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Article

Surveillance on the trends of important Communicable diseases in Urban Areas (Per view under National Urban Health Mission) of Paschim Medinipur District, West Bengal, India: approach towards Consultant's Lens

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ABSTRACT

Integrated Disease Surveillance Programme (IDSP) routinely collects and analysis some important communicable disease reported from Urban-PHCs in Paschim Medinipur district. In this study it was observed the trends of important communicable diseases for last 3 years (Sep' 2018 to July' 2021) in Ghatal, Kharagpur and Midnapore Municipality areas. IDSP enlisted diseases like vector born diseases (Malaria, Dengue and Chikungunya), Bacterial disease [Enteric fever, Bacillary dysentery and Acute Diarrheal Disease (ADD)-including acute gastroenteritis], Viral Diseases [Measles, Acute Respiratory Infection (ARI) / Influenza like Illness (ILI) and Viral Hepatitis] and some other Acute Communicable diseases that affects public health were observed and analysis by District IDSP & NUHM Cell and found that ARI/ILI, ADD and Other Acute communicable disease were observed to be the mostly reported cases in this municipality area. Malaria, Dengue and Viral hepatitis have shown a decreasing trend over the years. Measles has shown a cyclic sudden occurrence trends in a particular time of the year (August-January). In the case of Bacillary dysentery show an endemic trend throughout the year. Awareness generation to health hygiene by different filed level health workers like ANMs, FTSs, HHWs and MAS groups and safe drinking water supply can easily overcome the case load of ARI/ILI, ADD and Other communicable disease in this municipality area. So, different strategy of National Urban Health Mission (NUHM) is prompting to fruitful attempt for easily overcome this disease outbreak in near future.

1. INTRODUCTION

Surveillance of disease is an essential for health system for early detection of outbreaks, measuring disease burden, changes in morbidity and mortality patterns and for timely implementation of control and prevention measures. Since for last few decades surveillance of communicable diseases have been well organized and streamline through disease specific parallel programmes that provide effective and short-term outcome in under-develop and developing countries (Sarkar & Nath, 2018). In the year 1990, World Health Organization (WHO) initiates, follow-up and funding support to evaluate the integrated surveillance functions of some modifiable disease in Asia and African countries.

In India the formal launched of the surveillance project on 1997-1998 in the name of National Surveillance Programme for Communicable disease (NSPCD) by the Ministry of Health & Family Welfare, Government of

India and rolled out over 101 districts throughout country. There after its successful implementation and positive outcome, Government of India decided to implement the Integrated

Disease Surveillance Project (IDSP) instead of expending the NSPCD to all district in India on and from 8th November 2004 with the aid of World Bank (US Dollar 68 million over 5 years). The IDSP programme was started with Phase wise manner like Phase-I (F.Y. 2004-05)- nine States, Phase-II (F.Y. 2005-06)-fourteen States, Phase-III (F.Y. 2006-07)-Twelve States. Now from 2014-15 F.Y. it is totally Govt. of India Funded project under the scheme of 12th Five Year plan with budgetary support of 6.4 billion Indian rupees. In that time, the project was mainly focused upon the rural areas under the scheme of National Rural Health Mission (NRHM) and the disease related surveillance was coined out from health facilities in West Bengal as well as throughout India. From the F.Y. 2015-16, Govt. of India started a new project in the name of National Urban Health Mission (NUHM) with a concept of improving the health infrastructure in mostly neglected Urban areas throughout whole country as well as West Bengal also. But IDSP programme is initiated at urban areas of West Bengal in the Platform of NUHM from September 2018 in F.Y. of 2018-19. The Urban PHCs under NUHM programme of different municipality and Municipal Corporation areas were started surveillance and reporting to their respective District IDSP cell and District NUHM cell in weekly basis. The disease under surveillance in urban areas is listed in the table below and it was shown that all the disease under surveillance is communicable disease. The surveillance is reported on weekly basis in the two forms i.e. P-Form and L-form. Form-P (presumptive cases) is used to be Clinicians for provisional diagnosis and Form-L (laboratory cases) for the lab confirmed cases. This approach is based on early detection of warming signals of impending outbreaks and helps initiating approach to effective measures in a timely basis. The literature shows that very few researchers mining and analysis the data of communicable diseases in urban areas and shows significant trends of disease burden in India and West Bengal also. This concept prompts to initiate us to start the research work and it may be tries to give a clear concept of disease burden among the urban areas in Paschim Medinipur district as a reference of West Bengal is "Listed in table 1".

