

Study of Heat and Health Action Preparedness at Urban Health Centers of Coastal City Surat

By

Oshee Gupta

*Dissertation submitted in partial fulfillment of the requirements of the degree
MBA Hospital and Health Management*

Academic year, 2017-2019



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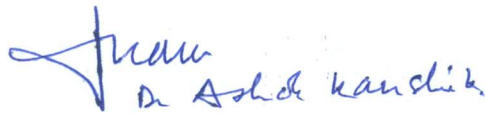
TO WHOMSOEVER MAY CONCERN

This is to certify that **Oshee Gupta**, student of MBA Hospital and Health Management from The IIHMR University, Jaipur has undergone internship training at **Urban Health Climate Resilience of Excellence** from **10 February 2019 to 10 May 2019**

The Candidate has successfully carried out the study on **Heat And Health Action Preparedness at Urban Health Centers of Coastal City, Surat** assigned to her during internship training and her approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish her all success in all her future endeavors.

A handwritten signature in blue ink, appearing to read 'Dr. Ashok Khandlik'.

Dean, Academics and Student Affairs

The IIHMR University, Jaipur

16 May 19

A handwritten signature in blue ink, appearing to read 'Dr. Ashok Khandlik'.

Professor

The IIHMR University, Jaipur



URBAN HEALTH AND CLIMATE RESILIENCE CENTRE OF EXCELLENCE

(Centre for Research, Training, Networking, Advocacy, Consultancy)

(Registration No.E/8280/Surat)

Date-10/5/2019

The certificate is awarded to

Name- Dr. Oshee Gupta

In recognition of having successfully completed her

Internship in the department of

Name of Department – Urban Health and Climate Resilience Center of Excellence

And has successfully completed her Project on

**A Study of Heat and Health Action Preparedness at Urban Health centers of Coastal City
Surat**

Date - 10 February 2019 to 10 May 2019

Organization –Urban Health and Climate Resilience Center of Excellence,

Health Department Surat Municipal Corporation

She comes across as a committed, sincere & diligent person who has a strong drive and zeal for learning

We wish him/her all the best for future endeavors

Dr. Vikas Desai

Technical Director

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CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **A Study on Heat and Health Action Preparedness at Urban Health Centers of Coastal City, Surat** submitted by Dr.Oshee Gupta Enrolment No- **IIHMR-U/01/2017-19/0618** under the supervision of **Col.(Dr.)Ashok Kaushik Professor** The IIHMR University, Jaipur for award of MBA in Hospital and Healthcare Management of the University carried out during the period from February 12, 2018 to May 12, 2018 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning.


Signature

ACKNOWLEDGEMENT

It gives me great pleasure to acknowledge and to express my gratitude to God Almighty and all those who have helped me throughout this project.

First and foremost, I would like to thank my mentor **Dr. Vikas Desai** Technical Director of Urban Health Climate Resilience Center of Excellence **and Mr. Anuj Ghanekar** Social Anthropologist. Child Friendly Smart City Knowledge Center Surat for allowing me to work in this auspicious Organization. Their support and valuable guidance inspired me greatly to work on this project.

I would like to sincerely thank **Col Ashok Kaushik** my guide and **Dr. Nutan P. Jain**, my mentor at IIHMR, Jaipur for their motivation and guidance in completion of my report. They have been the pillar of rock in my entire dissertation period.

Special thanks to **Mohit** intern at UHCRCE & my mother **Mrs. Sarita Gupta** for providing me with good environment and facilities to complete this project.

Lastly I would like to thank my family members, friends who have encouraged me directly or indirectly in completion of this project.

I perceive this opportunity as a big milestone in my career development. I will strive to use gained skills and knowledge in the best possible way.

Dr Oshee Gupta

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List of Symbols and abbreviations

SMC	Surat Municipal Corporation
No.	Number
Avg.	Average
Temp.	Temperature
UHRCE	Urban Health and Climate Resilience Center Of Excellence
UHC	Urban Primary Health Centers
MO	Medical Officer
ANM	Auxiliary Nurse Midwifery
Pt.	Patient
OPD	Out Patient Department
IPD	In Patient Department
IEC	Information Education Communication
KABP	Knowledge Attitude Behavior Practice
BP	Blood Pressure
Rbs	Random Blood Sugar
TB	Tuberculosis
i/v	Intra venous
ORS	Oral Rehydration
MAMTA	Health Institute for Mother and Child
Ant.	Anterior
P.G.	Post Graduate
&	And

Introduction

1. Surat Context of Heat & Health

Surat is one of the twenty cities across the world most affected by climate change. It is located on the banks of the Tapi River, which flows into the Arabian Sea, around 16 kilometres from the city centre. Much of the city and its surroundings are less than 10 metres above mean sea level. Surat, being a coastal city, faces climate change impacts of increased temperature and humidity with urban heat island effects, and heat stresses due to high heat index. With prolonged summers, the water demands of the city are also nearing the allocated water resources.

Global climate change results in prolonged summers and rise in temperature. Climate scientists all across the world are involved in empirical research and reporting impact of heat on health, productivity and overall development. The Ahmedabad heat action plan 2014 is the first evidence-based heat action plan in Asia and has drawn attention of all cities for action. Every city has a different context, and the initiative of one city can be a valuable guide for other cities. Despite being in same administrative state of India, Ahmadabad belongs to an arid zone while Surat city falls under a semi-arid zone. The major difference between the weather of Ahmadabad and Surat is in extreme temperature levels, duration and days, humidity and sea breeze. Surat climate and health data analysis of the perceived heat stressed year of 2010 showed 224 additional all cause deaths in summer. Surat heat and health action plan is also in place.

According to the Research Paper of UHCRCE—Last decade records higher humidity compared to the previous year. The rise in average humidity in last thirty years is 7.4%. Humidity and Heat is converted in to heat Index to assess exposure risk. In Surat In last thirty years fluctuating trend in temperature is observed. Maximum temperature have increased by 0.4°C, Average temperature by 0.8°C, and Minimum temperature by 4.1°C.

2. Theoretical Perspective

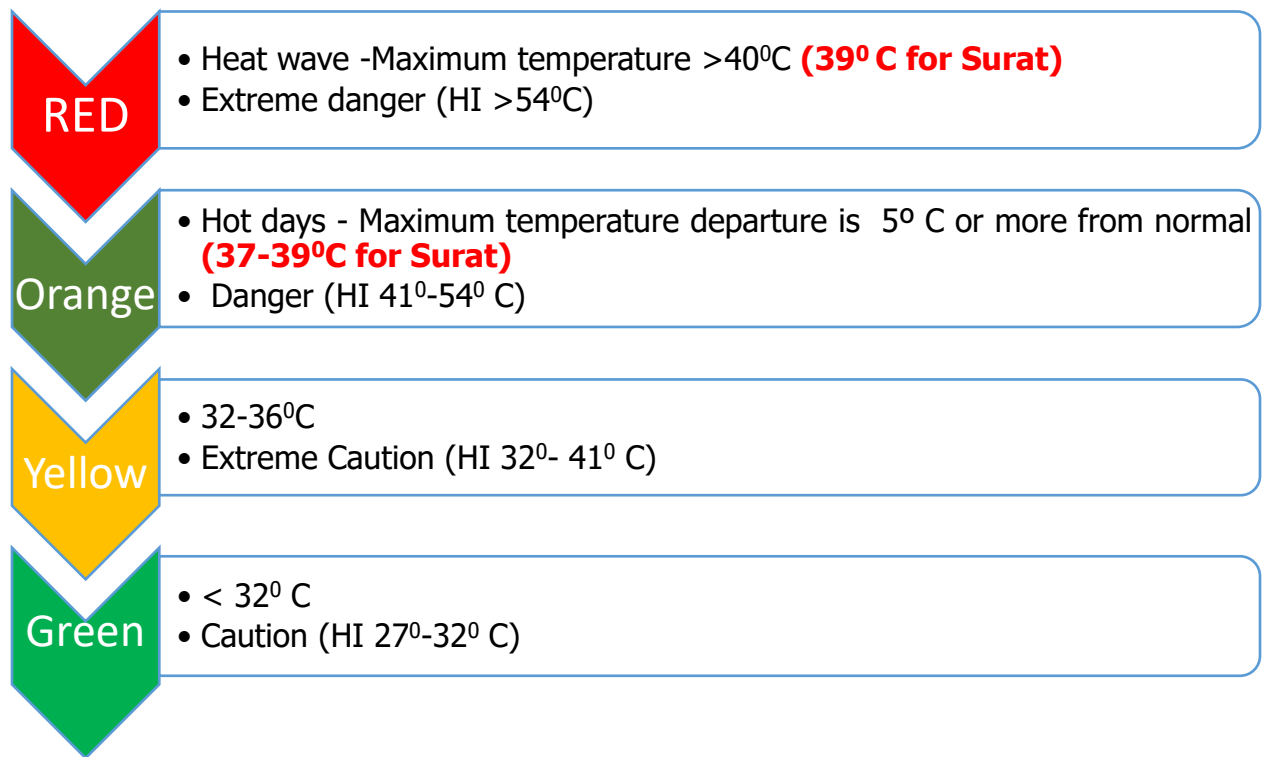
The location, socio demographic profile, industrialization, floods and climate events, all together making Surat city vulnerable to climate change. This aspect derives the need to understand the effect of high temperature on health.

The effect of heat wave is adverse on overall health of the people.

Table No.1 Effect of extremes of temperature on health given by “NOAA”

Celsius	Fahrenheit	Notes
27-32C	80-90F	Caution: fatigue is possible with prolonged exposure and activity. Continuing activity may result in heat cramps
32-41C	90-105F	Extreme Caution: Heat cramps and heat exhaustion are possible. Continuing activity could result in heat stroke
41-54C	105-130F	Danger: Heat cramps and heat exhaustion are possible with continued activity
Over 54C	Over 130F	Extreme danger: heat stroke is imminent.

The Standard Color Coding of Heat Wave.



Direct effect of rise in temperature on health are:

- Prickly heat
- Heat syncope associated with dizziness, light headedness, nausea.
- Heat Cramps - Cramping of active muscles (arms, legs), abdominal muscles
- Heat stroke associated with Chills, restlessness, Irritability, euphoria, disorientation, red face and skin, hot/dry skin, very high body temperature, collapse, unconsciousness, convulsions and death.
- Heat Exhaustion associated with nausea, dizziness, weakness headache, blurred vision, profuse sweating, cold/wet grayish skin, normal or subnormal body temperature, unconsciousness, coma and death.

Indirect effects of rise in temperature on health are:

Reduced work Performance – Associated with tiredness, fatigued workers, reduction in the efficacy and accuracy.

Increased Accidents (Industrial and Road) – Fatigued and tired workers. Drivers being more susceptible

Reproductive Problems – Reduction in fertility of both male and female .Can be a problem for the fetus too.

Heart/Lung Strain - For patients with heart, lung, kidney or circulatory problems; heat stress is an added strain, which in severe situation may precipitate serious episodes of acute problems.

Why UHC –Rationale of the Study

UHC are the first point of contact providing the primary health care facility.

1 U-PHC is over 50000 population

Table no. 2 Staffing pattern at UHC(1)

S.No.	Staff	No.
1.	MO	2.1 full time, 1 part time
2	Nurse	3
3	LHV	1
4	Pharmacist	1
5	ANM's	3-5
6	Public Health Manager/ Mobilization Officer	1
7	Support Staff	3
8	M & E unit	1

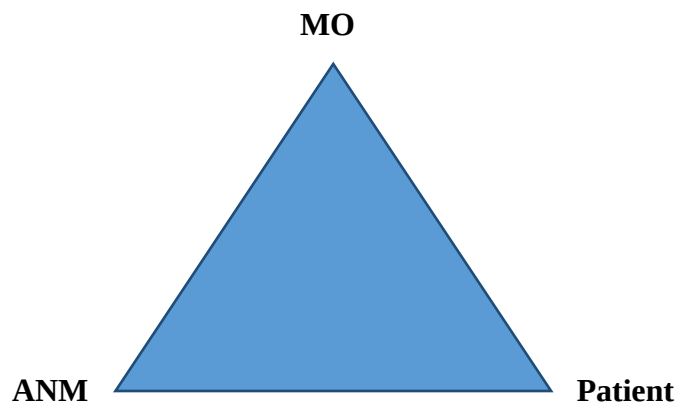
1 ANM is over 10,000 population

Community Health Volunteer (ASHA/LW)- 1000-2500 population

Mahila Arogya Samiti - 250- 500 population.

