection.

It is shown in Table 5, that majority of the respondents (M= 2.3063; SD= .90073) were satisfied with their health, most (M= 2.1661; SD= .85564) were satisfied with themselves, most (M= 2.2901; SD= .91287) were satisfied with their ability to perform their daily activities and majority (M= 2.1700; SD=.84571) were satisfied with their personal relationships. It is further revealed that most (M= 2.1622; SD= .83021) were satisfied with the conditions of their living place, and the majority (M= 2.1752; SD= .85231) were satisfied with their life these days, taking all things together. From the results, respondents generally not happy. Therefore, the respondents, self-rated their health and happiness low.

Association of Climate Anxiety with Self-Rated Health and Happiness

Spearman Correlation Matrix

The Spearman correlation coefficients between the study variables are shown in Table 6.

Table 6: Spearman Correlation Matrix

	SRHH	CA	GEN	MAR	EDUL	REL	ETHN
SRHH	1.000						
CA	-0.657*	1.000					
GEN	0.0532	0.1362	1.000				
MAR	0.1647	0.3218	0.0146	1.000			
EDUL	0.4356*	0.1056	0.0353	0.0348	1.000		
REL	0.0241	0.0343	0.2316	0.2146	0.2131	1.000	

ETHN	0.2582	0.0218	0.0463	0.2701	0.1573	0.0421	1.000
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Source: Field Data (2025); *Significant at 5%

In Table 6, CA and SRHH have a strong negative correlation ($r=-0.657$), and this is statistically significant at 5%. This means that a rise in climate anxiety significantly reduced self-rated health and happiness of the adult population in the study area. On the other hand, a decrease in climate anxiety significantly increases self-rated health and happiness of the adult population.

Ordinary Least Squares Estimation

Estimated results of the impact of climate anxiety on self-rated health and happiness, controlled by socio-demographic characteristics, are summarized in Table 7. The study accounted for heteroskedasticity by using robust standard errors.

Table 7: Impact of Climate Anxiety on Self-Rated Health and Happiness

Self-Rated Health & Happiness	Coefficient	Robust Std. err.	T	P> t	(95% conf. interval)	
Climate Anxiety	-.5992727	.0317165	-18.89	0.000*	-.6614854	-.5370599
Married	-.0114893	.1089321	-0.11	0.916	-.2251628	.2021841
Divorced	.0145186	.1199721	0.12	0.904	-.2208101	.2498473
Widowed	.0231375	.110609	0.21	0.834	-.1938252	.2401001
2. Male	.1308976	.050248	2.61	0.005*	.0323347	.2294606
Education						
Primary school education	-.1080384	.0600204	-1.80	0.072	-.2257702	.0096934
O-Level/A-Level education	-.0603755	.0615414	-0.98	0.327	-.1810907	.0603397
College/Tertiary	-.0104848	.0841956	-0.12	0.901	-.1756369	.1546673
Reli						
Islam	-.0755054	.0709654	-1.06	0.288	-.2147061	.0636953
Other Religions	.2331747	.22189	1.05	0.293	-.2020686	.6684181
Ethnic						
Other ethnic groups	.0572802	.1014489	0.56	0.572	-.1417147	.2562751

Household size	-.0004058	.0045391	0.09	0.929	-.0093095	.0084978
_cons	4.025536	.143825	27.99	0.000*	3.743419	4.307652
Number of obs	1,534					
F	26.60					
Prob > F	0.0000*					
R- square	0.2376					
Root MSE	.87623					

Source: Field Data (2025); *Significant at 5%

The results from Table 7 indicate that climate change anxiety (coeff.= -0.5993, std. err. = 0.0317, $p < 0.0001$) has a significant negative impact on self-rated happiness. Therefore, a unit increase in climate change anxiety leads to a 59.9% decrease in self-rated health and happiness. Also, gender (coeff. =.1308976, std err=.050248, $p < 0.005$) significantly matters in self-rated health and happiness. Male adults had significantly higher self-rated health and happiness than female adults. Moreover, self-rated health and happiness are statistically the same for Akan and other ethnic groups. Also, marital status, educational level, and religion do significantly matter in self-rated health and happiness among the adult population.