Table 1: - Annual incidence of various IDSP notified disease in Ghatal, Kharagpur and Midnapore Municipality (Total population of Ghatal Municipality is 54,693; Total population of Kharagpur Municipality is 2,89,631; Total population of Midnapore Municipality is 1,69,227 based on the Census report of 2011)

Name of Municipality	Name of Disease	Total reported presumptive cases (Sep'2018-June 2021)	Annual incidence/1 Lakh/year	Infection Rate (no of actual incidence/Total population ×100)
Ghatal	Malaria	333	202.95	0.203
Kharagpur		1773	204.05	0.204
Midnapore		1303	256.66	0.257
Ghatal	Dengue	15	9.142	0.009
Kharagpur		202	23.25	0.023
Midnapore		30	5.91	0.006
Ghatal	Chikungunya	9	5.49	0.005
Kharagpur		3	0.35	0.0003
Midnapore		7	1.38	0.001
Ghatal	Enteric fever	475	289.49	0.290
Kharagpur		3589	390.04	0.390
Midnapore		988	194.61	0.195
Ghatal	Bacillary dysentery	0	0	0
Kharagpur		1074	123.61	0.124
Midnapore		203	39.99	0.040
Ghatal	Acute Diarrheal Disease (ADD)-including acute gastroenteritis	353	215.14	0.215
Kharagpur		6005	691.11	0.691
Midnapore		2144	422.31	0.422
Ghatal	Measles	17	10.36	0.010
Kharagpur		1269	146.05	0.146
Midnapore		311	61.26	0.061
Ghatal	Acute Respiratory Infection (ARI) / Influenza like Illness (ILI)	2128	1296.94	1.300
Kharagpur		26805	3084.96	3.100
Midnapore		6375	1255.71	1.256

Ghatal	Viral Hepatitis	7	4.266	0.004
Kharagpur		665	76.53	0.076
Midnapore		40	7.88	0.008
Ghatal	Other Acute Communicable diseases that affect public health	12	7.31	0.007
Kharagpur		5039	579.93	0.580
Midnapore		1622	319.50	0.319

2. MATERIALS AND METHODS

The Present study was undertaken for Ghatal, Kharagpur and Midnapore Municipality with a area of total 156.05 KM^2 in the district of Paschim Medinipur, of the state of West Bengal, India. The total population was 5,913,457 and the out of this 5,13,551 reside in Urban areas of Midnapore, Kharagpur and Ghatal Municipality. The health infrastructure is strengthening and funded to these three major urban local bodies (ULBs) by the NUHM programme under the guidance of Dept. of Health & Family Welfare, Govt. of West Bengal. For development of health structure in this urban area, total ten (10) Urban Primary Health Centers (U-PHCs) was established with a concept for catering primary health care services among peoples including slams in these urban areas. Kharagpur municipality is the major urban areas in Paschim Medinipur district and has six (6) U-PHCs, Midnapore the 2nd largest municipality area and has three (3) U-PHCs and Ghatal municipality has one (1) U-PHC to serve the health care activities in their urban areas.

These U-PHCs are the reporting units for urban areas and they submit the IDSP report to District IDSP and NUHM Cell on weekly basis in "P" and "L" formats. Another "S" form that means syndromic approach and it could be collected through ASHA (Accredited Social Health Activist) by the house/village visit at Sub-Center level in rural areas. But it is not applicable to urban areas and it is the policy making strategy decided by the competent authority of Dept. of Health & Family Welfare, Govt. of West Bengal. The reporting forms (P forms) mainly based on presumptive form of the disease survilance was compiled and reviews through analysis using MS Excel 2010 (Sarkar & Nath, 2018). The data has been presented as tabulated graphical representation. The rate of annual incidence was also calculated by averaging the total number of presumptive cases through the years, divided by the total population of the district and then multiplied by one lakh (1,00,000) (Sarkar and Nath, 2018). The disease trends were also analysis accordingly based on the presumptive reported cases. For this study and report analyzing, necessary permission was obtained from the Chief Medical Officer of Health & Member Secretary, District Health & Family Welfare Samity, Paschim Medinipur, West Bengal, India.

