

Mosquito Awareness and Future of GIS in its Surveillance

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Abstract

Dengue and Malaria are illnesses which are transmitted through the bite of mosquitoes starting with one host then onto the next i.e. they are vector borne ailment which earns a lot of deaths in numerous nations all through the world. Different ecological spatial components have impact on these illnesses, they succeed well and transmit the parasite in dampness loaded ranges in hotter atmospheres. The best environment are close neighbourhoods where creature and human cohabit. These ailments have been accounted for high new born child death rate and the reports are expanding each day in our nation. Our goal is to distinguish the environment and the transmission of mosquitoes for decreasing their generation. This paper indicates us information from the survey questionnaire and how utilizing it helps us to demonstrate the impact of survey on people in general and after that decides the future part of GIS for recognizing hazard territories for Dengue and Malaria epidemicity in different cities and neutralizing against them as quickly as could be allowed.

Keywords: Geographic Information System(GIS), Global Positioning System(GPS), Aedes, Anopheles, Epidemicity, Epidemiology.

I. INTRODUCTION

Dengue and Malaria are endemic in more than 100 nations and around 40 % of total populace is at their hazard. Mosquitoes are a noteworthy general medical issue in India and they get more than 1.5 million individuals tainted each year. It is nearby malady yet must be focussed in an all-around arranged way. There has been found an exponential increment in the mosquito borne illnesses as of late. It is principally a direct result of the improvement of medication resistance of dengue and malarial parasites alongside a few different components. In the area of Eastern Uttar Pradesh the spreading of vector borne illness ends up noticeably uncontrolled particularly amid stormy season. GIS could be a phenomenal device for the illness administration as it has inborn capacity to oversee spatial, non-spatial and transient information. GIS contains set of procedures and instruments which are fit for coordinating, putting away, investigating, altering, and to show topographically referenced data from various stages and sources.

A. Dengue

Dengue is a mosquito conceived viral ailment created by the dengue infection from the bite of an Aedes mosquito. Indications really begin appearing following 3-14 days of disease, normally individuals contaminated with dengue infection are asymptomatic 80% and around 5% just hint at extreme ailment.

Early indications of dengue incorporate high fever, migraine, joint torment, loss of craving, spewing and a trademark skin rash. In spite of the fact that for the most part the fever doesn't last past seven days, however a few cases may grow more basic condition and stance life debilitating risk to the individual. The circumstance is portrayed by a drop in the Blood Platelets level, Blood plasma spillage or a seriously low blood pressure.^{[1][2]}

B. Malaria

Malaria is mosquito conceived protozoan sickness malady brought about by the disease of Plasmodium parasites. It is most ordinarily transmitted by a contaminated female Anopheles mosquito. Common side effects of Malaria incorporate fever, weariness, cerebral pains and retching while in genuine cases it causes yellow skin, trance like state, seizures or demise. Jungle fever impacts essentially poor, undeserved and underestimated populace in external regions which are described by insufficient control measures and restricted access to social insurance services.^{[3][4]}

From survey questionnaire, Firstly the information to recognize the Aedes(Dengue) or Anopheles(Malaria) mosquito was made a request to know what number of

individuals think about them and could separate amongst them and distinguish them along these lines the individuals who didn't know were made mindful.

Aedes comprises of 700 species and serve as vector for many illness mosquitoes of this class are small and have black and white stripe checking on their body and legs. Aedes has a white "lyre" on her thorax with two yellow "chords" in the middle. Aedes frame concourse failing to exceed six in number, it implies in the event that if you see a swarm, be sure, these mosquitoes are not aedes.^{[5][9]}



Fig. 1 Aedes Mosquito^[14]

While Anopheles includes 460 species mosquito can be recognized by the palps which are the length of the proboscis and by the nearness of discrete black and white scales on the wings. Anopheles can without much of a stretch be distinguished by the average resting position, abdomen sticking up in the air, making a point of 45 degree with the surface.^{[5][9]}



Fig. 2 Anopheles Mosquito^[15]