Discussion

This study focuses on climate anxiety and self-rated health and happiness among the older adults in Ghana. The demographic profile, especially the gender of the respondents, reveals important characteristics that have implications for the interpretation and generalizability of the study findings. The predominance of female respondents compared to males suggests a gender imbalance within the study sample. This may reflect demographic realities within the study area and the greater availability of women during data collection. The overrepresentation of women is significant because gender has been shown to influence perceptions of health, wellbeing, environmental risks, and coping strategies. Consequently, the study's findings may reflect experiences and perspectives that are more characteristic of women than men.

The results further indicate that older adults experienced a moderate level of climate anxiety. Specifically, respondents sometimes reported difficulty concentrating and sleeping because of concerns about climate change. These findings suggest that climate change is increasingly becoming a psychological stressor among older adults in Ghana. This observation aligns with emerging global literature [9,18,45] which argues that climate-related concerns extend beyond physical and environmental impacts to include mental and emotional well-being. It is worth noting that older adults are particularly vulnerable because they often depend directly on environmental resources for their livelihoods and may have fewer adaptive capacities than younger populations.

Moreover, respondents generally expressed neutrality about their overall health status, quality of life, and health conditions at the time of the survey. This suggests a degree of uncertainty among older adults about their well-being. Such neutrality may reflect the complex realities of aging in Ghana, where older persons often experience both positive and negative health conditions simultaneously. While many may not suffer from severe illnesses, they may also face age-related limitations, chronic health conditions, reduced mobility, and inadequate access to healthcare services, making it difficult to rate their health positively as espoused in [20] and [21].

The results further show that respondents were generally satisfied with their health, themselves, their ability to perform daily activities, their personal relationships, and their living conditions. These findings suggest that despite physical and economic challenges associated with aging, many older adults have developed adaptive coping mechanisms and resilience. The relatively high satisfaction with personal relationships is particularly significant in the Ghanaian context, where family support systems and communal living remain important sources of social and emotional

support. Social connectedness has consistently been identified in gerontological literature [21,22] as a key determinant of wellbeing and successful aging.

However, although respondents expressed moderate satisfaction in specific domains of life, the overall assessment revealed low levels of happiness. This apparent contradiction suggests that satisfaction with particular aspects of life does not necessarily translate into overall happiness. Happiness is a multidimensional construct influenced not only by health and social relationships but also by economic security, psychological well-being, social inclusion, and future expectations. Older adults may be satisfied with certain aspects of their lives while simultaneously experiencing concerns about financial dependence, declining health, loneliness, climate-related uncertainties, or inadequate social protection.

Furthermore, the relatively low self-rated health and happiness scores may have implications for health outcomes. Previous studies [16,30,3335] have demonstrated that self-rated health is a strong predictor of morbidity, mortality, healthcare utilization, and quality of life among older populations. This study affirms similar findings in a developing economy setting. Individuals who perceive their health negatively are more likely to experience poorer physical and mental health outcomes.

Additionally, the findings reveal a strong and statistically significant negative correlation between climate anxiety (CA) and self-rated health and happiness (SRHH) among adults in the study area. This indicates that higher levels of climate anxiety are associated with lower levels of perceived health and happiness. The strength of the correlation suggests that climate-related concerns are not merely environmental issues but are increasingly becoming important determinants of individual wellbeing. This finding supports emerging literature that identifies climate anxiety as a growing

psychological burden affecting people's quality of life, emotional stability, and overall health perceptions [47,48]. The study further confirms this relationship by showing that a one-unit increase in climate anxiety is associated with approximately a 59.9% reduction in self-rated health and happiness. This substantial effect highlights the seriousness of climate anxiety among adults and suggests that concerns about climate change can significantly undermine subjective wellbeing. This finding is particularly fascinating, given that climate-resilient policies are largely inadequate and inefficient. It is crucially worth noting because individuals who are constantly worried about environmental degradation, unpredictable weather patterns, declining agricultural productivity, and future livelihood uncertainties may experience heightened psychological distress, which subsequently affects their assessment of health and life satisfaction. This finding was partially established in studies including Ugwu et al. [52], Awuni et al. [6], and Nyantakyi-Frimpong [3], which found that climate change may reduce the productivity of farmers, thereby causing psychosocial problems.