3. RESULTS AND DISCUSSION

The disease data has been analysis and represented based on the 'P' form from nearly last three years (Sep' 2018 to Jun' 2021) and some interesting and significant result has been shown and explained following manner.

3.1. Disease trends and occurrence study

1. ***Vector born disease-*** It was observed that both presumptive cases of Malaria and Dengue were significantly increasing in the month of September 2018 and October 2018 and declined from July 2019 and lowest presumptive cases for both Malaria and Dengue was reported in the month of April 2020, then arise again from January 2021 and in the month of May 2019 highest presumptive cases of Malaria were found in Ghatal and Kharagpur municipality area. But in case of Midnapore Municipality the maximum presumptive cases were reported in the month of October 2019 (Fig. 1a). After that the case load of Malaria was decline till April and then further it slightly increases from February 2021 to April 2021 and then rapidly decline. But overall, the disease trends of presumptive cases in case of Malaria were shown to be decreasing in all three municipality areas. This trend was directly related to the climate condition of these municipal areas. The case load increasing from February to July that is the pre monsoon and rainy season throughout in all West Bengal, which favor for increasing the mosquito breeding site that directly corelated to the high cases of Malaria. But the decreasing trends of Malaria cases focus that successful implementation and achieving the goal of National Vector Born Disease Control Programme (NVBDCP) in NUHM platform in the state of West Bengal.

   Slightly deferent trends were observed in case of Dengue, the highest presumptive cases were reported in the month of August 2019 for Ghatal and Kharagpur Municipality area but the reported cases was maximized in the month of November 2019 for Midnapore Municipality. It was also observed that in the month of October 2018, the