Secondly their health conditions was asked to know how they are currently feeling and do they know they about the symptoms of the illnesses(Dengue or Malaria) along these lines the individuals who didn't thought about the side effects were made mindful of it that way they can deal with themselves on the off chance that they experience those indications or regardless of the possibility that it is one of their relatives, Thirdly measures to be taken amid a Dengue or Malaria flare-up was asked and Lastly a scene was characterized to record how the general population would respond around that scene.^{[10][12]}

II. FACTORS BEHIND MOSQUITO ENDEMICITY

Mosquitologists working in the field in the primary portion of this century, in the decades taking after the explanation of the mosquito cycle in man and mosquito, discovered that it was a central malady and that the format of the land is a critical thought in the comprehension of the neighbourhood epidemiological circumstance. The mosquito epedemicity is basically a direct result of the advancement of medication resistance of dengue and malarial parasites. It might have different reasons including on-going city formative exercises, extreme utilization of pesticides, unpredictable deforestation ^[6] and statistic moves etcetera for this improved rate of spreading of this malady. Calculates additionally have been connected to the way of life of various group individuals (particularly for the neighbourhood occupied tribes), and the conduct of mosquitoes which transmits the illness and in addition climatic and different qualities. For the spreading of mosquito borne sickness, variables like the extent of tainted mosquitoes, the vector populace thickness, proximity to rearing ground and opportunity, climatic elements, for example, precipitation, temperature and relative mugginess are known to affect the science of mosquitoes.^[7] The financial and physic-substance components could likewise be one vital reason for the Mosquito epedemicity of the review region.^[8]

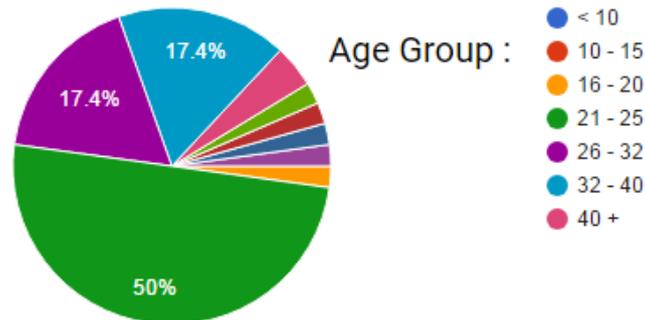
Dengue Cases(C) and Deaths(D) in our Country since 2014:^[11]

Affected States/UTs	2014		2015		2016	
	C	D	C	D	C	D
Andhra Pradesh	1262	5	3159	2	3376	2
Arunachal Pradesh	27	00	1933	1	13	0
Assam	85	0	1076	1	5715	4

Gujarat	2320	3	5590	9	7869	14
Haryana	214	2	9921	13	2489	0
Karnataka	3358	2	5077	9	5833	8
Kerala	2575	11	4075	25	7204	12
Madhya Pradesh	2131	13	2108	8	3134	12
Maharashtra	8573	54	4936	23	6708	32
Orissa	6433	9	2450	2	8377	11
Punjab	472	8	14128	18	10475	11
Rajasthan	1243	7	4043	7	3632	16
Tamil Nadu	2804	3	4535	12	2531	5
Telangana	704	1	1831	2	2764	4
Uttar Pradesh	200	0	2892	9	7512	42
Uttrakhand	106	0	1655	1	2146	4
West Bengal	3934	4	8516	14	17702	34
Delhi	995	3	15867	60	4393	10
D&N Haveli	641	1	1154	0	4161	2
Puduchery	1322	1	771	0	463	2
Total	40571	137	99913	220	111880	227