There are total 44 Urban Health Centers in Surat distributed amongst 7 zones.

In the study of Heat and Health Action Preparedness of Urban Health Centers it is necessary to assess the preparedness and awareness of UHC, Medical Officers, ANM's and the Community to deal with the effects of rise in temperature on health in order to decrease the number of heat related morbidities. This assessment can help city authorities to update existing heat and health action plan.



As MO are the leaders of the UHC as they are the main in charge person at the UHC. ANM's are the leaders of the community as they cater the largest population in comparison to other health care workers. Patients in the OPD gives the outlook of the community approach and the practice as they are the community voice.

Balance at all the three sides brings the balance in the health care delivery system at the primary level so it is essential to study these three parts of the primary health care system in order to see the preparedness of Health and Health Action of Urban Health Centers

Literature Review				
Authors (year)	Study location	Sample size	Sampling techniques	Salient features

SK.Rathi et al May , 2019(2)	Surat	total of 9,237 deaths for 184 summer days (2014-2015)	Birth and Death Registration Department of the SMC was approached for all-cause mortality (death) data. City deaths were sorted out through place of residence of deceased persons. SPSS version (16.0) was used for descriptive and bivariate analysis.	Mean daily mortality was estimated at 50.2 ± 8.5 for the study period with a rise of 20% all-cause mortality at temperature $\geq 40^{\circ}\text{C}$ and rise of 10% deaths per day during extreme danger level (HI: $> 54^{\circ}\text{C}$) days. Spatial (Zone wise) analysis revealed rise of 61% all-cause mortality for Southeast and 30% .East and Southeast zones emerged as high risk zones. Hence, this study is very crucial for designing the specific interventions like temperature forecast, early warning system through short service messages (SMS) at micro level.
Vikas K Desai et al(3) 2015	Surat	This paper reports summer (March to May) variability analysis of temperature and humidity for Surat city from 1985 – 2014 in general and 2010-2014 in particular	Daily data including daily mean temperature ($^{\circ}\text{C}$), daily maximum temperature ($^{\circ}\text{C}$) for the period of 1985 to 2014 (only for summer months) is utilized for analysis.	Descriptive statistics and statistical difference using one-way analysis of variance (ANOVA) followed by the Tukey's multiple comparisons test were performed. Significance was set at $P < 0.05$. There were more frequent maximum temperature spikes identified in the last decade (2005-2014) as compared to previous two decades (1985-1994 and 1995-2004). Humidity increased from 54.9% to 60.4%. Maximum summer temperature increased to 1.60°C from 2011 to 2014. There were 37 hot days with the maximum temperature $\geq 40^{\circ}\text{C}$. Of 425, 384 are heat risk days having HI more than 410°C . Year 2010 had significantly higher mean summer temperature ($F = 4.545$, $p 0.001$) and HI ($F = 18.243$, p
Vikas K. Desai et al(4)	Surat	all-cause mortality data with	The data on temperature and humidity	Student's t-test and correlation coefficient were used to study the relationship between ambient heat

		temperature and humidity was done as part of a collaboration with Surat Municipal Corporation (SMC A total of 36,167 deaths for 961 summer days (2001–2012))	were collected online from Tutiempo Network, S.L50 for the summer months of 2001–12. The values were collected for daily mean, maximum and minimum temperature (°C) and daily mean humidity (%) for Surat city. The mortality data of the city were obtained from the Birth and Death Registration Department of SMC for the period from 2001 to 2012. non-resident Surat city deaths were excluded from the data set through sorting the place of residence (town/village)	and mortality. Mean daily mortality was estimated at 37.6 ± 9.4 for the study period. There is an increase of 11% mortality when the temperature crosses 40°C. However, there is an increase of 3 (9%) deaths per day during danger-level heat-risk days and 6 (18%) deaths per day during high-risk heat days (extreme danger) respectively. Mortality seems to be well correlated with the high temperature ($P < 0.001$) and high heat index (HI) values ($P < 0.001$). The effect of extreme heat on mortality is at a peak on day-2 of the maximum temperature. The study concludes that the impact of ambient heat in the increase of all cause mortality is clearly evident and HI is more important than maximum temperature (18% deaths/day versus 11% deaths/day).
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Chapter 3 Material and Methods

Aim- To study the Heat and health Action preparedness at Urban health centers of Coastal city Surat

Research Question

Q. What is the preparedness of Urban health centers of coastal city Surat to manage health impact of heat wave?

Objectives:

1. To record and observe the temperature and humidity pattern from 1 March 2019 to 30 April 2019 in order to calculate the heat index and observe the temperature and heat index trend.
2. To assess the infrastructure facilities towards the pt. comfort in UHC.
3. To assess the doctors and community health workers skill in patient care facility.
4. To study the patient awareness and practices related to heat management.

Methodology:

Research Design: Observational Study

Study Area- Urban Health Centers

Study Population- MO, ANM, OPD Patients

Inclusion Criteria-

Senior MO

ANM present at the UHC at the time of group discussion.

Patients present during the time of visit in the UHC

Exclusion Criteria-

Junior MO

ANM's not present at UHC during group discussion.

Patients staying in Surat for less than 5 years

Sampling and Sample Size-

Surat city has a total of 44 UHCs spread in seven zones. One UHC was selected from each zone.

2UHC were selected from South West Zone being the largest zone.

300 units for the weather (5 Indicator variable- max., min. & actual temperature, humidity, heat index) 8 UHC, 8 MO, 65 ANM's, 27 Patients.

Sampling Technique-UHC, MO (Stratified Sampling)& Pt. ,ANM(Convenience Sampling)

Study duration-72 days- 27 Feb to 10 May 2019

Methods of Data Collection

Accuweather App

Recording of temperature

Interview

Observation

Tools of Data Collection

Steps taken

- The maximum, minimum, current temperature and humidity at 11am and 3pm was recorded using Accuweather app.
- Checklist for the Urban Health centers for assessing the infrastructure, drinking water & case management facility towards the pt. comfort was used.
- For OPD secondary data was taken from Feb 2018 to April 2019
- Structured Questionnaire for MO with help of Google Forms.
- Group Discussion for the ANM's have two parts in it one was the discussion part in the structured format of questions and the activity part on the chart paper. The activity on chart paper was prepared having four columns made in which they have to write in 3 columns individually regarding the General Effects of heat, Effects of heat on health, Messages they want to deliver to the community. In 4th column through stickers the effect of heat is marked.
- The exit interview was conducted in the selected UHC'S. Using structured Questionnaire in order to find out the socio demographic profile of the people in the particular region of the UHC's, their approach towards their health in context of heat, practices followed and awareness regarding the climate towards their health.

Preparation of the study tools

Recording the temperature and humidity and calculated the heat index using National Weather Service Calculator in order to find out the heat index trend.

Calculated individual score of the center on the basis of the facilities

Compared the 8 centers together finding out the score on the basis of the facility.

Calculated the ranking of all centers having the poor facility.

Analyzed the pattern of the OPD trend month wise.

Analysis of the qualitative and the quantitative data of the MO, ANM's and patients.

Finally linking the gaps that are connected with the 5 components of the study and providing suggestions for the scope of improvement.

Research Tools:

AccuWeather App for collecting the temperature and humidity.

Questionnaire for Medical Officers using Google forms.

Exit Interview Structured Questionnaire

Structured Questionnaire for Urban Health Centers

Focused group discussion for ANM's

Limitations –

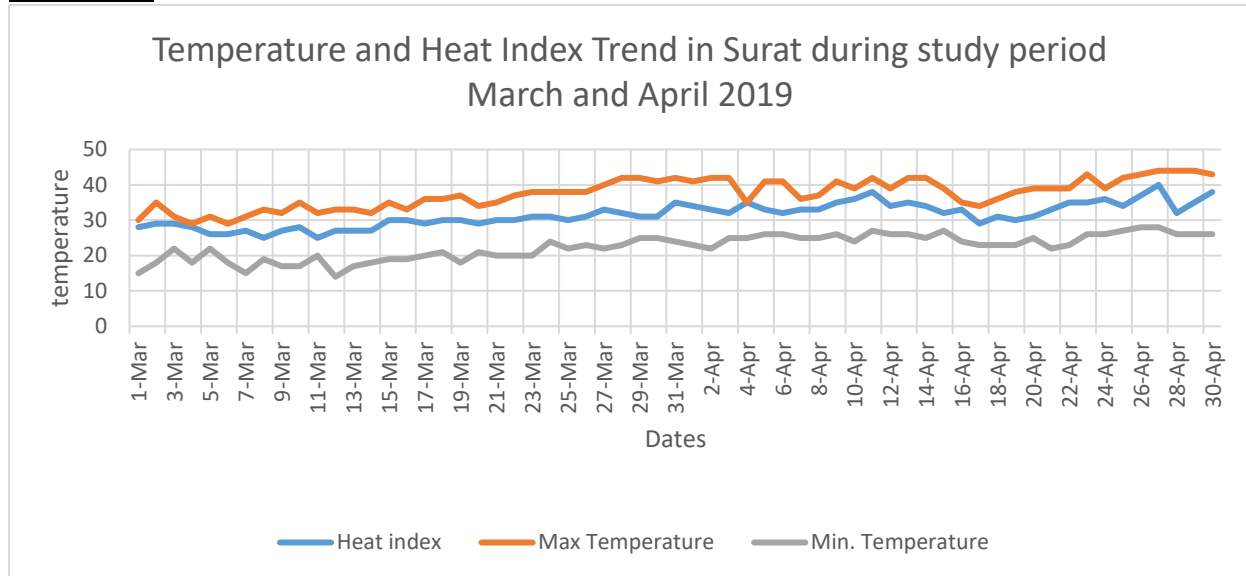
Weather forecast app

Heat index calculator usage for calculating Heat Index.

Chapter 5 Results and Discussions

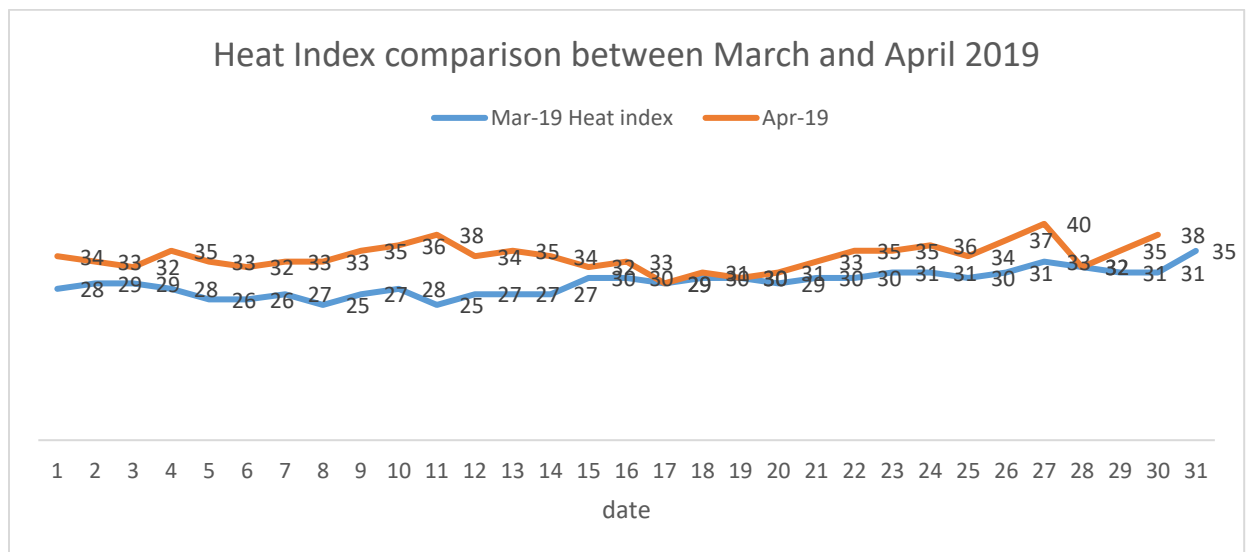
Findings

Graph No.1 Temperature and Heat Index Trend in Surat during study period March and April 2019



Temperature and humidity are on the continuous rise. From 15 March onwards the max.,min temperature & Heat Index was in continuous rise. 26 April to 29 April were the highest temperature recorded days which suggests there is increase in chances of heat morbidity cases.