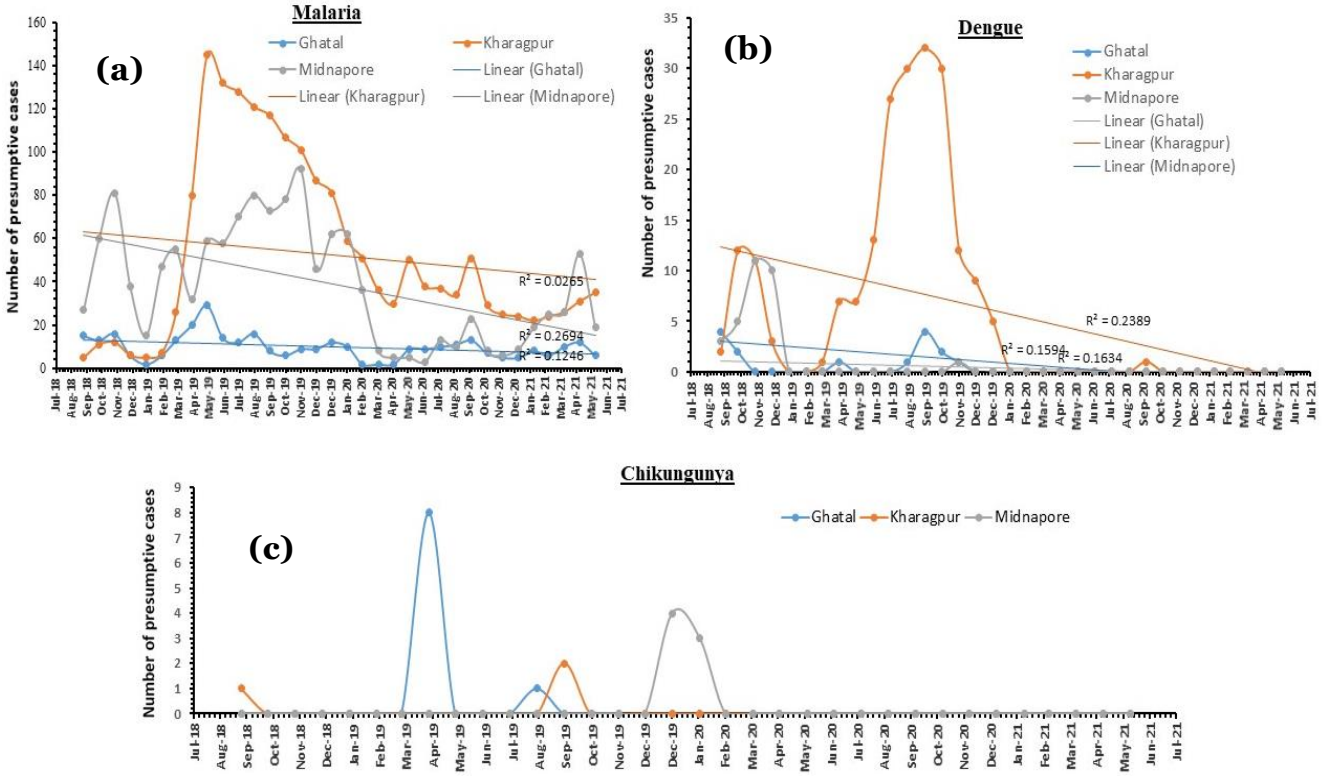

Figure 1- Trends of different vector born diseases from September 2018 to June 2021 in Ghatal, Kharagpur and Midnapore Municipality area. (a) trends of presumptive Malaria cases (b) trends of presumptive Dengue cases (c) trends of presumptive Chikungunya

presumptive cases were maximized for Ghatal Municipality and November 2018 for Kharagpur Municipality (Fig. 1b). But the presumptive cases were declined for this time in Midnapore Municipality area. Following this study of presumptive cases, it was clearly noticed that the trends was declined during proceeding consecutively form August 2019. This is may be due to the relative humidity increased during the rainy season remain high for several weeks during post rainy season directly related to the breading of *Ades aegypti* mosquito (Chakravarti and Kumaria, 2005). During this post rainy season (July -October) in West Bengal, abundant stacks of fresh water reservoirs, developed optimum conditions that influence for mass breeding and propagation of vector that is *Ades aegypti* mosquito and increase of
relative humidity facilitates the viral transmission (Chakravarti and Kumaria, 2005).

It was clearly observed from the metrological data (Table 2) that vector born diseases are increases according to the trends of increasing rain fall. It is also to be noted that average temperature of above 34 ºC is also influencing the Vector born disease. So, it is clearly concluded that rainfall and temperature is correlated with vector density and influences the burden of vector born disease.

Very few presumptive cases of Chikungunya were found in all three municipality areas which are negligible but though it is presumptive, it may be other fever cases which have the sign and symptoms like Chikungunya (Fig. 1 c). In these cases, district surveillance teams and entomological survey will very fruitful to confirm these types of cases.

The decreasing trend of both Malaria and Dengue gives the positive influence and impact of NVBDCP programme on NUHM platform.

2. ***Bacterial disease*: -** The disease trends of Enteric fever, Acute Diarrheal disease (ADD) and Bacillary Dysentery were observed as endemic, that reside and reported throughout the year (Fig 2 a, b & c). The reported presumptive cases in all three diseases were slightly decreased in the month of October November and December. This is may be due to the bacterial growth retreads at 25-10 °C during winter seasons. Enteric fever that mainly affects the West Bengal is Typhoid fever that caused by the Gram-negative bacterium *Salmonella enteria*, subep. Serovar Typhi. The transmission was done through asymptomatic human carrier through the fecal-oral route (Ref. Eng SK, Pusparajah P, Ab Mutalib NS, Ser HL,

Chan KG, Lee LH (June 2015). "Salmonella:A review on pathogenesis, epidemiology and antibiotic resistance". *Frontiers in Life Science*. 8 (3): 284–293. doi:10.1080/21553769.2015.1051243).

