Relation Between Public Health Hazards and Nutritional Status of Primary School Children in Bankura District, West Bengal

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Abstract: Public health is the science of preventing disease, prolonging life and promoting health through organized efforts and informed decisions by society, organizations, public and private communities and populations. Endemic fluorosis is a threat to public health in various areas of Bankura W.B. The purpose of this study was to discover malarial condition as a communicable disease and the status of fluorosis as a non-communicable disease in the Bankura, where school children regularly drank more than 1 ppm of fluoride. This study was done also to link economic conditions, nutritional status and susceptibility of children towards the diseases with an integral impact of public health epidemiology.

Key words: Malaria,Malnutrition, epidemiology,Bankura.

Introduction

Public health is very important to prevent the diseases with prolonging individual's life and promote the human health without health complications [1]. Public health surveillance is the continuous, systematic collection, analysis and interpretation of health-related data needed for the planning, implementation, and evaluation of public health practice [2]. The basic demand is to provide organize health services with modern public health and epidemiological concept grew as part of the development of community life, and in particular, urbanization. Religious and societal beliefs influenced approaches to explaining and attempting to control the communicable disease by sanitation, town planning, and provision of medical care and non-communicable disease with public awareness to early adaptation of preventive measures. [3] Where religious and social systems repressed scientific investigation and spread of knowledge, they were capable of inhibiting development of public health many times . Nutrition is common relatives to provoke the disease conditions in communities [4].

Figure 1: Components of Public Health

Literature Review

Malaria, at one time a rural disease, diversified under the pressure of developments into various ecotypes. These ecotypes have been identified as forest malaria, urban malaria, rural malaria, industrial malaria, border malaria and migration malaria; the latter cutting across boundaries of various epidemiological types. Further, malaria in the 1990s has returned with new features not witnessed during the pre-eradication days. These are the vector resistance to insecticide pronounced exophilic vector behaviour; extensive vector breeding grounds created principally by the water resource development projects, urbanization and industrialization; change in parasite formula in favour of *P. falciparum*; resistance in *P. falciparum* to chloroquine and other anti-malarial drugs; and human resistance to chemical control of vectors [4].

According to the Report 2014**, 22%** of Bankura's population live in high transmission (> 1 case per 1000 population) areas, 67% live in low transmission (0–1 cases per 1000 population) areas and 11% (137.7m) live in malaria-free (0 cases) areas [5]. At present, official figures for malaria in Bankura is available at NVBDCP website indicated that 0.7–1.6 cases of total population confirmed cases and 9-12 deaths annually[6].