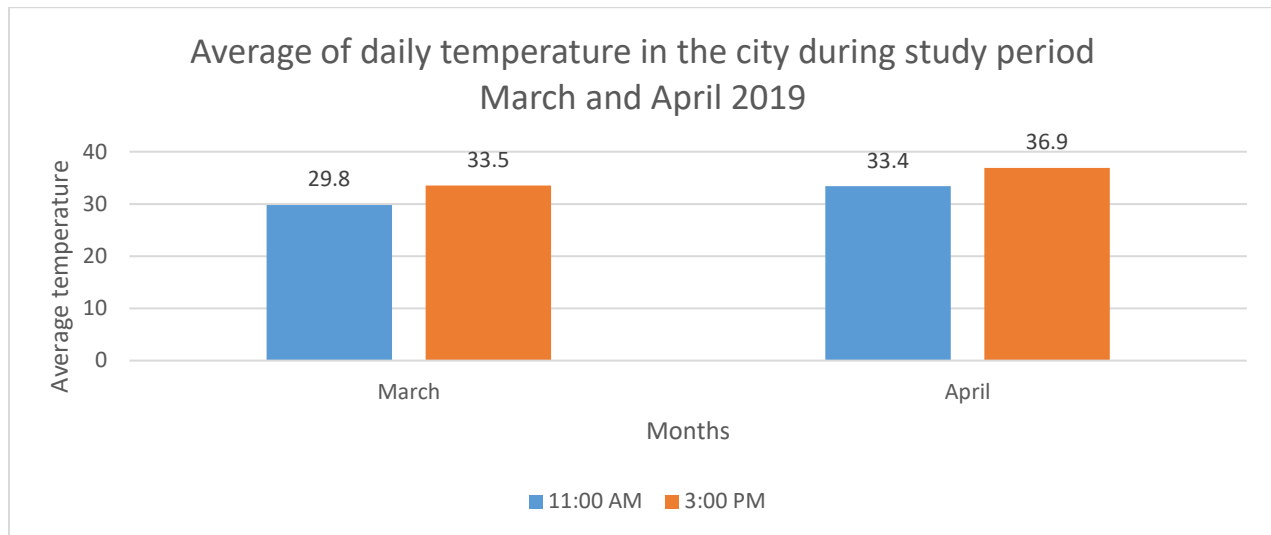
Graph No.1a Daily Heat Index of March and April 2019



From 15 March onwards the heat index was in continuous rise and by the end of the March reached up to 35 and lies in the extreme cautious condition. According to the National Weather

heat index chart. Whereas April month from starting only lies in the extreme caution condition and by the last week of April it's in the danger category. Which clearly suggests of higher chances of increase in heat morbidity cases.

Graph no.1b Average of daily temperature in the city during study period March and April 2019

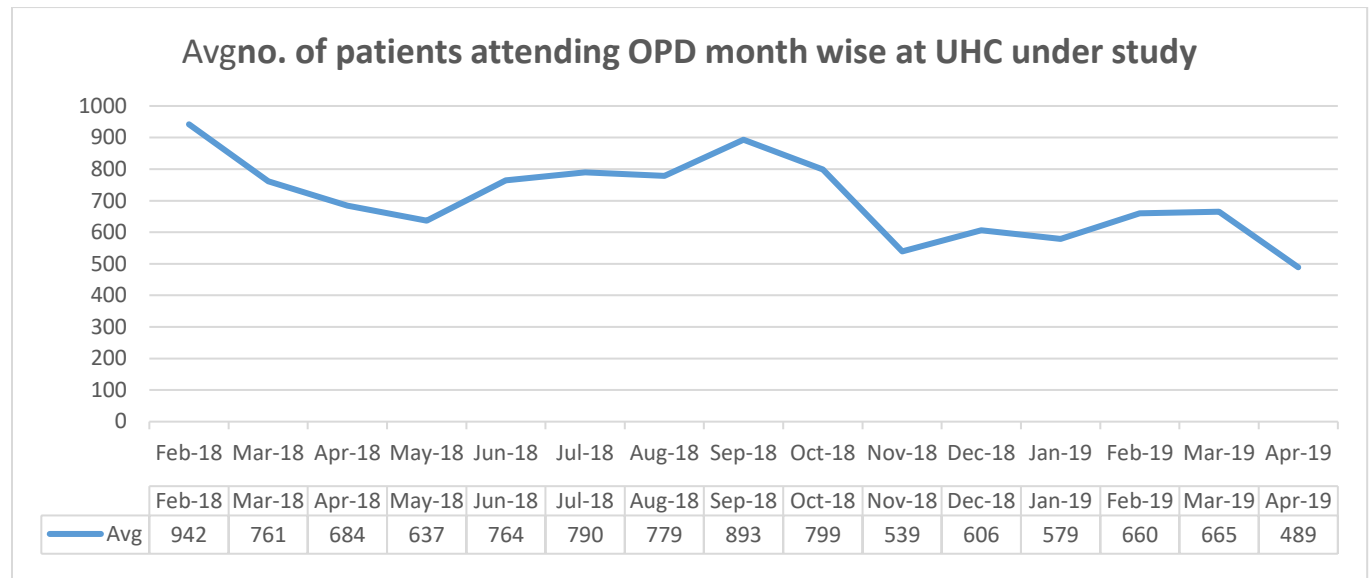


According to the studies done earlier May is declared as the hottest month. But the variation that is seen in the graph depicts that there is only difference of 3.7C between the temperature variation from 11 am to 3pm in March 2019. Whereas in April the temperature variation is of 3.5 C. That is the difference between the temperatures at 11am and 3pm has further decreased by .2C in April in comparison to March.

Hence there is continuous discomfort from morning till evening as the difference in temperature decreases.

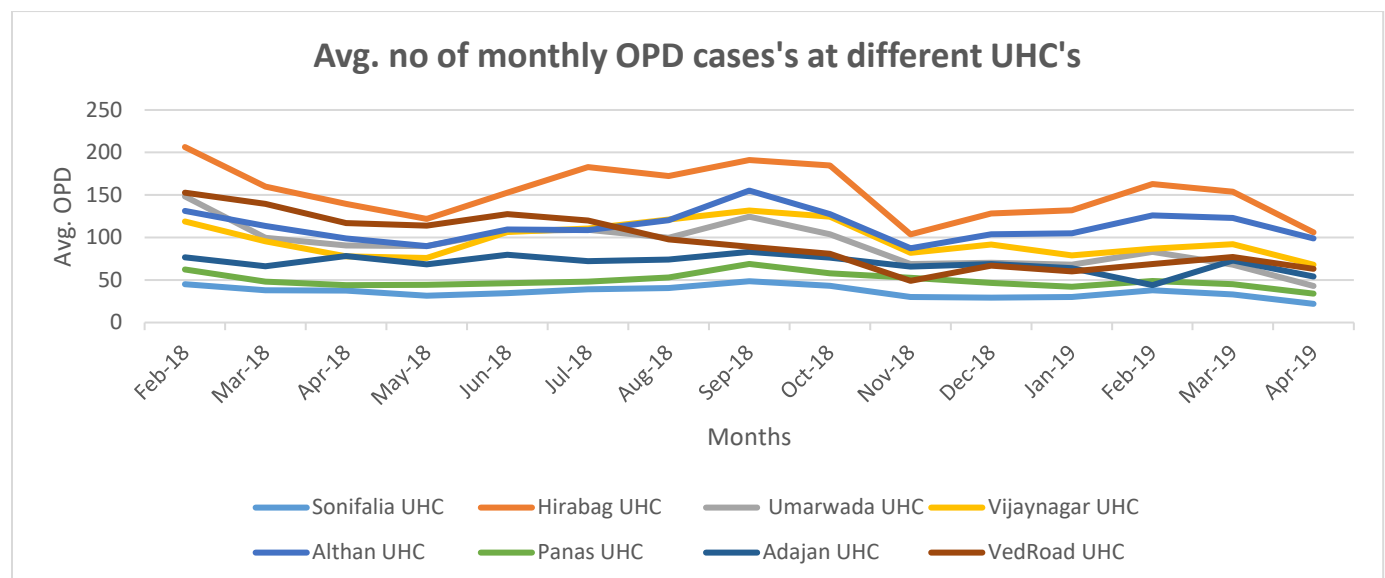
UHC Centers

Graph No.2 Avg no. of patients attending OPD month wise at UHC under study



Maximum total number of OPD cases are in the month of February and minimum in November in 2018. Whereas Maximum no. of cases in 2019 is in March and minimum in January. It also depicts the seasonal pattern that more number of cases are in the month of monsoon, than summers followed by winters. In both the years in the month of summer March is having the maximum no. of OPD cases whereas earlier studies have proved that May is the hottest month with maximum OPD's

Graph No.2a Avg. no of monthly OPD cases at different UHC's during the study



The average OPD pattern depicts from May the OPD no. has increased in all the centers from March there was a dip in no. of OPD's but it increases from May till September and then there is a decline in OPD pattern.

Maximum no of OPD in summer season is in Hirabag UHC in 2018 & 2019 and in summer season there were maximum OPD cases in March in all UHC in 2018 except Adajan. It has maximum OPD in April month.

In 2019 there were maximum no. of OPD cases in March all UC. This brings in contrast where earlier studies have declared May is the hottest month with maximum no. of morbidities in Surat but this graph depicts the minimum OPD in the May in Summer season depicting the new pattern in trend of summer that there is early onset of summers.

Table no.3 Infrastructure facility at the centers under the study period

	Sonifalia UHC	Hirabag UHC	Adajan UHC	Vijaynagar UHC	Althan UHC	Panas UHC	Umarwada UHC	VedRoad UHC
Availability of open space outside the four sides	Absent	Excellent	Excellent	Excellent	Moderate	Excellent	Moderate	Excellent
Availability of tree shade outside the four sides	Absent	Excellent	Excellent	Moderate	Excellent	Excellent	Poor	Excellent
Morning OPD hours with high heat discomfort	11:0 to 1:0	10:0 to 12:0	12 or 12:30	11:0 to 1:0	12:0 to 3:0	12 to 12:30	11:30 to 12:30	10:0 to 12:0
Observed	Nil	nil	Nil	moderate	nil	nil	moderate	moderate

crowding and discomfort during the peak hours of the OPD								e
Windows and doors in the opposite direction								
Sitting space for how many people in the waiting area	1 1	32	40	10	20	12	20	10
Presence of fans in the waiting area								
Total number of fans in the waiting area	3	3	10	2	5	6	0	10
Fans not functional in the waiting area	0	0	0	0	2	1	0	0

- Amongst the centers taken 7 centers are having building till first floor and above it is terrace which is open. Sonifalia UHC building is till 2nd floor. GF of the building is been utilized as parking area and has one store .Rest other UHC are having one floor in it. In Althan UHC and maternity home, they have the labour room and maternity ward on the first floor.
- Umarwada UHC has more congested and slum area nearby therefore having limited free outer space at the entrance.
- Ved Road UHC is having all the 4 outer walls facilitated with the tree shade but is the only UHC having very weak infrastructure with poor hygiene in the outer free space. The walls are having deeper cracks with poor paint.
- Adajan UHC has a SMC garden in its campus compound in which garden entrance is from the center and from the outside .It has open space and tree shade in all four sides making comfortable temperature inside the UHC.
- General OPD timings at the center in morning 9:30am to 12:00pm and in afternoon 2:00pm to 4:00pm.
- Over-crowding is not there at any center. Only at the MAMTA days in all the centers there is presence of overcrowding which is twice in every week in each center.
- Air Conditioner is present only in the Hirabag UHC in the lab as it has the TB unit.
- There is total absence of curtains in the waiting lounge in all the UHC's.
- In 4 UHC's partial curtains are present in Medical Officer's room. And in only one UHC partial curtains are present in Medical Officer's pharmacy and injection room
- Artificial Lighting is required at day time in all the rooms in every center since the windows closed in maximum health centers.