3. Sanitation and hygiene are important to prevent typhoid. It can only spread in environments where human feces are able to come into contact with food or drinking water. Careful food preparation and washing of hands are crucial to prevent typhoid fever.

Acute diarrheal disease (ADD) is placed a major impact on disease burden in West Bengal from last few decades. This disease was caused by different types of microorganisms like Virus, Bacteria and Protozoans but in west Bengal bacterial species (*Escherichia coli*, *Shigella* spp, and *Salmonella* spp) contributes the major part. This disease was also spread through Oral-fecal rout that means drinking water contaminated with human faeces causes acute diarrheal disease (WHO web page-https://www.who.int/news-room/fact sheets/detail/diarrhoeal-disease). This disease can also be prevented through access to safe drinking water and personal and food hygiene.

Bacillary dysentery is and intestinal infection caused by a group of *Shigella* spp. And mode of transmission is oral and fecal rout. It also prevented by maintaining good personal and food hygiene.

From the metrological studies it was observed that the average rain fall and temperature between 30 ºC -40 ºC is shown in every year from April to October month. After careful interpretation it was concluded that bacterial diseases (Enteric fever, Bacillary dysentery and Acute Diarrhoeal disease) and increases during the same period of months i.e. April to October. So, it is clearly said that the causative organisms are preferred the environmental conditions of these months. From literature search it is showed that enteric fever causing *Salmonella typhae* favors the temperature of 35 -37 ºC (Kroupitski et al., 2019). Disease bacillary dysentery caused by a group of enteric organisms like *Shigella* spp, *Salmonella* spp, *Campylobacter* spp and *Escherichia coli* (E. coli) prefers to grow in a temperature between 35 -37 ºC (Nicolas et al., 2007). So, it is concluded that the environment has a high impact in disease incident.