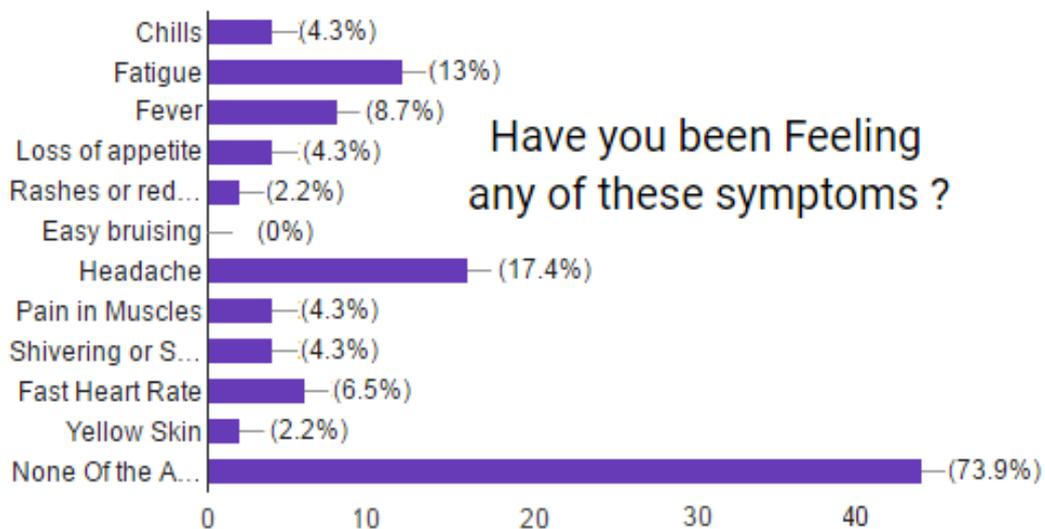
III. STUDY REPORT

From the survey questionnaire it was recorded that there were many individuals who took part in the survey, and they all belonged to various age groups but the youth took the most interest in it as they want to know more about the epidemicity and how to counter it as shown below : ^{[10][12]}

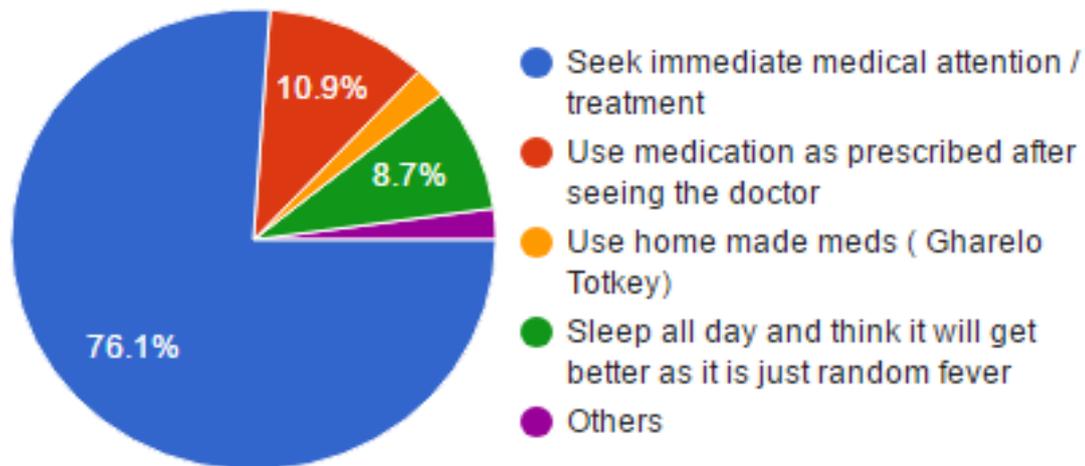


It was concluded from the survey that one of the main cause of the spread of Dengue or Malaria is because people can't even identify the Aedes and Anopheles mosquitoes according to the survey 82% say they can't identify 5% say maybe they can identify while only 13% are confident in their identification skill, thus firstly we have to make the people aware of them and its properties. ^{[10][12]}

We also asked individuals about their current health conditions and if they are currently feeling any illness or discomfort to which we got the following data : ^{[10][12]}



After this the survey has a portion which asked the individuals as what should be done when you get fever during the Dengue or Malaria outbreak and it was good that the results were as expected which shows that the current public is somewhat aware as what should be done during a crisis but to improve the results further we should increase the knowledge among people about aedes and anopheles mosquitoes to further reduce the number of patients



