

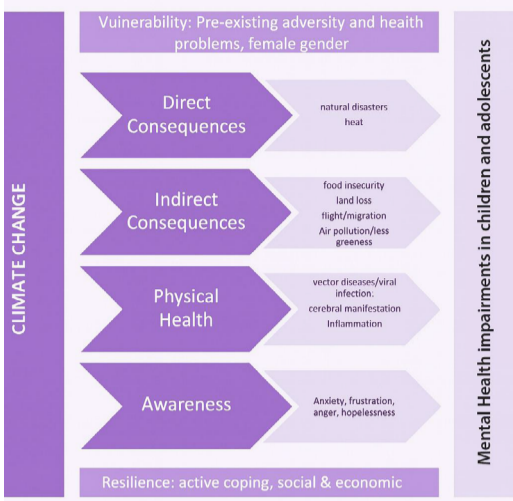
Climate Change and Youth Mental Health: A Cross-Regional Study from India and Hong Kong

Mercian Daniel,^{1,2} Sandhya Kanaka Yatirajula,¹ Tang Hiu Yu Natalie,³ Maree Hackett,^{4,5} Pallab Maulik,^{1,5,6} Shelly Lap-ah TSE^{3,7}

1. The George Institute for Global Health, India; 2. Department of Psychiatry, Kasturba Medical College, Manipal; 3. The Chinese University of Hong Kong; 4. The George Institute for Global Health, Australia; 5. Faculty of Medicine, University of New South Wales, Sydney; 6. Department of Brain Sciences, Imperial College London; 7. Fudan University/Shanghai Jiaotong University/Nanjing Medical University National Secretary of ICOH, P. R. of China.



Background



- Climate change is part of a broader pattern of human-driven environmental disruption.
- Mental health impacts, especially among young people are understudied.
- Limited evidence exists from Hong Kong, while none from India.
- This study aims to fill that gap by examining youth mental health impacts of climate change.
- Provides preliminary insights into actions to reduce psychological harm.

Objectives

Examine links between climate change and mental health (depression, anxiety) among youth aged 14-24.

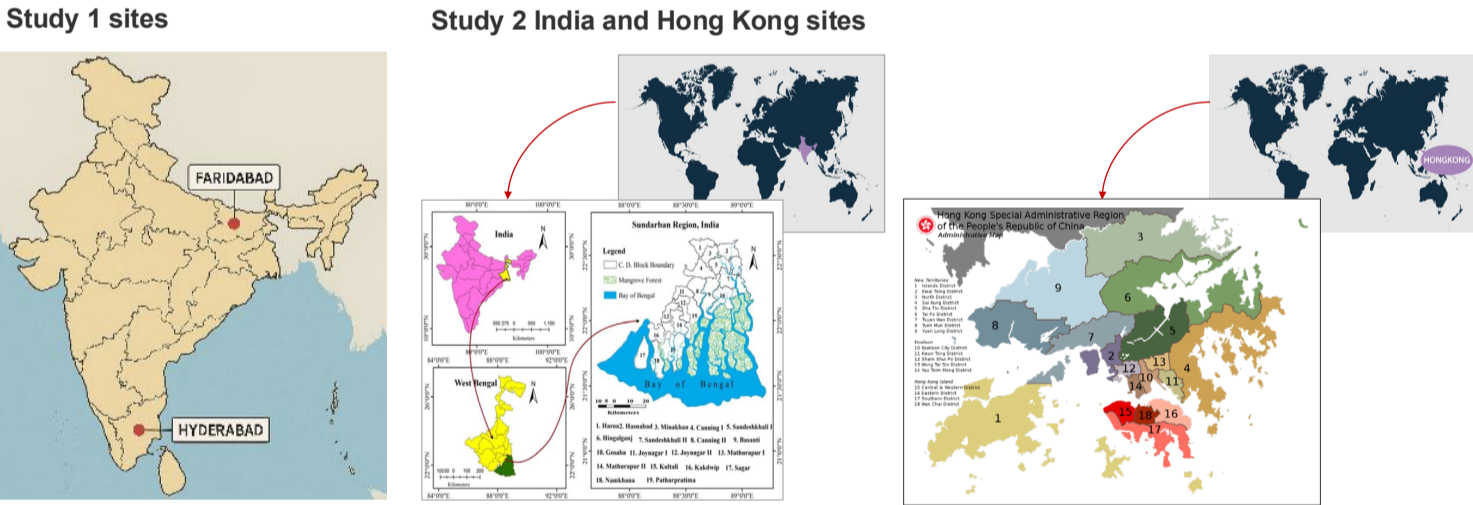
- Assess mental health status and life satisfaction of participants..
- Evaluate climate change knowledge and awareness among young people.
- Explore perceptions, emotions, and psychological impacts of climate change.
- Understand levels of concern, hope, agency, and engagement related to climate action.