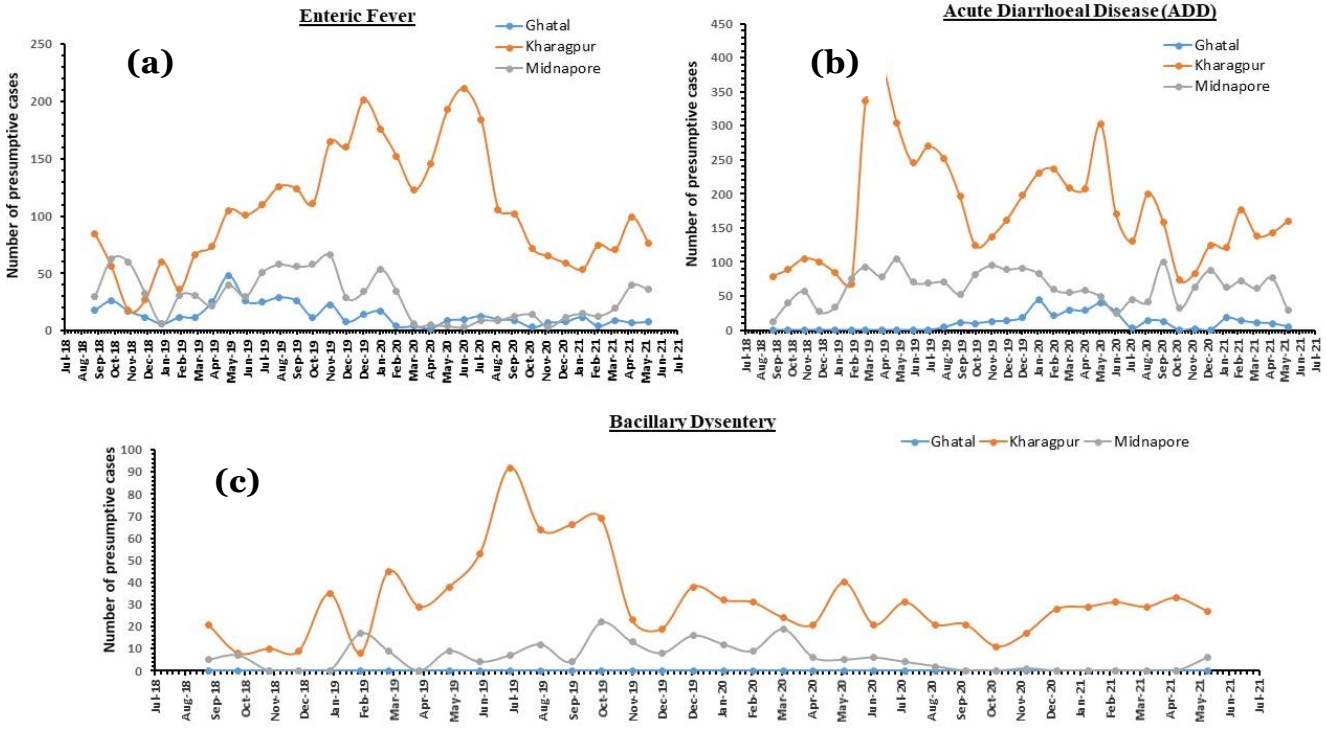

Figure 2 Trends of different bacterial diseases from September 2018 to June 2021 in Ghatal, Kharagpur and Midnapore Municipality area. (a) trends of presumptive Enteric fever cases (b) trends of presumptive Acute diarrheal disease cases (c) trends of presumptive

Table 2: - Metrological Data of studied period of Paschim Medinipur district

Year	Month	Paschim Medinipur District, W.B., India						
		Temperature °C			Rainfall		Wind Flow (KMH)	Wind pressure (mb)
		Max	Ave	Min	mm	inch		
2018	September	34	30.53	28	43.8	1.72	25	43.8
	October	33	29.59	24	88.4	3.48	12	88.4
	November	31	28.83	27	4.1	0.16	9	4.1
	December	21	17.4	14	25.1	0.99	15	25.1
2019	January	22	18.61	16	0.3	0.01	13	0.3
	February	26	21.61	18	5.8	0.23	19	5.8
	March	36	31.58	24	13.2	0.52	18	13.2
	April	39	35.43	32	37.8	1.49	27	37.8
	May	42	36.94	30	50.9	2	29	50.9
	June	41	35.77	32	33.9	1.33	29	33.9
	July	35	32.97	30	37	1.46	23	37
	August	34	31.1	27	37.5	1.48	25	37.5
	September	32	29.5	24	68.8	2.71	17	68.8
	October	31	28.19	21	160.2	6.31	18	160.2
	November	30	27.97	23	65.4	2.57	28	65.4
	December	23	18.81	13	2.1	0.08	12	2.1
2020	January	22	18.55	16	7.8	0.31	14	7.8
	February	23	20.1	16	5	0.2	12	5
	March	30	24.9	18	8.9	0.35	16	8.9
	April	39	34.17	29	33.8	1.33	24	33.8
	May	38	33.45	24	177	6.97	53	177
	June	37	33.63	31	23.1	0.91	25	23.1
	July	35	32	28	26.9	1.06	23	26.9
	August	35	31.35	28	32.9	1.3	20	32.9
	September	32	30.6	28	26.7	1.05	18	26.7
	October	31	28.8	25	27.8	1.09	19	27.8
	November	29	26.9	24	0	0	12	0
	December	22	19.26	15	0	0	13	0
2021	January	22.24	20.18	14	0	0	13	0
	February	24.8	21.23	16	0	0	16	0
	March	36	32	26	18.1	0.713	27	18.1
	April	40.8	37.4	35	12.6	0.5	25	12.6
	May	41.2	35	29.9	65.8	2.59	36	65.8
	June	43	38	31	0.95	0.037	29	0.95

In the three cases the same disease trends were observed and it is endemic through out the year in three municipality areas (Fig 2 a, b & c). This type of trends was due to the lack of health and food hygiene and consumption of contaminated drinking water supply in municipality areas. The human sanitization systems in the municipality areas a big problem particularly in slam areas that influence this type of bacterial infections. Other reasons of this endemic in nature of these three acute bacterial infections in the municipality areas may be due the incomplete consumption of antibiotic courses. In this situation, NUHM create a protective shade over the municipality areas and marge different health promoting programmes of Govt. of India including Intensified Diarrhoea Control Fortnight (IDCF) in every year in the month of July. It is very much promising and helpful to generate health and food hygiene among slam dealers and supply of safe drinking water through municipality water systems, it is assuming that the case load of such bacterial infection may reduce in near future.