Table No.3a) Drinking Water facility at the center

Facilities	Sonifalia UHC	Hirabag UHC	Adajan UHC	Vijaynagar UHC	Althan UHC	Panas UHC	Umarwada UHC	VedRoad UHC
Availability of water filter	✓	✓	✓	✓	✓	✓	✓	✓
Water filter functional	✓	✓	✓	✗	✓	✓	✗	✓
Availability of water Cooler	✓	✓	✓	✓	✓	✓	✓	✓
Water Cooler functional	✓	✓	✓	✓	✓	✓	✗	✓
Additional Drinking Water Arrangements for summers	✗	✗	✓	✗	✗	✗	✗	✗

- Supply of water was same in all the centers and is Surat Municipal Corporation.
- Storage tank capacity at the two centers was 5000l whereas other two centers have two water tanks but the capacity was not known. One center has two storage tanks of the capacity 1000l and other tank capacity is not known whereas one has the capacity of 1500l i.e 1000l and other tank of 500l. In two centers there is presence of water tanks but not aware about their number and the storage capacity.
- At the center where both water filter and water cooler were not functional provision of water jug with a capacity of 20l was made.
- As stated by the medical Officers of all the centers, water safety level is been checked by the corporation once in a year and corporation is only maintaining the record of it.
- Staff of the hospital and medical officer does not rely upon the safety of the water at the center and brings their own water.
- Only at one center provision of one water jug of 20l of capacity was present .Which was placed at the entrance of the OPD as part of the summer plan for the adequacy of water.

Table no.3b) Ice availability for patient care at the center

	Sonifalia UHC	Hirabag UHC	Adajan UHC	Vijaynagar UHC	Althan UHC	Panas UHC	Umarwada UHC	VedRoad UHC
Availability of the Refrigerator	✓	✓	✓	✓	✓	✓	✓	✓
Functional Refrigerator	✓	✓	✓	✓	✓	✓	✓	✓

Availability of ice packs								
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- Availability of functional refrigerator and ice packs was there at all the centers.
- Preparation of ice cubes is not been done in any of the center as according to them they have the provision of ice packs.
- According to the MO's they does not experience shortage of ice packs as they keep the stop in surplus in advance and they the provision to for arranging the ice packs in cases of emergency
- Ice pack usage was restricted for keeping the vaccines and for the smear preparation of the TB slides.

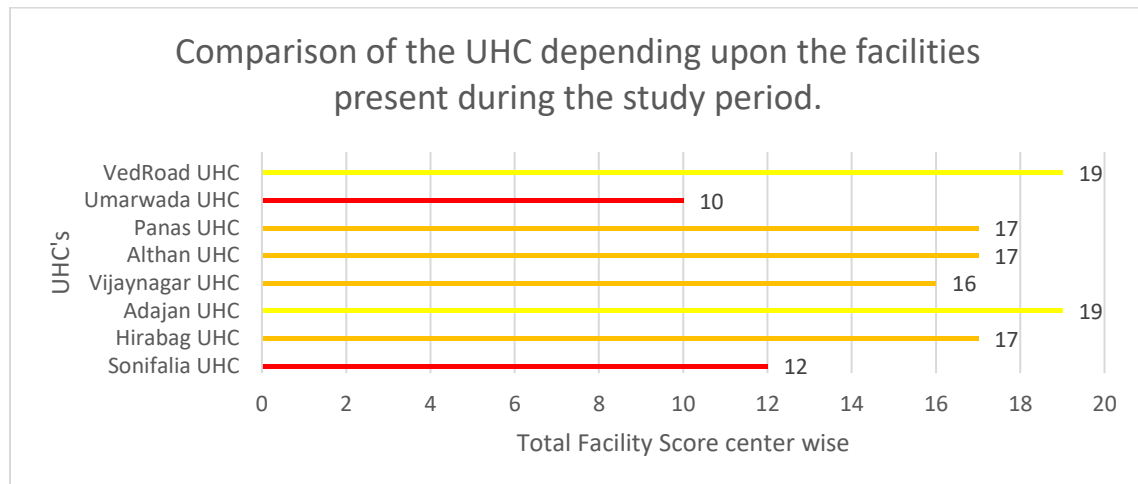
Table no.3c) Heat morbidity and Case management Facility at the center

Table No. Availability of the medication.	Sonifalia UHC	Hirabag UHC	Adajan UHC	Vijaynagar UHC	Althan UHC	Panas UHC	Umarwada UHC	VedRoad UHC
Presence of ORS at the center								
Presence of i/v fluids at the center								
Provision for giving iv fluids at the center								

- There is presence of ORS at all the centers.
- According to the MO during the heat months at the UHC at MAMTA Day. They keep the stalls for ORS distribution as per the order from SMC, but during the time of visit such things were not present
- There is absence of emergency bed or emergency corner in all the centers
- On 9 April 2019 heat and health action plan was send by the corporation the mail was of 45 pages, but was not seen in 50% of the UHC's and where it was seen except one center no arrangements accordingly has been made.
- Other than the mail there is no IEC material in any of the center.
- In one of the centers once the i/v fluids was given at the center a year back. According to MO staff nurse is trained for giving the I v.
- Other than MO ANM's are conveying the message of heat protection only on MAMTA Days only when the temperature according to them is very high.

Depended upon the above findings of the facilities, comparison of the different centers on the basis of scoring are

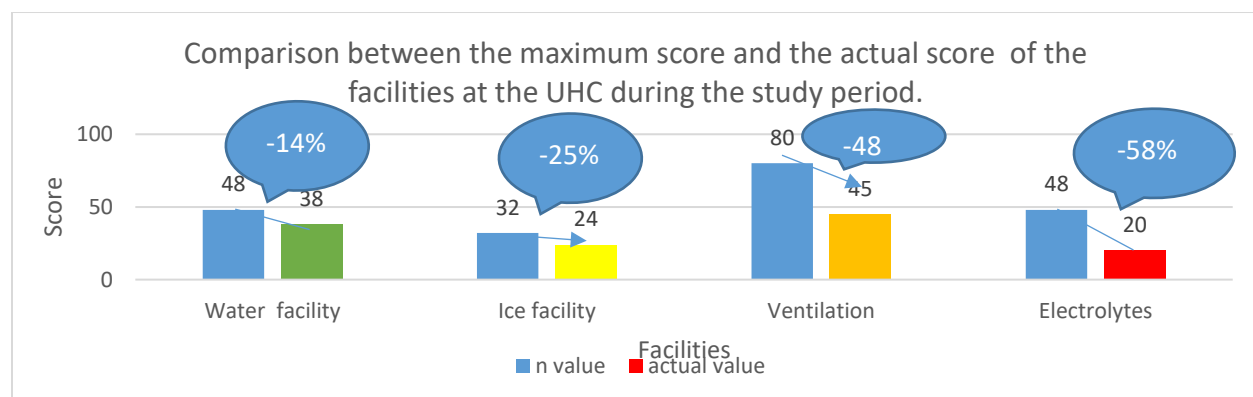
Graph no.2b UHC facility scoring



Adajan & VedRoad UHC are comparatively having better facilities. Umarwada and Sonifalia UHC are comparatively less prepared.

The comparison of the centers will carry importance if the required score is compared with the actual score.

Graph No. 2c Comparison between the maximum score and the actual score of the facilities at the UHC during the study period



Maximum number of gap was in the heat morbidity and case management facility. In any of the center there was no provision of an area where an i/v fluid can be given to the patients till the time ambulance reaches the center. In two of the center there was absence of i/v fluids. There was no IEC material at the center related to the heat morbidities management & prevention

Table No.3d Facility Wise scoring of the individual UHC

Facilities	Sonifalia UHC	Hirabag UHC	Adajan UHC	Vijaynagar UHC	Althan UHC	Panas UHC	Umarwada UHC	Ved Road UHC
Water facility n=6	5	5	6	4	5	5	3	5
Ice Pack & Ice cube facility n=4	3	3	3	3	3	3	3	3
Physical Environment n=10	3	7	7	7	6	6	1	8
Electrolytes n=6	1	2	3	2	3	3	3	3
n=26	12	17	19	16	17	17	10	19

80-100% = **Green**, 70-80% = **Yellow**, 50-70% = **Orange** <50% = **Red**

Electrolytes scoring was poor in all centers. Umarwada Center was the weakest in physical Environment, Electrolytes & Water facility.

Sonifalia was weakest in physical environment and electrolytes facility.

Working in the orange colored zone will help in coming to the yellow category of 70-80%

Medical officers KABP (structured questionnaires)

The question asked through the Google forms from the MO. The responses were as obtained

Q.1 What are your diagnosis related to heat morbidities in your entire work span?

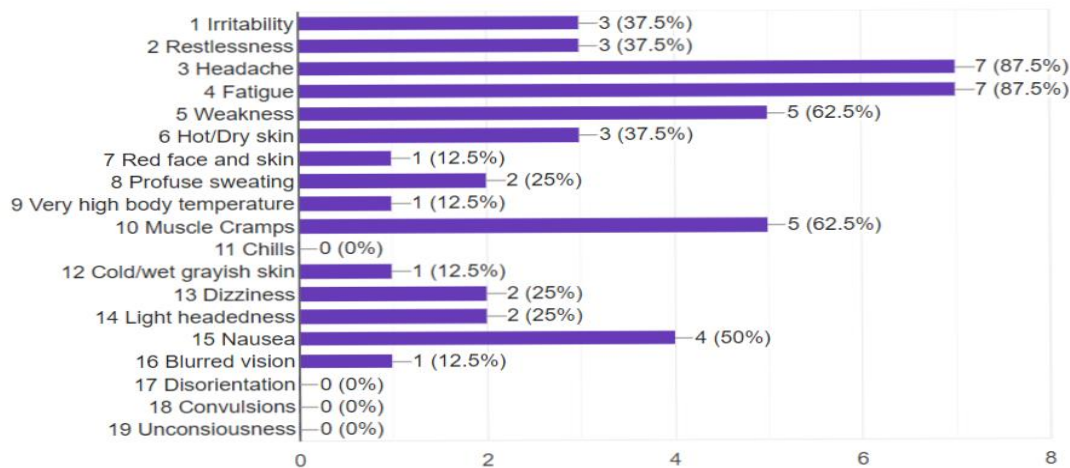
Out of 8 MO's 4 have diagnosed heat related morbidities in their entire work span. Number of cases diagnosed by 2 MO's vary from 2 to 4. Whereas other two have diagnosed approx. 24 cases. Cases diagnosed were

1. Heat stroke.
2. Body ache
3. Hypovolemic shock
4. Hypoglycemia
5. Heat Syncope
6. Headache

The questionnaire was responded by the senior MO. having more than 5 years of working experience still in their entire work span 50% of them have not diagnosed the cases of heat related morbidities. In spite of the data showing higher incidences of heat wave cases in past 10 years and is even seen in the current trend.