Lastly the survey concluded with asking the individuals as if they will try to get more information about Dengue fever or Malaria just to protect and remind your family & friends as how serious the disease is to which 70% responded with YES while 30% still responded with NO which shows that there are still some individuals out there who do not know how severe these illnesses are and that we should always be prepared to neutralize it as soon as possible. ^{[10][12]}

IV. METHODS

The survey was done by Google Forms as an online questionnaire and was conducted worldwide to collect the responses of individuals as how each and every one of them thinks about the Mosquito epidemicity, but the main focus was on our nations people as to see their mentality through the responses and then to improve the thinking and knowledge of our general public. ^[10]

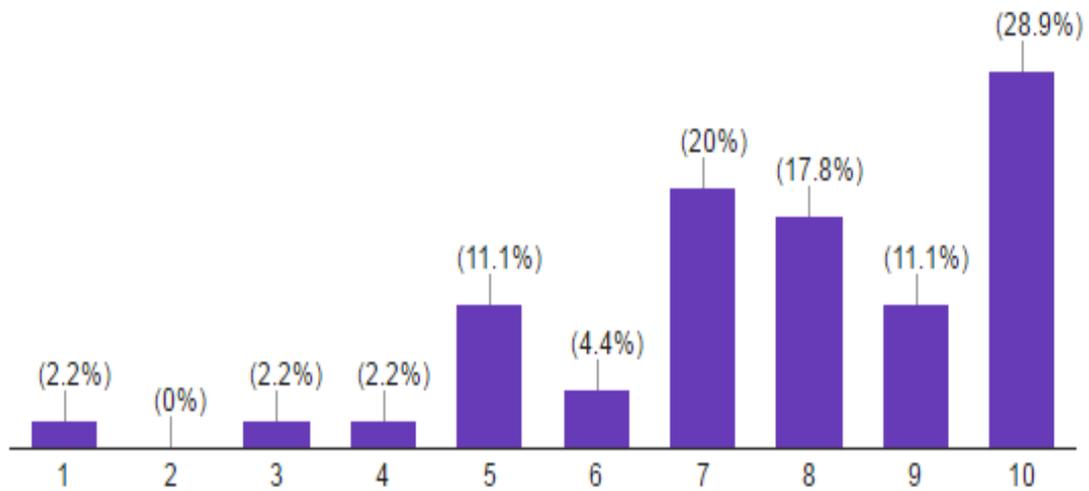
V. RESULT

The survey helped general public to become aware of the Mosquito epidemicity and in the survey a scene was introduced to know how the general public will react on the scale of 1-10 if they were in that scene ^{[10][12]}

Scene-1

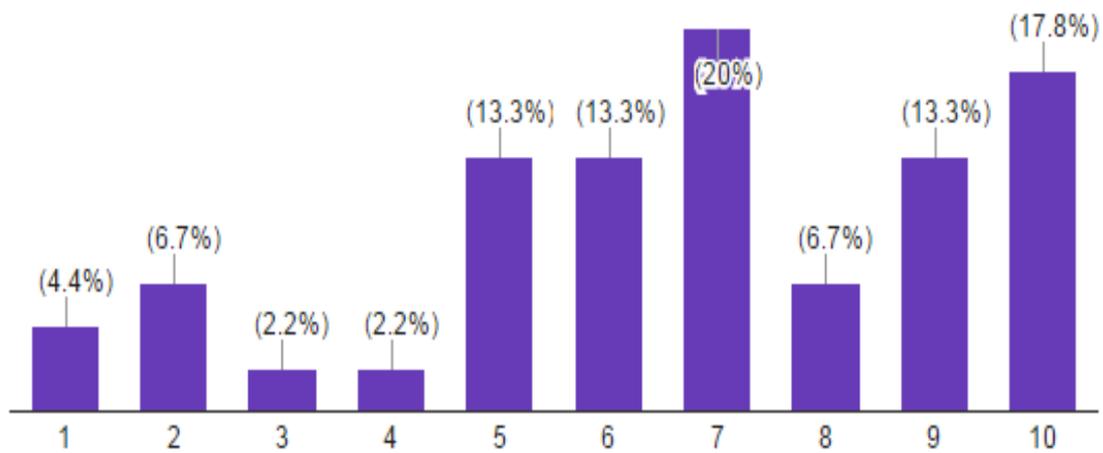
“One day, you find a water container that is full of mosquito larvae behind your neighbour's house”

Ques. 1 : How confident are you that you could bring up the issue of removing the water container to your neighbor in this situation?