4. ***Viral Diseases*: -** IDSP surveillance four types of viral illness (Measles, Viral Hepatitis, Acute Respiratory illness and influenza like illness- ARI & ILI) in urban arears in West Bengal and as well as Paschim Medinipur district. After carefully analysis of the disease trends, it was observed that Measles appears in acyclic manner from October and reported maximum presumptive cases in the month of January in every year and the same disease picture is noticed in all three municipality areas. But the reported presumptive cases of Measles were reduced from 2019 to 2020 (Fig. 3a). This trend due to the awareness generation on personal health hygiene and different protective measures like hand washing and sanitization among slam dwellers those are reside in a congested and unhygienic areas in close proximity is highly influence to spreads this viruses through Sneezing and remain infective for upto two hours in airspace or nearby surfaces (Ref:- "*Pinkbook Measles Epidemiology of Vaccine Preventable Diseases*". *Centers for Disease Control and Prevention (CDC). 15 November 2016.)* through Mahila Arogya Samiti (MAS) Group guided by Honorary Health Workers (HHW) of this municipalities under NUHM programme.

   Acute Respiratory illness and influenza like illness (ARI & ILI) both are caused by the influenza virus and SARS virus. This disease trends in these cases were following as endemic in nature and presumptive cases were reported throughout the whole year and there is no such significant pick was observed on epidemic curve. But maximum cases were reported from the month of July 2019 to October 2019, December 2020 to March 2020 and January 2021 to April 2021 in a zic-zac manner in all municipality area (Fig. 3b)). But the reported cases were reduced from 2020 to 2021 in all municipalities and it is very promising approach to generate awareness among general people through CoVID management. The proper awareness of mask and hand washing with sanitization/shop during this period and overall lockdown through out country gives the fruitful results.

   Other acute communicable diseases like Mums, Pox, Tuberculosis etc were also observed that the trends were endemic in nature and mostly presumptive cases are reported throughout the year in all three municipality areas in typical wavelike manner but the case load reduced gradually from 2019 to 2021 (Fig. 3 d). This type of trends may due to the natural changes of Virus through mutations. These gradually decreasing trends indicate the awareness generation among common people and maintaining the CoVID appropriate behaviors.

In case of viral hepatitis, the disease trends were significantly different from ARI/ILI and it was cyclic in nature throughout the year in all municipality areas. The presumptive cases of viral hepatitis were reported from August to January in every year in maximum in all municipal areas. But interestingly it was observed that the case load is diseased from 2019 to 2020 (Fig. 3 c). This is due to the supply of safe drinking water and awareness on good food habit among common people through HHWs and First Tire Supervisors (FTS) of municipalities on different health programmes under NUHM platform.

3.2. Annual incidences of diseases: - The annual incidences of IDSP notified diseases in urban areas are shown in table 1. ARI & ILI is the mostly reported presumptive cases followed by ADD and Enteric fever in the all three municipality arear of Paschim Medinipur district. ARI & ILI is the most infectious disease reported in Ghatal, Kharagpur and Midnapore Municipality areas with a rate of infection transmission of 1.30 %, 3.10 % and 1.25 % respectively.

The overall disease burden of all IDSP notified disease were reduced due to the implementation and establishment of Urban-Primary Health centers (U-PHC) in municipality areas working under NUHM programme funded by the Govt. of India guided by Dept. of Health & Family Welfare, Govt. of West Bengal.