Q.2 Signs and symptoms observed as heat related sickness among OPD patients of the center from March 2018 to June 2018

Graph No.3 .Signs and symptoms observed as heat related sickness



Maximum Number of doctors had seen the symptoms of headache, fatigue, weakness and muscle cramps. Symptoms like Chills, Disorientation, Convulsions and Unconsciousness were not been seen at the OPD's in the center. This even depicts that these are the indirect or hidden effects of heat morbidities and are also common symptoms in other disease. So chances of missing the cases of heat morbidity increases.

Q.3 According to you what are the heat related morbidity management actions?

Table no.4 Responses of MO for heat related morbidity management actions

Responses	No.	%
Providing the adequate ventilation- by checking the free flow of fresh air, presence of cross ventilation in order to prevent from suffocation.	3	38%
Checking for the availability of fans and shifting the patient in cool area to cool down the body temperature and loosening of the clothes	2	25%
Instructing for the intake of oral fluids to patients. That is water, ORS and other fluids. According to the hydration status, giving iv fluids.	8	100%
In case of hypotension-keeping the head at the low position, cold water sponging, BP monitoring and referral if required.	1	13%
Utilization of the emergency facilities kept at the center	1	13%
Avoiding unnecessary Direct exposure to sun.	2	25%

All the MO have the knowledge related to the hydration therapy .Rest other treatment modalities knowledge is below 38%.

Q.4 When ice packs are required for treatment of heat morbidity

Table No.4a Responses of MO related to conditions for applying ice packs.

Very high body temperature	6	75%
Heat stroke	1	13%

- 75% of MO's are aware about the high grade fever condition and two of them had even given the range from 103F to 104 F.
- And only 13% responded for the heat stroke. Whereas one of the MO didn't responded for this question.
- There are many other heat morbidities but none of them mentioned about it and heat stroke is the major one.

Q.5 What are the sites of ice pack application?

TableNo4b. Responses of MO related to the sites of ice pack application.

Response	No.	%
Neck/ Carotids	4	50%
Groins /Inguinal	4	50%
Axilla/ Armpit	3	38%
Head, forehead	2	25%
Chest and Chest Wall	2	25%
Ant abdominal wall	1	13%
Sole and palm	1	13%

- Ice applications sites are carotid, axilla, and inguinal since these sites have the richest blood supply therefore ice application at which sites aids in rapid cooling of the body temperature.
- Head, chest, ant. Abdominal wall, sole and palm are not the sites of ice application.25% of the MO's replied for the site chest and 13% for the ant. Abdominal wall, sole & palm.
- 50% of the MO's replied for the sites carotid and groins.
- 38% for the axilla.
- One medical officer is not having the knowledge regarding the sites of ice application. +

Q.6What are the actions for unconscious patient suspected /diagnosed as heat morbidity?

TableNo.4c Responses of MO regarding actions to be taken in case of unconscious pt.

Responses	No.	%
Lying the patient in left lateral position	1	13%
Head at the low position of the patient	3	38%
Recording BP and pulse	1	25%
Maintaining the body temperature through Ice pack application, Cold water sponging	3	38%

ORS	1	13%
I/v fluids	5	63%
Blood sample for rbs, electrolyte, and creatinine level	1	13%
Gastric Lavage, Rectal Lavage	1	13%
Antipyretics	1	13%
Cases Referred to the higher centers in ambulance	2	25%

- 2 out of 8 responded are incorrect regarding the positioning of the patient and giving ORS. As in unconscious stage oral fluids are not given it can lead to the choking of the wind/food pipe. Left lateral position is used for the pregnant ladies not for unconscious patients. 3 out of 8 have the knowledge regarding the positioning of the patient whereas 63% are aware about the treatment of the i/v fluids
- 1 out of 8 responded incorrect regarding the procedures gastric and rectal lavage. Since these are the procedure performed in the case of poisoning not in case of unconsciousness.
- Antipyretics are also not been given in this stage.
- Knowledge related to hydration therapy is 63%.

Q.7 Where and how will you refer the case?

Responses

New Civil Hospital, SMMIMER, Maskati

Table No.4d Responses of MO for the procedure of referring of the cases from UHC

Responses	No.	%
Stabilizing the patient by lowering down the body temperature, dehydrate and then referring to the New Civil Hospital	3	38%
Calling of ambulance 108	5	63%

- 100% of the MO are aware about the place of referral.
- 3 out of 8 are aware about the procedure of shifting the patient

O.8 Description the heat related illness referred cases from UHC

Responses are:

4 respondents reported about the cases they had referred in the higher facilities.

Cases

Vomiting, Loose Motion, Fatigue

Headache, body ache, giddiness, muscle cramps and fever

Hypotension, weakness, nausea (2)

Table No.4e Responses of MO' Messages they would like to give for patients in summer

S.NO.	Message	No.	%
1	Take plenty of oral fluids	6	75%
2	Clothes-loose, comfortable	3	38%
3	Avoid wearing black colored and wear more of white colored clothes	1	13%
4	Avoid going outdoors in afternoon during 12pm to 4pm	5	63%
5	Covering of the body while going out	1	13%
6	Covering of the head ,using umbrella and cap	2	25%

- Overall the group of MO are aware about the most of the messages that can be delivered to the patients regarding the preventive approach towards heat morbidity. Which suggests that group has knowledge regarding the preventive approach for the heat morbidities
- But in practice, messages are delivered related to intake of fluids and avoidance of direct heat.

Q.9 Do you receive heat warning messages at UHC?

a) Out of 8 respondents 3 replied that they receive heat warning messages. As three of the respondents are using the mobile application for the weather updates.

b) Which month is worst for heat morbidity cases for city?**Table No.4f Worst Month for heat Morbidity acc. to MO's**

S.No.	Months	No.	%
1	March	3	38%
2	April	1	13%
3	May	3	38%
4	June	2	25%

The overall is a mix response for months having high no. of OPD related to heat morbidities. Which suggests that March & May have the highest no. of OPD in summers

10. Center Equipment with the heat warning message facility and reporting of the cases

a) 6 respondents wants their center to be equipped with heat wave warning facility.

b) 5 respondents replied that in their routine they report heat morbidity cases.

c) Preparations that can be made at the center to manage heat morbidities

Table No.4g Responses of MO's related to preparations that can be made at the center to manage heat morbidities

SNo.	Availability of the facilities	No.	%
1	Plantation of trees at UHC	1	13%
2	Area for managing heat related morbidities	1	13%
3	Indoor patient department	1	13%

4	Adequate water supply	1	13%
5	Cold water facility at the center for patients	1	13%
6	Ice Packs, Ice cubes	2	25%
7	Liquids, ORS, stock of iv fluids	2	25%
8	Training of the staff for sensitization towards heat	1	13%
9	IEC material before the onset of summers	1	13%

- Total 9 facilities have been described by the MO's regarding the preparation for the center for heat related morbidities.

The 9 facilities are divided into 4 categories Infrastructure, Drinking Water Facility, Management facility , Training of the staff & IEC material

- 3 out of 8 wants their center to be prepared related to infrastructure.
- 2 out of 8 wants their center to be prepared related to drinking water facility.
- 2 out of 8 wants the availability of the IEC material related to heat and training of the staff related to the sensitization for heat related morbidities
- 2 out of 8 wants training for the staff for their sensitization towards heat related morbidities and presence of IEC material.

Q.11 Which is the heavy OPD season as per your experience at UHC?

Table No.4h Responses of the MO for the heavy OPD season

Availability of the facilities	No.	%
Monsoon	7	88%
Winter	1	13%

Q.12 Are heat waves health problem for the Surat city?

All the respondents believe that Heat wave are health problems for the Surat city

Summary of responses of the MO

The questionnaire was responded by the senior MO. having more than 5 years of working experience. Still in their entire work span 50% of them have not diagnosed any cases of heat related morbidities. In spite of the data showing higher incidences of heat wave cases in past 10 years and is even seen in the current trend of higher Heat Index.

3 cases were even reported during the study period related to the heat morbidity but were missed in the diagnosis.

Maximum Number of doctors' i.e.88% had seen the symptoms of headache, fatigue, weakness and muscle cramps. Symptoms like Chills, Disorientation, Convulsions and Unconsciousness were not been seen at the OPD's in the center. Still 50% didn't diagnosed any cases of heat related morbidities which depicts that these are the indirect or hidden effects of heat morbidities and are also common symptoms in other disease. So chances of missing the cases of heat morbidity increases.

All the MO had the knowledge regarding management of heat related morbidities related to the hydration therapy .Rest other treatment modalities knowledge is below 38%.

Case management related to the unconscious patient -2 out of 8 responses were incorrect regarding the positioning of the patient and giving ORS. As in unconscious stage oral fluids are not given it can lead to choking of the wind/food pipe. Knowledge related to hydration therapy is 63%.1 out of 8 responded incorrect regarding the procedures gastric and rectal lavage. Since these are the procedure performed in the case of poisoning not in case of unconsciousness

Conditions for Ice application Therapy for the heat morbidities-13% were aware about the heat stroke condition whereas 75% of MO's were aware about the high grade fever and two of them had given the range from 103F to 104 F. There were many other heat morbidities but none of them mentioned about it.

6 responses given by the 8 MO related to the sites of Ice application were wrong. 50% of the MO's aware for the sites carotid and groins & 38% for the axilla. Hence Less than 50% of MO have knowledge for the sites of ice application.

Acc. To the MO's March & May are the highest OPD months related to the Heat Morbidity cases & Monsoon is the highest OPD season.

Overall the group of MO are aware about the most of the messages that can be delivered to the patients regarding the preventive approach towards heat morbidity. Which suggests that group has knowledge regarding the preventive approach. But in practice, messages are delivered related to intake of fluids and avoidance of direct heat contact.

Total 9 facilities have been described by the MO's regarding the preparation for the center for heat related morbidities & 3 out of 8 wants their center to be prepared related to infrastructure.

All the respondents believe that Heat wave are health problems for the Surat city & 75% of them wants their center to be equipped with heat wave warning facility.

Group Discussion was conducted in two parts

Major emerging points from ANM Focused Group Discussion

1st part was the discussion, 2nd part was chart activity

1st part of the discussion

1. Profile of the ANMs present in the group discussion

Table No.5 ANMs present during the group discussion

ANM	No.	%
Total No. of ANM	80	100%
Present during the discussion	65	81%

Table No.5a Experience of ANM's at the UHC

Total No.	No.	%
More than 2 years	10	15%
Less than 2years	55	85%

Table No.5b Number of ANM living in Surat & living outside Surat

Total No.	No.	%
Localities	20	31%
Daily up down from other places	45	69%

- 81% of the ANM's were present at their respective centers during the group discussion
- ANM's having experience less than 2 years are 85%.which is more in comparison to experienced ANM's as there was new recruitment of the ANM's on contractual basis. They have not received any training for the heat related morbidities.
- ANM's doing daily travelling for work are 69% which are more in comparison to localities making them more vulnerable to heat effect.

2. Understanding of the ANM's related to heat wave

- 31% of them had understanding for the word heat wave.
- On probing about the word loo, they were able to associate it with the effects of heat wave on health which are vomiting, diarrhea, dizziness, difficulty in traveling, inability to work due to high temperature.

3. Who are more Vulnerable to heat?

Table No.5c ANM's Responses regarding the vulnerable population related to heat

Responses	No.	%
Children	55	85%
Female in ANC period	40	62%
Female in PNC period	32	49%
Elderly People	12	18%
Lifestyle disease	5	8%
ANMs	12	18%
People working directly under sun	10	15%
Everyone	5	8%

According to their perception children and ANC mothers are more vulnerable. Even 18% have the perception that they are also vulnerable since they work on field and are community health workers

4. What are your practices related to heat at the community level?

- Majority of them replied at their visit in the field if someone ask them in hot weather days that they have headache, dizziness, fever then they advise them regarding increasing the intake of oral fluids and avoiding going under direct sun.
- Otherwise at field visit they don't educate the people from themselves.