Methodology

Studies adopted an exploratory approach and applied a cross-sectional survey design

Study 1	Study 2
Adapted from a Climate Cares study at Imperial College London.	Joint research between The George Institute & CUHK
Urban slums in North and South India; indirectly affected (N= 536)	India rural cyclone-affected riverine area (N= 838) and Hong Kong urban (N= 759)
July 2021	June 2023-March 2024
SRS technique from existing study database (16-24 years)	India: SRS technique from administrative database (18-24 years); Hong Kong: CUHK mass mail and school visits (14-24 years)
Questionnaire comprised of scales and demographic details translated into local languages (Hindi, Telugu, Bengali) and adapted from the Climate Cares study	
RedCap® on tablets by trained field staff	India: RedCap® mobile version; Hong Kong: Qualtrics online and paper forms
Independent Ethics Committee, The George Institute	Ethics Committees of The George Institute and CUHK
Written consent for ≥18 years; parental consent and adolescent assent for 16–17 years	

Study sites



Analysis

Demographics	Climate-related psychosocial factors
1. Gender	1. Climate events experienced
2. Age	2. Time of experiencing climate events
3. Education	3. Effect climate events on family
4. Occupation	4. Knowledge of climate change
5. SES/ Income	5. General awareness of climate change
6. Household density	6. Life satisfaction
	7. Psychological effect of environment (lack of green/ blue space, air, noise and light pollution etc.)
	8. Negative and positive impact on life
	9. Climate change related feelings (helpless, afraid, angry, hopeful etc.)
	10. Climate concern scale
	11. Impact on daily life
	12. Engagement in climate change activities
	13. Climate agency scale
	14. Hopes and concern for future
	15. Current and past mental health (diagnosis and treatment)

Outcome measures (Study 2)

Depression measured using Patient Health Questionnaire- 9 items (PHQ-9)
• *Converted to binary scores:* No Depression (PHQ-9 ≤4) v/s Depression (PHQ-9 ≥5)

Anxiety measured using Generalized Anxiety Disorder- 7 items (GAD-7)
• *Converted to binary scores:* No Anxiety (GAD-7 ≤4) v/s Anxiety (GAD-7 ≥5)

Statistical analysis (see analysis framework)

- Logistic regression to estimate association with climate-related psychosocial factors
- Control for demographic characteristics

Contact Information

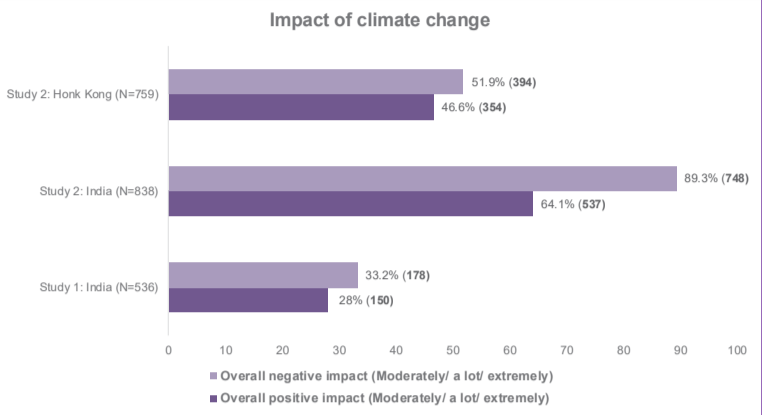
Email: mdaniel@georgeinstitute.org.in | Website: www.georgeinstitute.org.in
The George Institute for Global Health, India

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Results

Participants' characteristics

- About equal male-female split across studies (India: ~48-52%; Hong Kong: 52% female)
- Younger participants in Hong Kong (Mean=17 yrs.)
- Study 1: 67.7% undergraduates; Study 2 India: 86.9% up to higher secondary, Hong Kong: 66.8% up to higher secondary.