The study also found significant gender differences in self-rated health and happiness, with male adults reporting higher levels than female adults. This finding may be explained by the gendered nature of social and economic vulnerabilities in many African societies. Women often bear multiple responsibilities, including caregiving, household management, food provision, and income generation. These responsibilities may increase their exposure to climate-related stressors and reduce their capacity to cope effectively. Furthermore, women frequently have less access to productive resources, land ownership, financial capital, and climate adaptation opportunities, making them more vulnerable to the adverse effects of environmental changes. Similar findings have been reported in Asiamah et al. [5] (2026) and Antwi-Agyei and Nyantakyi-Frimpong [3] about how gendered differences exist regarding the ramifications of climate impact in Ghana.

Conclusions and Policy Implications

The findings revealed that climate anxiety is significantly associated with reduced levels of self-rated health and happiness. The strong negative correlation between climate anxiety and wellbeing demonstrates that concerns about climate change extend beyond environmental issues and have profound psychological and health implications for individuals. The study further established that climate anxiety is a significant predictor of self-rated health and happiness, with increasing levels of anxiety leading to substantial declines in perceived wellbeing. These findings suggest that climate-related fears, uncertainties, and concerns regarding future environmental conditions can adversely affect individuals' physical, emotional, and social well-being. The study also found significant differences in self-rated health and happiness across gender groups. Male adults reported higher levels of health and happiness than females.

The findings of this study have important policy implications for improving the wellbeing of adults in the face of increasing climate-related challenges. Given the significant negative effect of climate anxiety on self-rated health and happiness, policymakers should integrate climate-related mental health concerns into public health planning and interventions. Mental health services should be strengthened to provide counseling and psychosocial support for individuals experiencing anxiety arising from climate change and environmental uncertainties. There is also the need for government agencies, civil society organizations, and educational institutions to intensify climate change education and awareness programs. Providing accurate information on climate change and practical adaptation measures can help reduce uncertainty, enhance resilience, and mitigate anxiety among vulnerable populations. Such programs should emphasize community participation and locally appropriate adaptation strategies.

The study further highlights the importance of gender-sensitive interventions. Since female adults reported lower levels of self-rated health and happiness than males, climate adaptation and social welfare programs should specifically address the vulnerabilities of women. This can be achieved through improved access to livelihood opportunities, financial resources, healthcare services, and social protection programs that enhance their adaptive capacity. Government should also strengthen social protection mechanisms and promote livelihood diversification, particularly among populations whose livelihoods depend heavily on climate-sensitive sectors such as agriculture. Improved economic security can reduce vulnerability to climate shocks and alleviate the psychological stress associated with environmental uncertainty. Furthermore, climate adaptation policies should move beyond physical infrastructure and environmental management to incorporate psychological wellbeing as a key component of resilience-building. National and local climate policies should recognize that climate change affects not only ecosystems and economies but also mental health and overall life satisfaction.

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Data availability

Datasets used and/or analyzed during the current study are available on request (contact the corresponding author). These data are not publicly available because of ethical and privacy requirements.

Ethical approval

The ethical principles outlined in the 2013 revised Declaration of Helsinki were applied to this research involving human subjects. The study was approved by the University of Skills Training and Entrepreneurial Development's Institutional Review Board with reference number

USTED/IERC/2025/026. Each participant was informed in detail about the research's aim, area, and steps, and assured of their rights, including the right to withdraw at any time without penalty. The respondents were also asked to sign an informed consent form, and their privacy and anonymity were preserved during the research. Presentation and publication of human data were performed in accordance with relevant guidelines and regulations.

Consent to participate

The respondents were also asked to sign an informed consent form, and their privacy and anonymity were preserved during the research. The Ethical consideration letter and the consent form to participate are available upon request.

Informed consent

We obtained informed consent from all participants involved in the study. They were fully informed about the research objectives, procedures, potential risks, and benefits, and gave their voluntary consent to participate.

Consent to Publish Identifying Information/Images

Not applicable

Generative AI and AI-assisted technologies in the writing process

During the preparation of this work the authors used ChatGPT for language and readability. This tool was not used to write the manuscript. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

Competing interests

The authors declare no competing interests

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