5. What if the people not asking about the heat related morbidities?

- (70%) Replied on MAMTA day at the center they advise PNC mothers to cover their child while coming to the center and increase the intake of oral fluids.
- (10%)To come at the center in the early OPD hours
- (5%)Not to move under direct sun
- (15%) of the ANM's didn't replied

6. Role as ANM at the community level?

Table No.5e Responses of ANM w.r.t. to their roles at community level

Responses	No.	%
Providing information to people and clearing their doubts related to health problems	5	8%
If any member of the family they are visiting is unwell then providing the information related to it	12	19%
Providing information related to the vaccination of child.	15	23%
Conducting the surveys and asking about the lifestyle	20	31%

diseases.		
Providing information related to family planning	20	31%
Advise the pregnant women about the precautions to be taken during the pregnancy period	35	54%
Checking for the ANC and PNC visits	40	62%

Maximum of them consider their responsibility is regarding checking of the ANC and PNC visits of pregnant women. Advising women regarding the precautions to be taken during the pregnancy period.

None of them mentioned about their role in community regarding providing information to people related to precautions to be taken during summers

7. Have you seen any cases of heat related morbidity?

None of them had replied.

8. Have you ever suffered from heat related morbidity?

Out of 8 centers .One to two from each center had given the history of suffering from heat related morbidity at the time of field visit during the month of March and April 2019.

Fig1 Heat morbidity Case of ANM at UHC

Case: One ANM from Ved Road UHC had suffered from nausea, dizziness on the day of focused group discussion i.e.26 April 2019.It was the declared heat wave day by the weather forecast report.

Even the Heat Index recorded during the study period is 37.Which marks the day in the danger category according to National Weather Report Chart of Heat Index.

ANM's have not seen any of the case of heat morbidity in their visit but in each center there is a history of ANM's suffered from the heat morbidity.

It proves that ANM's are vulnerable related to heat morbidity

And there is a gap in the service area of the ANM's

9. Do you know is there any system with which you can see temperature and what is it?

- 30 out of 65 are aware that in mobile phone they can see the temperature.
- 20 out of 30 knows how to see the temperature in phone

It suggests that 46% of the people are aware about the technology which can aid in their preparedness related to heat.

2nd part of Group Discussion

Table No.5f Responses of ANM w.r.t. General Effects of Heat

S. No.	Responses	No.	%
1.	Trees and plants die due to high temperature	2	3%
2.	Decrease in the amount of oxygen level	1	2%
3.	Shortage of water supply in village	1	2%
4.	Wells and lakes gets dried in summers.	2	3%
5.	Difficult for human animals to survive in high temperature.	5	7%
6.	Farmer faces problems in farming	3	5%
7.	Food deteriorates fast in summers	1	2%
8.	Increase in the cost of vegetables	2	3%
9.	Effect on work and economic condition	1	2%
10.	Difficulty in travelling	1	2%

There is minimal knowledge of general effects of heat. Maximum of them were relating heat effects w.r.t. health and were unable to think beyond it.

Table No.5g Responses of ANM w.r.t. Heat related diseases' /signs/symptoms

S. No.	Responses	No.	%
1	Headache	14	22%
2	Migraine	1	2%
3	Burning sensation in eyes, red eyes	3	5%
4	Epistaxis	4	6%
5	Breathlessness	5	8%
6	Weakness	16	25%
7	Restlessness	4	6%
8	Irritation	1	2%
9	Dizziness	19	29%
10	Fatigue	4	6%
11	Body ache	2	3%
12	Sweating	3	5%
13	Nausea	5	8%
14	Decrease appetite	1	2%
15	Vomiting	13	20%
16	Diarrhea	9	14%
17	Dehydration	8	12%
18	Fever	7	11%
19	Low BP	12	19%
20	High BP	4	6%
21	Syncope	1	2%
22	Skin problems (Prickly, Sun burn, Measles, fungal infection, rashes)	11	17%
23	Burning sensation in urine due to low water intake	2	3%
24	UTI	3	5%
25	Heat Stroke	1	2%
26	Increase in no. of death rates	1	2%

- Maximum responses are for the symptom dizziness. For heat stroke only one response received.
- The group all together were able to bring 26 diseases, signs and symptoms related to heat morbidities. Which is good in number covering all the major signs and symptoms starting from head to toe. 1 out of 26 described by them were wrong.
- UTI is not because of the increase in temperature.
- But individual scores related to the disease are low.
- Since it was a mix cohort of experienced and unexperienced ANM's therefore verities is achieved.

Messages you would like to deliver to the community

Responses are as followed

- (14%) Avoid direct contact with sun during 12 to 4pm
- (2%) Sit in the cool and comfortable place.
- (65%) Increase the intake of oral fluids and water by adding lemon water /juices/buttermilk/sauf water/glucose water/cold water in the daily routine in summers.
- (8%) Drink ORS in summers if not well
- (10%) Don't allow the children to play outside in sun
- (15%) Changes should be made in the clothing style. Like covering the body/using umbrella/sunglasses/wearing footwear before going out in sun.
- (12%) Eat lighter food in summer with less oil and spices. Add fruits and vegetables in the diet
- (5%)Take special care of the ANC mother and elderly people
- (8%) Not to eat food from outside as it deteriorates fast.
- (7%) Keep animals and birds in the shaded area.

Summary of the Group discussion

85% of the ANM's are unexperienced i.e. having experience less than 2 years. This fact suggests that the trainings received by them related to heat and health action plan are minimal. 69% of them are doing daily up down from home to the center through train or buses making them more vulnerable to heat.

Their knowledge related to the vulnerable population related to heat is moderate as majority of them answered children and ANC mothers. 3 Groups in the group discussion were able to bring the all categories of the vulnerability rest were limited to the above two.

Majority of them didn't convey the information related to the heat to the community at the time of their field visit. Only on MAMTA days which is twice in every week at the center they deliver the message to the ANC mothers related to the intake of oral fluids and covering of the child with cloth. The delivery of the message depends upon their perception of the temperature.

There is minimal knowledge of general effects of heat. Maximum of them were relating heat effects w.r.t. health and were unable to think beyond it.

The experienced staff was aware about the signs and symptoms regarding the heat related disease.

Heat stroke was mentioned by only one ANM. None of them discussed about the heat stress.

They were more aware about the indirect effects of heat and skin diseases. Since they work in field and able to notice such symptoms amongst themselves or in their family.

As none of them had seen any case of heat morbidity in the community. But since mid of March there is one to two ANM from each center having heat related problems. This itself creates a question mark?

They are not reporting the cases of heat morbidities as there is no system at the centers to record.

SMC only asks for the mortality cases not for the morbidity cases.

As per the Preventive Approach 65% of them responded to deliver the message related to increase intake of oral fluids and liquids. Messages related to sitting in the comfortable environment, care of ANC mothers and elderly patients are minimum.

None of them talked about the referring of the cases to the UHC.

Exit Interview in the OPD at the UHC during the study period

1. Profile of the exit interviewed patients

- a) Out of 27, 78% are females and 22% are males
- b) Education and age profile of different age groups

Table No.6 Age and Education profile of the patients interviewed

Education	No.	%
Illiterate	6	22%
Primary	4	15%
Secondary	12	44%
Higher Secondary	1	4%
Graduate	3	11%
PG	1	4%

Age in Yrs	N0.	%
0-10	1	4%
11-20	4	15%
21-50	20	74%
>50	2	7%

Maximum population was having the education till secondary

74% of the patients belongs to the middle age group.

c) Occupation of the patients

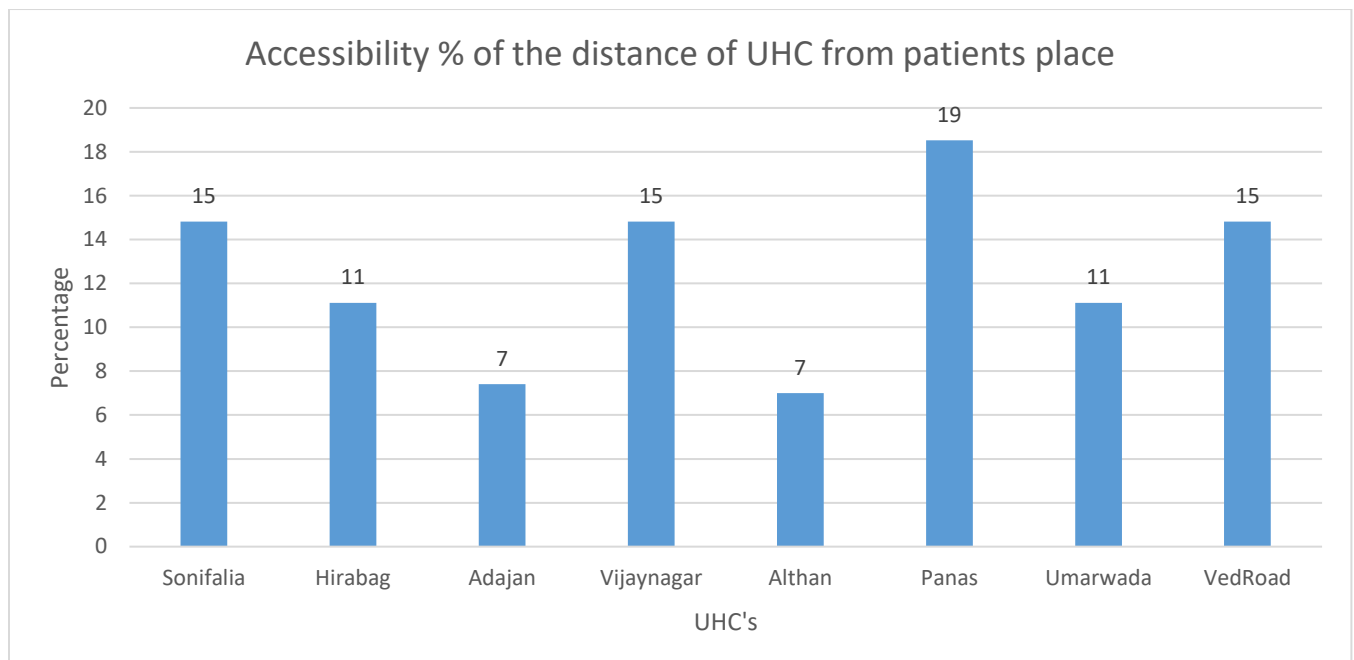
Table No.6a Occupation of the patients interviewed.

S.no.	Occupation	Number	%
1	Housewife	16	59%
2	Laborers' having non exposure to heat	3	11%
3	Laborers' having exposure to heat	2	7%
4	Laborers' having exposure to work place heat	2	7%
5	Student	1	4%
6	Working Professional on site	1	4%
7	Working Professional in office	0	0
8	Work from home	1	4%
9	Drop out	1	4%

The maximum population occupation is of housewife i.e. 59% .Their work is of taking care of their family at home and doing the house hold activities. Maximum housewives are in the age group of 21 to 40 years of age which is the maximum population group in this study.

4 out of 27 are having exposure to heat. There are no working professional working in office or children below 5 years of age. There are 4% working professional on site, student and people involved in work which is from their home

d)Graph No.4 Accessibility Percentage of the distance of UHC from patients place



Panas UHC is more accessible distance wise from patient's place

e) Table no.6b Reasons for visiting UHC by patients

S.no	Reason	No.	%
1	Headache & fever	2	7%
2	Bodyache	3	11%
4	Bleeding from nose	1	4%
5	Prickly on face and back	1	4%
5	Acidity Problem	1	4%
6	Diabetes checkup and pain in legs	1	4%
7	Cough	2	7%
8	Weakness, old anemic patient	1	4%
9	Vaccination of a child	5	19%
10	ANC visit	6	22%
11	Health check up scheme	2	7%
12	Copper T examination	1	4%
13	X ray reports examination	1	4%

These 13 reason are clubbed under 4 categories of the morbidities.