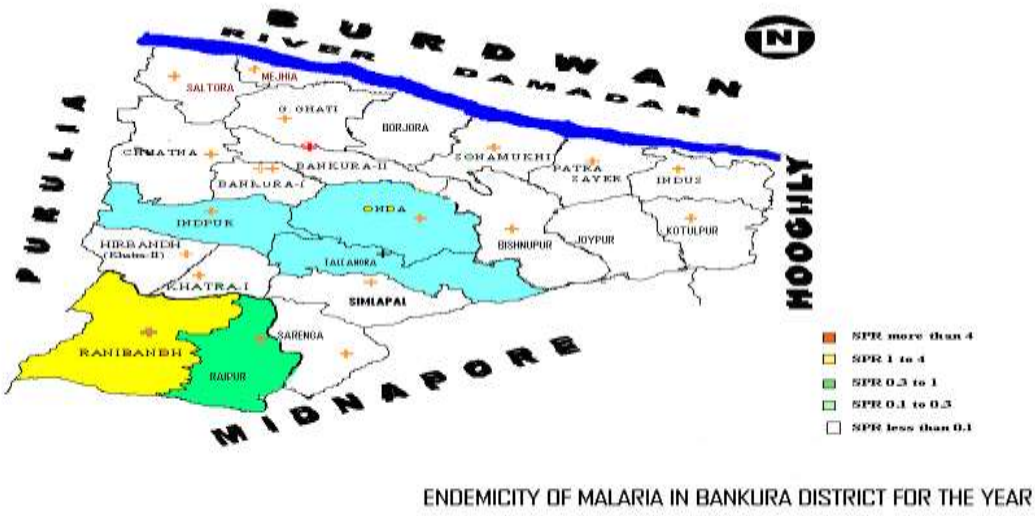


Figure2: Malaria endemicity in Bankura district 2017

MATERIALS AND METHOD

Bankura is located in the western part of the State of West Bengal. The District Bankura is bounded by latitude 22038' N and longitude 86036' E to 87047' E. The Damodar flows along the northern boundary of the district. The district is bounded by Bardhaman in the north, Purulia in the west and PaschimMedinapure in the south. The total area of Bankura is 106882 Sq. Kms. As per the latest Census data (2011), thepopulation of the district is 113,596,674. It is the 3rd least populated district in West Bengal (After Alipurduar and Purulia, with Population Density of 523 persons / Sq. Kms. The district has 22 Panchayet Samitis12, with 190 Gram Panchayats13, consisting of 3823 Villages and 6638 habitations. The total number of urban centers is 12, of which 3 are Municipalities (Bankura, Bishnupur and Sonamukhi), and the remaining 9 are 14Census towns, (Khatra, Ledisol, JhantiPahari, Kotulpur,Simlapal, Raipur Bazar,Ghutgarya, Barjora and Beliatore).Data from outsourcing on malaria were collected and analysis for compact outcome with epidemiological study.

Cross sectional survey for fluorosis endemic areas were under taken in samlapal block of Bankuradistrict, W.B. in sept, 2017. The survey covered 442 primary school children from class 3 to 5 standard aged 8 yrs to 10 yrs both boys and girls randomly .The prevalence of dental fluorosis was assessed by clinical examination with Dean (H.T. Dean) index and spot urine and water sample were collected in polyethylene fluoride non-reactive plastic pot. (100 ml container – Screw cap) and tested within 24-48 hrs by ION-METER using fluoride electrode methods.

Data analysis and comparison.

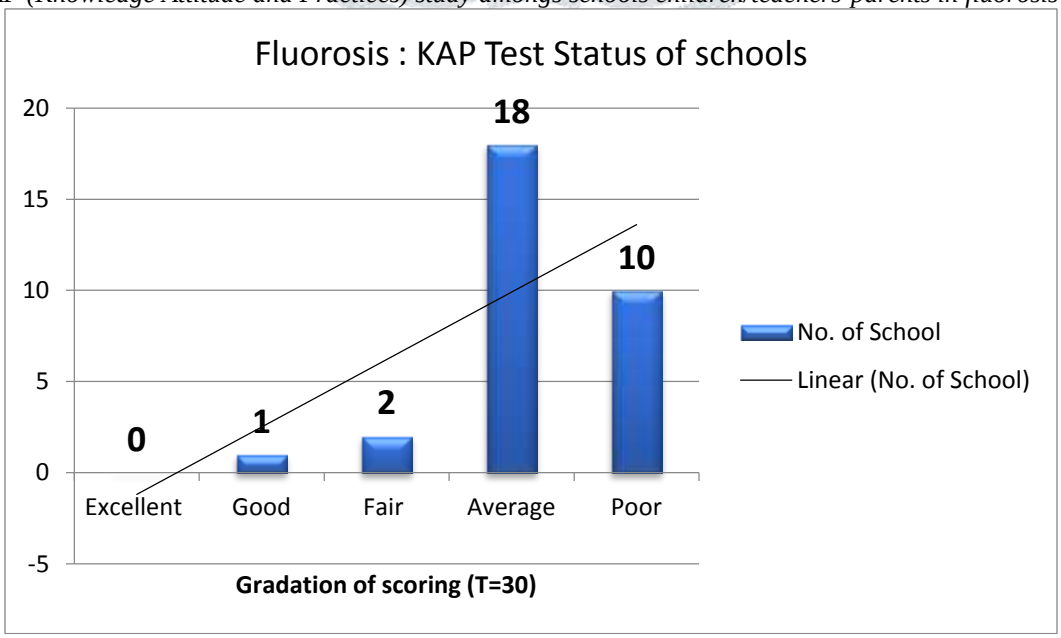
Data collection as per plan will be made in the specific format at the field level .This data will be then entered into Microsoft excel, 2010 for analysis. Graphical interpretation also be included as a part of data analysis and understanding of epidemiology of disease pattern.