Climate feelings, concerns and agency

	Study 1 India N= 536	Study 2 India N= 838	Study 2 Hong Kong N= 759
Strength of negative feelings, Mean (SD)	9.3 (3.1)	14.7 (4.6)	13 (5.3)
Median (Q1, Q3)	9 (7,12)	15 (12,18)	13 (8,18)
Min - Max	1-18	2-27	0-30
Climate concern, Mean (SD)	9.8 (5.3)	13.1(4.3)	7 (5.9)
Median (Q1, Q3)	9 (6,11)	13 (10,6)	6 (1,10)
Min - Max	0-24	0-24	0-24
Climate agency scale, Mean (SD)	3.9 (3.2)	8.6 (5.4)	-3 (4.6)
Median (Q1, Q3)	4 (2,5)	9.0 (5,13)	-3 (-6,0)
Min - Max	-12-14	-13-18	-18-15

Key findings (study 2)

Gender, education, occupation, and income as protective factors

- Males, individuals with higher education, formally employed, and higher household income had lower odds of depression and anxiety in both India and Hong Kong.

Climate-related stressors increase mental health risks

- Lack of green/ blue spaces, noise pollution, light pollution and hot weather in Hong Kong; and water salinity, livelihood loss, light pollution, and destruction of house in India (Moderately/A lot/Extremely) were strongly associated with depression and anxiety.

Negative emotions amplify mental health risk

- Feelings of helplessness, fear, anger, disappointment, shame, anxiousness, loneliness and sadness while thinking about climate change significantly increased odds of depression and anxiety in both India and Hong Kong.

Protective role of knowledge and awareness, concern, agency and life satisfaction

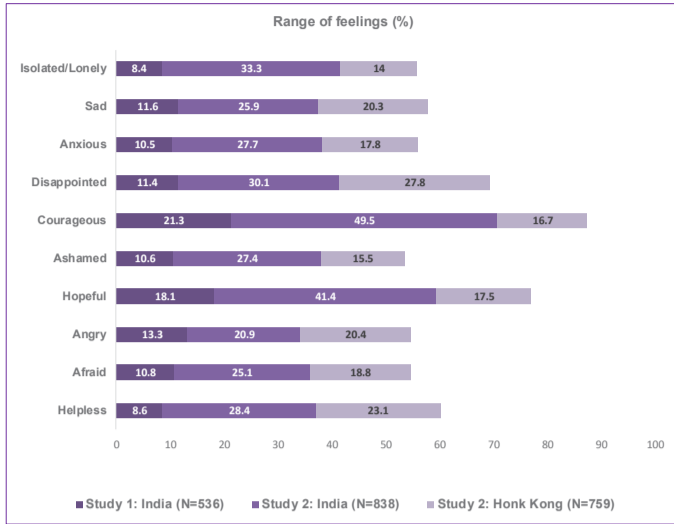
- Knowledge, climate concern, and life satisfaction (in Hong Kong); and general awareness, climate agency, and life satisfaction (in India) reduced mental health risks.

Lessons learned

- Climate change impacts mental health between and within regions, especially those directly and disproportionately affected.
- Socio-demographic factors such as gender, education, occupation, and income are critical determinants of mental health.
- Climate-related stressors linked to environmental conditions in urban and rural settings exacerbate mental health challenges.
- Negative emotional responses related to climate change and environmental degradation significantly increase the risk of mental health problems.
- Similar to socio-demographic determinants, climate-related psychosocial factors are significant risk factors for mental health.

Policy recommendation

- Integrate mental health into climate action plans**
Recognize mental health impacts of climate change in national and regional adaptation strategies, especially for populations directly and disproportionately affected.
- Target vulnerable socio-demographic groups**
Develop tailored interventions for young people without schooling, women and girls, and low-income communities.
- Address environmental stressors in urban and rural planning**
Incorporate water security, pollution control, and livelihood generation measures into climate resilience programs to reduce mental health risks linked to environmental conditions.
- Include psychosocial support in climate policies**
Provide community-based mental health services and counseling to manage negative emotional responses and climate-related distress.
- Promote climate literacy, agency and engagement opportunities**
Co-create and implement education and awareness campaigns to strengthen climate knowledge and psychosocial resilience, reducing vulnerability to mental health problems.