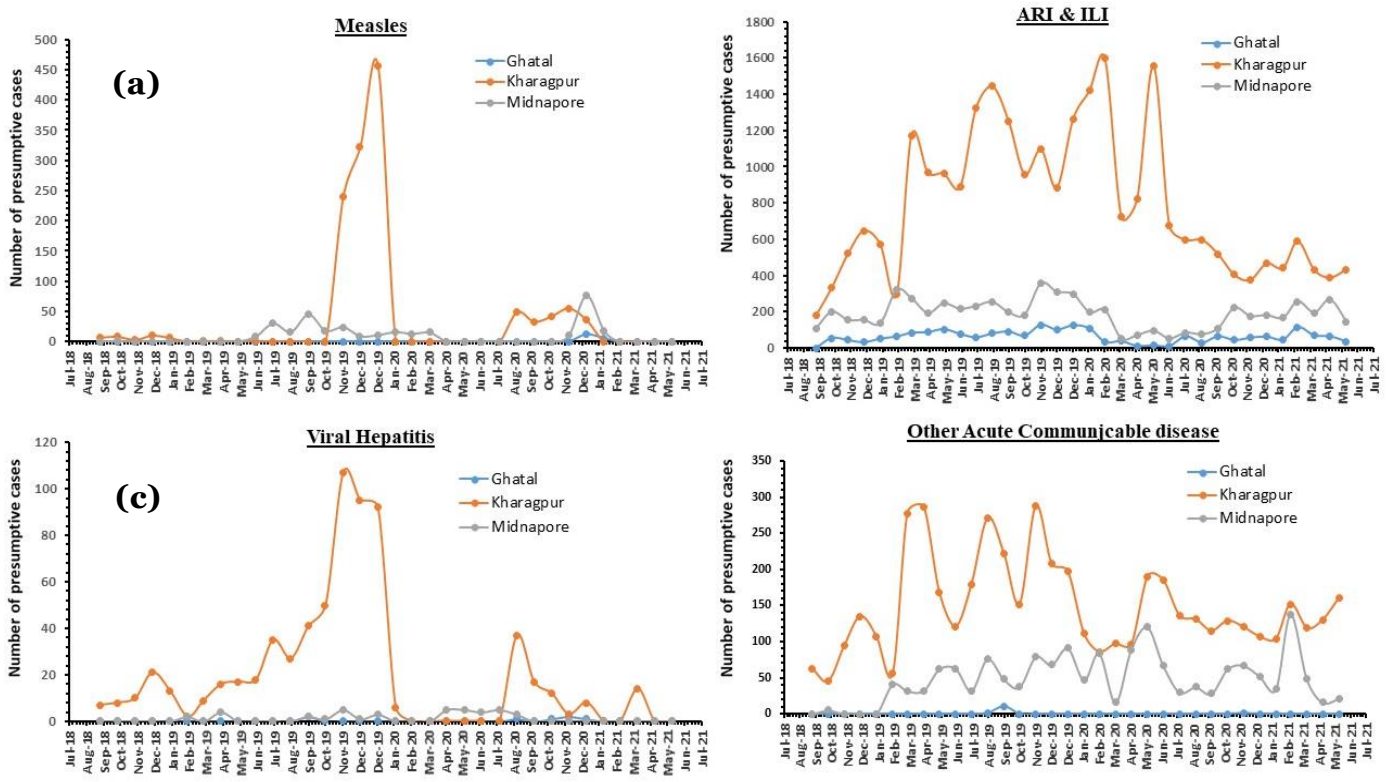

Figure 3 Trends of different viral diseases from September 2018 to June 2021 in Ghatal, Kharagpur and Midnapore Municipality area. (a) trends of presumptive Measles cases (b) trends of presumptive Acute Respiratory illness and influenza like illness- ARI & ILI c

4. CONCLUSION

ARI-ILI and ADD are the most reported cases in the three municipality areas. So, the district and municipality should implement such programme to increase health hygiene and improvement the potable quality of drinking water through monitoring the bacterial load in supplied drinking water in routine manner. In this condition, municipality or district level should incorporate Public Health Engineering (PHC) Dept. and build up a consignment for this routine cheeking of the water samples collected from different wards of municipality areas. Though health is a state subject and State Health Dept as well as State NUHM authority should give appropriate strategies and local policies can be prepared to improve the disease surveillance in municipality areas and overcome the disease burden.

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CONFLICT OF INTEREST

Authors are declared that there is no Conflict of interest.

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