Heat related morbidities- 7 cases (Headache and fever, bleeding from nose, body ache, prickly on face and back)

Vulnerable to heat related morbidities- 2 cases (Diabetes, acidity problem,)

Chronic morbidities- 3 cases (Cough, anemic patient)

Preventive- 15 cases (Vaccination, ANC visit, Health checkup, Copper T examination)

Opinion-1case(X ray report examination)

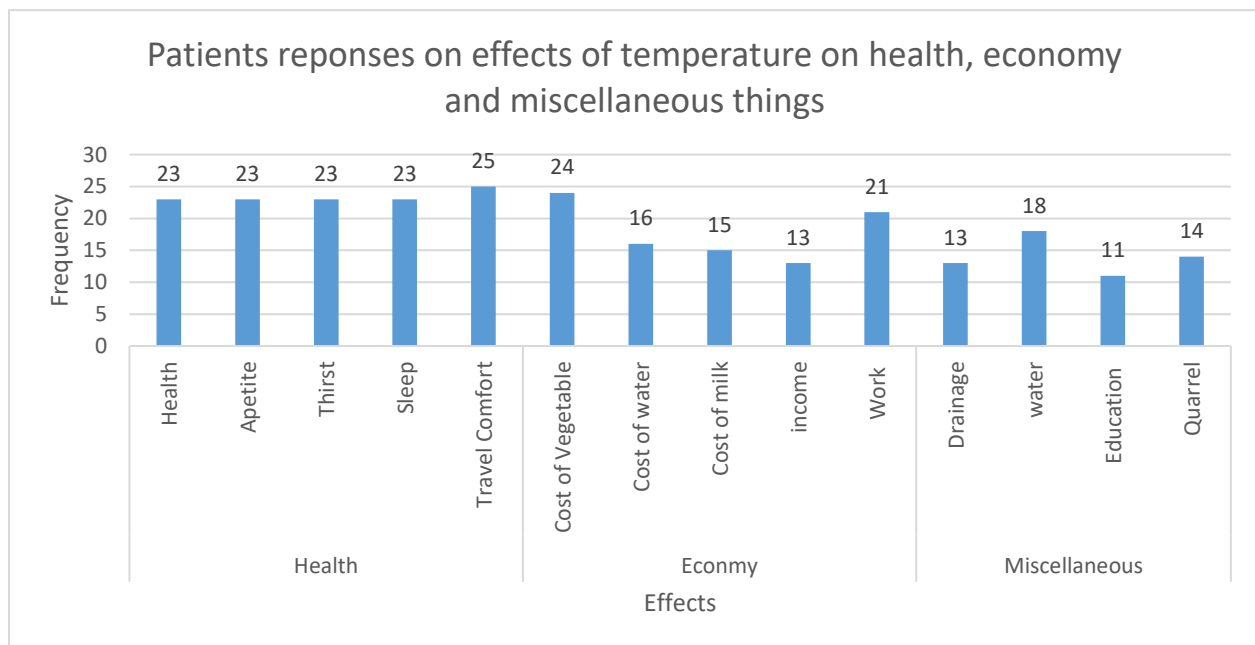
Which suggests that in two months 7 cases of heat morbidities have come and 2 are the vulnerable to heat cases. Which marks that heat morbidity cases are coming since March only.

2) Do you feel in Surat City the heat has increased in last 5 years?

a) According to 93% of people temperature has increased in Surat.

Out of these 33% feel the too much temperature has been increased.52% feel temperature has increased on a moderate level and 15% feel that little temperature has been increased

b) Graph No.4a Patient's Responses on effects of temperature on health, economy and miscellaneous things.



In exit interview General effects of temperature on health, economy and miscellaneous activities recorded according to the patients responses. Maximum affect of temperature under health category is on travel comfort and in economy cost of the vegetables.

Over all patients feel there is more effect of temperature on health.

3.a)In last summer no. of people fallen ill from patient's family or the patient himself/herself?

- Total 23 people had fallen ill last summer. This number includes both patient as well as their family members.
- 6 out of 23 who had fallen ill last summer ,were the respondents.

- 13 were males and 10 were females
- Only 2 out of 23 had sought treatment from UHC, and 2 from the district hospital and medical college
- 19 out of 23 had sought the treatment from private doctor.
- 5 out of 23 had been hospitalized.

Table no.6c Age Gp. Of the people who had fallen ill.

S.No.	Age Gp.	No.	%
1	0-10 years	9	39%
2	10-20 years	7	30%
3	20-50 years	7	30%
4	50 years and above	0	0%

Table no.6d Occupation of the people who suffered last year due to heat.

S.No.	Occupation	No.	%
1	Housewife	5	22%
2	Laborers' having non exposure to heat	3	13%
3	Laborers' having exposure to heat	1	4%
4	Laborers' having exposure to work place heat	2	9%
5	Student	2	9%
6	Working Professional on site	1	4%
7	Working Professional in office	0	0
8	Work from home	1	4%
9	Child below 5 years of age	8	35%
10	Drop out	0	0

- This suggests that there is more number of males that are falling ill.
- People have more inclination towards private doctors.
- Children are more affected because of heat.
- More no. of people falling sick who were at home, this suggests that the physical environment at their place is not adequate.

Q3.As per your experience who suffers max due to high temperature & Why?

Table. No.6e According to the pt.s responses received regarding vulnerable population due to high temperature

S.No.	Responses	Reasons	No.	%
1.	Children	Excessive temperature Less tolerant towards high temperature. They are weak They play outside in direct sun Suffers from prickly	13	48%
2	Young aged people		1	4%
3	Female	Excessive temperature.	2	7%

		Due to abortions and delivery females become weak		
4	Male	Stay longer time in outdoors and directly under sun	1	4%
5	Middle aged females		1	4%
6	Adults	Because of high temperature they stay in slum which is not clean and dirty	1	4%
7	Elderly People	High BP	2	7%
8	Ill people	They have lesser energy level, Deficiency of water in the body	1	4%
9	People who work directly under sun or in high temperature	Due to excessive temperature, suffer from dizziness Due to unhygienic water condition at work place	4	15%
10	Poor people	Excessive temperature	1	4%
11	Everyone	Excessive temperature. Since people are outside in summers	6	22%

According to the maximum respondents children are more vulnerable to heat.

Fig2:Case of heat morbidity at UHC

Case1:Pt. 8 years old female patient came to the VedRoad UHC on 25April 2019. Occupation: Student.

Chief complain-pimples on eyebrow region and on fore head

Past history-pimples repeats in every summer and gets relieved having 3 day medication course.

Diagnosis-Prickly due to the heat

Q.4. Physical environment of the patients place

16 out of 27 stay in Zhopadas, Row house and duplexes

11out of 27 stay at ground floor (having no construction above it)/topmost floor of their building

These things all together makes the physical environment of the place hotter.

Which respondents have even mentioned in one of the reasons of the vulnerability due to heat

Q.5 In order to save yourself from heat do you make any changes in your clothing style, diet, working hours? If yes what are they?

Table No.6f Responses by pt. related to changes made by them in their clothing, diet and working hours in order to save themselves from heat

	Clothing	Diet	Working hours
Yes	20	16	10
Yes%	74%	59%	37%
No	7	11	17
No %	26%	41%	63%

- Changes made by the respondents in their **clothing style** are wearing of light /cotton clothes. When at home wearing more of the maxi and the shorts as according to them it's more comfortable and they don't feel much heat.
- Changes made by the respondents in their **diet** maximum people responded regarding consumption of the food at the room temperature with less spice and oil. Incorporating more vegetables, pulses, rice in diet.

6 of them responded of including butter milk and increase intake of cold water in the diet.

- Changes made by the respondents in their **working hours are**.
- Maximum responses received of completing the household work before 11 am to 12pm.
- Minimum of Resting in the afternoon between 1 to 3 and sleeping under fan/tree. Making the balance between work and rest.

Q.6- Do you experience water shortage in summers?

2 out of 27 responded they experience water shortage

Q.7 Drinking Water arrangement at work place?

6 out of 10 have filtered water can of 20l at their work place.1 does not have the safe drinking water at work place so carries water from home.

Number is taken as 10 since in the study population of 27 .10 are working outdoor rest are the housewife & working from the home.

Drinking Water arrangement at home

Maximum keep matka water at home.This keeps the water cool.3 out of 27 have the refrigerator at home.

Q.8. Do you get any advance information of heat wave days.

26% responded that they receive the information through news in the television,

Q.9. Do you think that can help in your preparedness?

Table no.6g Responses by the pt. related to the things that can help in the preparedness.

S.No.	Responses	No.	%
1	Nothing can be done	10	37%
2	Electricity cut should be lessen. So that with electricity, fan will be working and can avail the facility of cool air	1	4%

3	Using fans ,coolers	5	19%
4	Siting under open spaces	2	7%
5	Wearing lighter clothes	1	4%
6	Consumption of lighter food having less oil and spice	1	4%
7	Providing the news well in advance	1	4%

37% people believe that nothing can help in the preparedness

Whereas 30% believe that improving the physical environment can help in the preparedness.

Q.10.How do you think it should be informed to you?

Table No.6f Responses by pt.related to providing mode of information regarding preparedness from heat wave.

S.No.	Responses	No.	%
1	Doctors in the OPD	7	26%
2	News Channel	4	15%
	Newspaper	2	7%
3	Whatsapp, SMS, Internet	5	19%
4	It should be informed but how don't know	11	41%
5	It cannot be informed	1	4%

Majority of the respondents believe that it should be informed but they cannot think about the method.

7 out of 27 believe that doctors in the OPD should inform them so that it help them in the preparedness. Secondly there advice carries the importance for them.

Summary of the Exit Interviews

Total 27 respondents were there. 78% females and 22% males. 74% belongs to the middle age gp. which were the maximum and 4% belongs to the 0 to 10 yrs of age gp which were the minimum. Maximum population i.e. 44% had the secondary education and 4% had the post graduate and higher secondary education which was minimum. 17 out of 27 were housewives/working from home, were in majority. 4 out of 27 were having exposure to heat which was related to their occupation and carries significance.

“As 40 years of male with profession of Gardner came to Panas UHC on 28 March 2019 with a chief complain of bleeding from nose. He was working directly under sun when the bleeding started and his past history revealed that he suffers from it if he is working directly under sun and the temperature rises”

Patients have more accessibility % of distance from UHC to their home from Panas UHC i.e. 19% and least from Althan and Adajan UHC i.e. 7%.

Preventive health approach related to (vaccination, ANC visit, health checkup) was the maximum reason of patients coming to the UHC. 7 out of 27 were the patients suffering from heat related morbidity (Headache, fever, bleeding from nose, body ache, prickly on face and back). 2 out of 27 were vulnerable to heat related morbidity (Diabetes, acidity problem).

According to 93% of people temperature has increased in Surat & 52% feel temperature has increased on a moderate level.

Out of health, economy and miscellaneous things 87% of the people responded that health is maximum affected due to increase in temperature.

Total 23 people had fallen ill last summer. This number includes both patient as well as their family members. 6 out of 23 who had fallen ill last summer were the respondents. Out of 23 39% were the children. Housewives are more affected i.e. 22%. 19 out of 23 had seek the treatment from private doctor which even suggests their inclination towards private services. 5 were even hospitalized.

According to the 48% respondents' children are more vulnerable to heat. 2 cases of children with heat related morbidities came to the UHC but were undiagnosed related to the heat case.

In order to protect themselves from heat maximum changes are been made in their clothing style i.e. 74%.

2 out of 27 experiences shortage of drinking water. 86% of the respondents does not receive any heat warning message. 37% people believe that nothing can help in the preparedness. Whereas 30% believe that improving the physical environment can help in the preparedness.

Majority i.e. 41% of the respondents believe that they should be informed in advance but they cannot think about the mode. Which brings the hope they have on technology that something can be done for the preparedness related to protection from heat.