Association of depression & anxiety with climate factors (study 2: adjusted models)

Hong Kong	No Depression (PHQ-9 ≤4) n=244	Depression (PHQ-9 ≥5) n=515	aOR [95% CI]	p-value
Male [Ref: Female]	140 (38.5)	224 (61.5)	0.57 (0.42,0.78)	<0.01**
Under graduation [Ref: No schooling]	31 (22.8)	105 (77.2)	1.74 (1.12,2.70)	0.01*
Noise pollution [Ref: No effect/A little]	100 (25.9)	286 (74.1)	1.80 (1.32,2.45)	<0.01**
Lack of green/blue space [Ref: No effect/A little]	73 (25.5)	213 (74.5)	1.65 (1.19,2.29)	<0.01**
Light pollution [Ref: No effect/A little]	74 (24.7)	225 (75.3)	1.78 (1.29,2.46)	<0.01**
Knowledge			0.28 (0.09,0.90)	0.03*
Life Satisfaction			0.64 (0.59,0.71)	<0.01**
India	No Depression (PHQ-9 ≤4) (n=270)	Depression (PHQ-9 ≥5) (n=557)	aOR [95% CI]	p-value
Male [Ref: Female]	167 (38.4)	268 (61.6)	0.67 (0.48,0.92)	0.01*
Under graduation [Ref: No schooling]	43 (40.6)	63 (59.4)	0.47 (0.28,0.78)	0.00**
Formally employed [Ref: Homemaker/ Student]	16 (25.8)	46 (74.2)	0.39 (0.26,0.58)	<0.01**
Air pollution [Ref: No effect/A little]	234 (34.6)	442 (65.4)	0.52 (0.34,0.81)	0.00**
Light pollution [Ref: No effect/A little]	132 (27.7)	344 (72.3)	2.35 (1.69,3.26)	<0.01**
Reduced drinking water [Ref: No effect/A little]	264 (33.2)	530 (66.8)	0.38 (0.14,1.02)	0.05*
Climate Agency Scale	9.65 (5.77)	8.01 (5.19)	0.95 (0.92,0.97)	0.00**

Hong Kong	No Anxiety (GAD-7 ≤4) (n=361)	Anxiety (GAD-7 ≥5) (n=398)	aOR [95% CI]	p-value
Male [Ref: Female]	202 (55.5)	162 (44.5)	0.6 (0.42,0.78)	<0.01**
Noise pollution [Ref: No effect/A little]	160 (41.5)	226 (58.5)	1.65 (1.24,2.20)	<0.01**
Lack of green/blue space [Ref: No effect/A little]	111 (38.8)	175 (61.2)	1.77 (1.31,2.38)	<0.01**
Light pollution [Ref: No effect/A little]	119 (39.8)	180 (60.2)	1.68 (1.25,2.26)	<0.01**
Hot weather [Ref: No effect/A little]	232 (44.4)	290 (55.6)	1.49 (1.10,2.03)	0.01**
Knowledge			0.27 (0.09,0.79)	0.02*
Life Satisfaction			0.66 (0.61,0.72)	<0.01**
India	No Anxiety (GAD-7 ≤4) (n=258)	Anxiety (GAD-7 ≥5) (n=569)	aOR [95% CI]	p-value
Formally employed [Ref: Homemaker/ Student]	17 (27.4)	45 (72.6)	0.5 (0.34,0.74)	<0.01**
Light pollution [Ref: No effect/A little]	134 (28.2)	342 (71.8)	1.9 (1.37,2.62)	0.00**
General awareness	11.4 (5)	12.4 (4.27)	1.04 (1.01,1.08)	0.02*
Life Satisfaction	7.98 (1.44)	6.51 (1.89)	0.63 (0.57,0.69)	<0.00**
Climate Agency Scale	9.16 (5.33)	8.27 (5.47)	0.97 (0.94,1)	0.05*

*p<.05, **p<.001