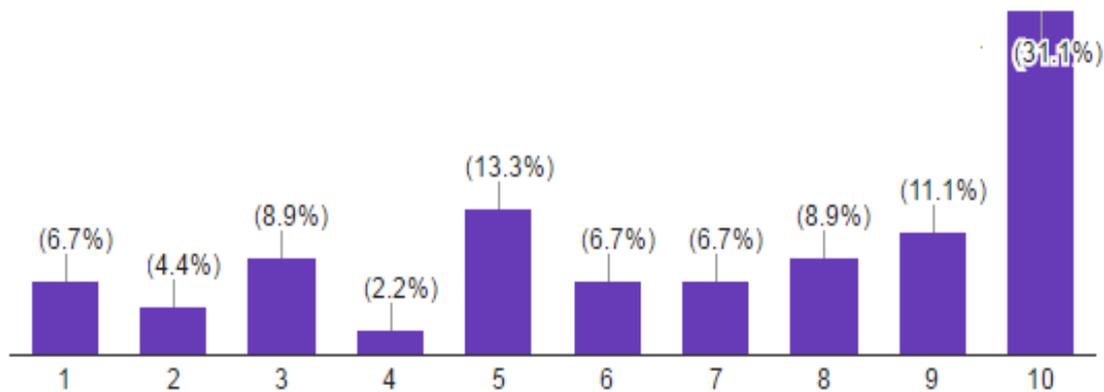
To which the following data was collected.

Ques. 2: How confident are you that you could convince you neighbour to do 10 minutes weekly search and destroy any potential mosquito breeding sites?



To which the following data was collected.

Ques. 3: If your neighbour refused to destroy the container, how confident are you that you report him to the local Health Authority?



To which the following data was collected.

From the data collected through the survey we also helped a person in saving his life by seeing the symptoms and health conditions as he was effected by malaria but he didn't knew its symptoms thus we contacted him and helped him to get neutralized.
[12]

VI. CONCLUSION

- From the collected data we can say that for mosquitoes to breed they require a particular climate, temperature and stagnant water (within which to lay their eggs).
- From the survey it can be concluded that it made a lot of people aware of their responsibilities to gather knowledge beforehand about these illnesses and neutralize them in their early stage and also to find and destroy as much mosquito breeding sites as possible to reduce the risk.
- From the survey data it was also concluded that there are a lot of people who know nothing about aedes and anopheles mosquitoes.
- It can also be concluded that if we use GIS and Satellite Imagery in such a way that we find the hotspots of their breeding sites then we could safeguard ourselves from mosquitoes by cleaning those areas thus counteracting against them.
- This way we will be able to reduce the number of patients of Dengue and Malaria and the deaths caused by them and help a lot of people.

VII. FUTURE WORK

From the study it can be inferred that Dengue and Malaria are spread throughout the nation and most of the general public is not even aware of aedes or anopheles mosquitoes which are the cause this epidemic nor their distinctive identifying features which will easily help them to identify these mosquitoes thus if the government were to start workshop or awareness programs about them then it will help a lot of people and it will also reduce the death rate caused by these illnesses as more people will be aware of them and will know how to neutralize it as soon as possible and also there is a wide spectrum of possibilities over which GIS can be attributed to mosquito control measures.^[13] Its application as an operational planning aid is an extension of geographical observation to promote better program management at both the state and national levels, which will help us a lot in the future in identifying their breeding hotspots and neutralize them in early stages.

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