Conclusion & Recommendations

The coastal Cities like Surat need a separate action plan when it comes to heat discomfort as revealed by climate data analysis and heat stress cases reported during the field work.

U-PHC can be the first sites for implanting the action plan.

In the study it has been observed that there is a change in trend of summers. The temp. rises from the mid of Mar and come in the category of cautious zone .It has even been seen from both the years study of 2018(Feb-Dec) and 2019(Jan-Apr) in the summer trend of OPD cases that max. no. avg. OPD cases was in the month of Mar. Through the temp. &time trend (11 am & 3pm) it has been noticed that there is a continuous discomfort throughout. UHC have poor physical environment facility. And average facility for the case management. Which needs to be taken care of the earliest as center wise OPD cases % of last year revealed that Mar has the highest % of cases in 2018 and second highest in 2019 as a whole. This % is not limited to the season.

Health centers are managing the heat stress cases as per their available logistics, knowledge and skills. However the management can be more systematically tackled by maintaining water and ventilation resources at center, making best use of materials like ice packs, electrolytes and conscious efforts in capacity building of MO &ANM in terms of their knowledge about heat stress case management, their skills to deal with patients and their attitude to prioritize heat associated morbidities.

The knowledge related to diagnosis, management of the cases needs to be improved in the medical offers. Their knowledge in context of hydration therapy is adequate but in rest training is required .Both MO & ANM's have the experience of suffering from the heat morbidity cases suggesting that they are vulnerable but have diagnosed min. cases which leads to missing in the no. of OPD.

ANM knowledge related to the disease of heat morbidity in a whole is adequate but individually needs to brush up with this as they were not sensitized towards providing information related to heat. Patients consider that heat maximum effects their health and economy.

Last year in summers 23 out of 27 were fallen ill (23 includes the no.of both patients and their family) and 2 of them had seek treatment from the UHC

Both MO and Patients have shown interest in preparedness of heat related to the facility for heat wave warning message in advance.

The UHC are doing good in the field of ANC, PNC care & vaccination care. But prevention and preparedness from other health problems is also essential in order to reduce the morbidity levels.

Suggestions

Compulsory System for recording the heat morbidity cases for both MO & ANM'S

IEC Material before the onset of summers

System to circulate the message related to heat at the smart city office of Municipal Corporation.

Improvement in the physical environment of UHC's

Training of MO in diagnosis of the heat morbidity cases

Training of ANM's related to the identification of diseases & providing a session for making them aware about their roles and responsibilities

Case management facility related to presence of i/v fluids to be provided.

Display of heat related messages and precautions to be taken can be displayed on TV screens in UHC's.

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Annexure1

Questionnaire for Urban Health Centers

Urban Health Centers Preparedness for Heat and Health Action

S.NO.	Question	Response					
a	Name of Center						
b	Zone						
c	Date	___/___/2019					
1	Total Month wise daily OPD March 2018- February 2019	Month	Total	Male	Female		
		February '18					
		March '18					
		April '18					
		May '18					
		June '18					
		July '18					
		August '18					
		September '18					
		October '18					
		November '18					
		December '18					
		January '19					
2	Monthly Age distribution of OPD cases	Month	<5yrs	6-10	10-19	20-60	>60
		February '18					
		March '18					
		April '18					
		May '18					
		June '18					
		July '18					
		August '18					
		September '18					
		October '18					
		November '18					
		December '18					
		January '19					
3	No. of Emergency beds at center (if not there write Nil)						
4	Drinking water facility at center	a	Source (SMC or Others)				

		b	Quantity (Storage tank capacity)		
		c	Drinking water storage (earthen pot (matka) / other)		
		d	Functional water filter for drinking water	Yes / No	
		e	Water cooler in working condition	Yes / No	
		f	Summer plan (to maintain adequacy+ safe water+ Cool water)		
5	Ice availability for Patient care	a	Refrigerator in working condition	Yes	NO
		b	Ice cubes availability	Yes	NO
		b	Ice Packs availability	Yes	NO
		c	What provision they have for preparedness of ice pack for summer	Ice factory ILR Refrigerator	
		d	Feasibility of ice availability in case of emergency nearby	Yes	NO

6	Availability of electrolyte /intra venous transfusion management	a.	Available	Yes / No	
		b.	Can IV treatment be started at center?	Yes / No	
7	Presence of cross ventilation in the reception/Waiting area of UHC building	a	Number of floors of UHC building	Ground floor / Ground floor + one floor/ Ground floor + two stories	
		b	Are window and door on opposite walls?	Yes / No	
		c	Sitting space for how many people in the waiting area		
		d	In the peak time of OPD whether there is presence of overcrowding and discomfort.	Nil Crowding Over Crowding	

		e	Artificial light required at day time (if yes,) in how many rooms of UHC		
8	Presence of curtains on the windows		(Yes/ No/ Not all)		
	a.) If partial which rooms?				
	b.)Is it in waiting lounge also?		Yes/No		
9	Artificial ventilation				
	a.)No. of fans at UHC	a	Ceiling		
		b	Other		
		c	Total		
	b.)Number of Fans at waiting lounge		Total installed		
			Total in working condition		
10	What time of OPD hours have very high heat discomfort?				
11	What IEC material is available at UHC for Heat and Health education?				
12	Among staff members of UHC who are conveying message of Heat and health to patients?				

Observations:

For office use only

S.N o.	Questions	Response		
1a	Out of four outer walls how many with open space?	(One/ two/ three/ all four)		
1b	Trees giving shadow on how many side of open space	(One/ two/ three/ all four)		
2.	Presence of cross ventilation in the reception/Waiting area of UHC building	a	Number of floors of UHC building (Ground floor / Ground floor + one floor/ Ground floor + two stories)	Ground floor / Ground floor + one floor/ Ground floor + two stories
b		Are window and door on opposite walls?	(Yes/ No)	
c		Sitting space for how many people in the waiting area		
d		In the peak time of OPD whether there is presence of overcrowding and discomfort	Nil Crowding Over Crowding	
e		Artificial light required at day time (if yes,) in how many rooms of UHC		

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Questionnaire

For The Preparedness Of Primary Health Care System To Manage Heat And Health Action Plan Surat

Medical Officers

B	Name of Center	D. Zone		
S.NO	Questions	Answers		
1a	During your entire work span have you ever came across heat related morbidities cases?	YES / NO Approx. total_____		
1b	If yes what are they, please mention (Your diagnosis)	.		
2.	In last summer (March 2018-June 2018) which of the signs/ symptoms you noticed as heat related sickness among OPD patients? (Can tick more than one option mentioned).	1.Irritability 4.Fatigue 7.Red face and skin 10.Muscle Cramps 13.Dizziness 16.Blurred vision 19.Unconsciousness	2.Restlessness 5.Weakness 8.Profuse sweating 11.Chills 14.Light headedness 17.Disorientation 20.Others(specify)	3.Headache 6.Hot/dry skin 9.Very high body temperature 12.Cold/wet grayish skin 15.Nausea 18.Convulsions
3.	According to you what are the heat morbidity case management actions	1. 2. 3.		
4. a.	According to you when icepacks are required for treatment of heat morbidity?			

4.b.	What are the sites of ice packs application	
5.	What are the actions for unconscious patient suspected/ diagnosed as heat morbidity	1.
		2.
		3.
		4
		5
6.a.	If you come across heat related morbidity cases where do you refer them?	
b.	How shall you refer the case?	
c.	Describe the heat illness referred case from UHC in a line or two.	1. 2
7.	Enlist three most important educational messages for patient in summer	1.
		2.
		3.
8.a	Do you receive any Heat wave warning message?	(Yes/No)
8.b	If No would you like to receive Heat wave message to equip your center for management of cases at UHC	(Yes/No)
8.c	What preparations should be done at UHC in summer to manage Heat morbidity	

9.a	As per your experience which season is heavy OPD season for your UHC?	Winter Summer Monsoon
9.b	As per your opinion heat waves are health problems in our city?	Yes/No
9.c	Which month is worst for Heat Morbidity for Surat city based on your experience of UHC cases?	
9.d	Do you report Heat morbidity in your routine reporting system?	(Yes/ No)

Annexure 3**Urban Health And Climate Resilience Centre Of Excellence****Urban Health Centers Preparedness for Heat and Health Action****Questionnaire for exit Interview**

Date _____

S.NO.	Question	Response																																
	a.) Sex- M/F b.) Age c.) Education d.) Occupation e.) UHC Name & Zone f.) Distance of home from center g.) Reason of visit																																	
.1.	Do you feel in Surat city the heat has increased in last 5 years	a.) Yes / No b.) If yes how much? Somewhat / Much / Too much																																
.2.	What is the impact of heat on our daily life (only tick those which patient replies)	<table border="1"> <tbody> <tr> <td>Health</td><td></td><td>Sleep</td><td></td></tr> <tr> <td>Work</td><td></td><td>Appetite</td><td></td></tr> <tr> <td>Income</td><td></td><td>Thirst</td><td></td></tr> <tr> <td>Education</td><td></td><td>Quarrel</td><td></td></tr> <tr> <td>Water</td><td></td><td>Drainage</td><td></td></tr> <tr> <td>Cost of Milk</td><td></td><td>Cost of vegetable</td><td></td></tr> <tr> <td>Cost of water</td><td></td><td>Travel Comfort</td><td></td></tr> <tr> <td></td><td></td><td></td><td></td></tr> </tbody> </table>	Health		Sleep		Work		Appetite		Income		Thirst		Education		Quarrel		Water		Drainage		Cost of Milk		Cost of vegetable		Cost of water		Travel Comfort					
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Q.3	In last summer a) b) Was hospitalized? c) Age: d) Sex: e) Occupation If yes How many? Were you sick?	<table border="1"> <tbody> <tr> <td>a</td><td>Had any member from your family has fallen ill?</td><td>-----</td></tr> <tr> <td></td><td>b.) How many?</td><td></td></tr> <tr> <td></td><td>c.) Were you ill?</td><td></td></tr> <tr> <td></td><td>d.) Was treated at UHC?</td><td></td></tr> <tr> <td></td><td>e.) Was treated by private doctor?</td><td></td></tr> <tr> <td></td><td>f.) Was any one hospitalized?</td><td></td></tr> <tr> <td></td><td>g.) What was the age</td><td></td></tr> <tr> <td></td><td>h.) Male/ female</td><td>56</td></tr> <tr> <td></td><td>i.) What is the occupation?</td><td></td></tr> </tbody> </table>	a	Had any member from your family has fallen ill?	-----		b.) How many?			c.) Were you ill?			d.) Was treated at UHC?			e.) Was treated by private doctor?			f.) Was any one hospitalized?			g.) What was the age			h.) Male/ female	56		i.) What is the occupation?						
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	g.) What was the age																																	
	h.) Male/ female	56																																
	i.) What is the occupation?																																	

4 a.)	As per your experience who suffers maximum in your family due to high temperature.	
5.b	Why?	
6 a.)	What is the type of your residence	Zopada / raw house / Duplex / Flat/ Bunglow
6.b.)		How many floors are there: Ground/ G+1/. G+2, G+3/ G+4/ G+----- ,
6.c.)	Which floor you stay?	
7	a.)In order to save yourself from heat,	
	Do you make any changes in your clothing style?	Yes / No, If yes What?
	b.)Do you make any changes in your daily diet?	Yes/ No, If yes what?
	c.)do you make any changes in your working hours	Yes /No, If yes what?
8	a.)What is the source of drinking water at your home? -----	Municipal water supply / tap in home/ Out side home/ Public standpost
	b.)Do you experience water shortage in summer	Other:-----
9.	a.)What is the drinking water arrangement at your work place? -----	-----
	b.)Do you carry your water to workplace?	

10	a.)Do you get any advance information of Heat wave days? ----- b.)Do you think that can help in your preparedness? ----- c.)How do you think it should be informed to you?	----- ----- -----
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