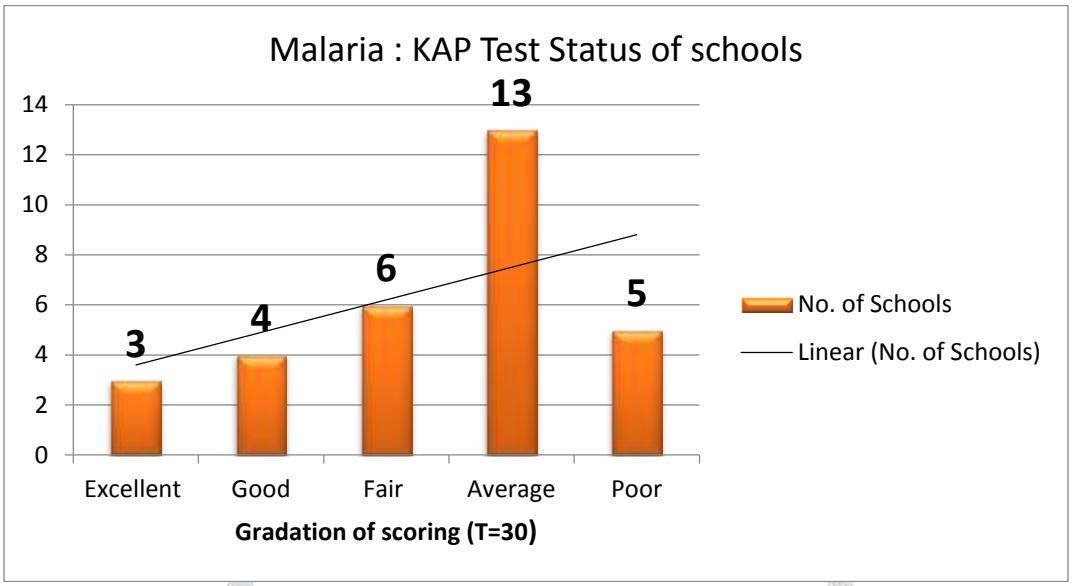
Statistical Analysis Plan:

Analysis of variance by 't' test will be used for statistical analysis of the collected data. Difference will be considered significant when $p<0.01$.

RESULT AND DISCUSSION

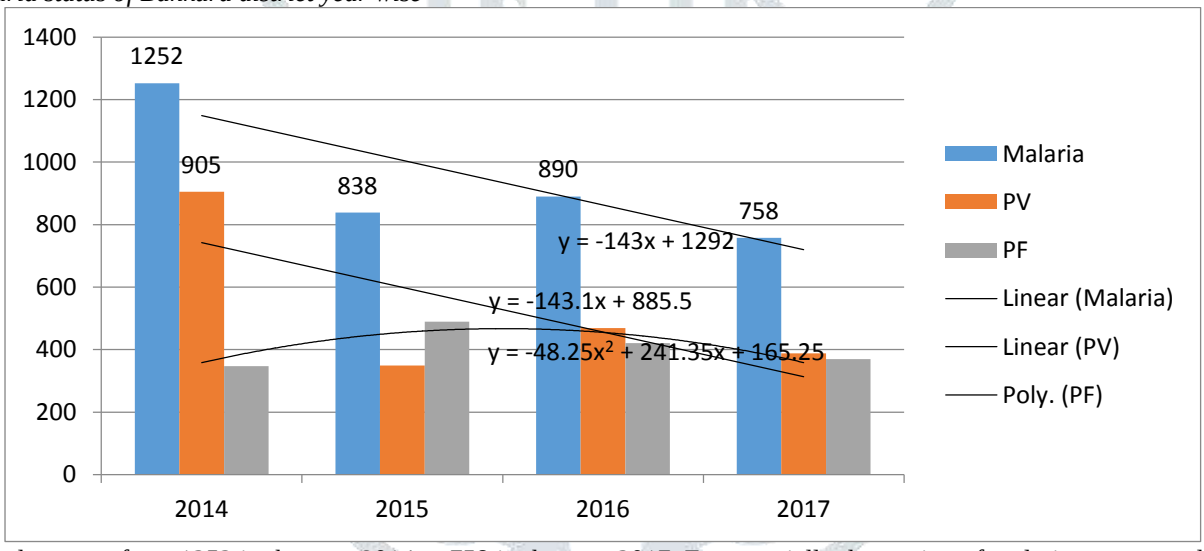
Graph 1-2: Tally of KAP (Knowledge Attitude and Practices) study amongs schools children/teachers-parents in fluorosis and malaria





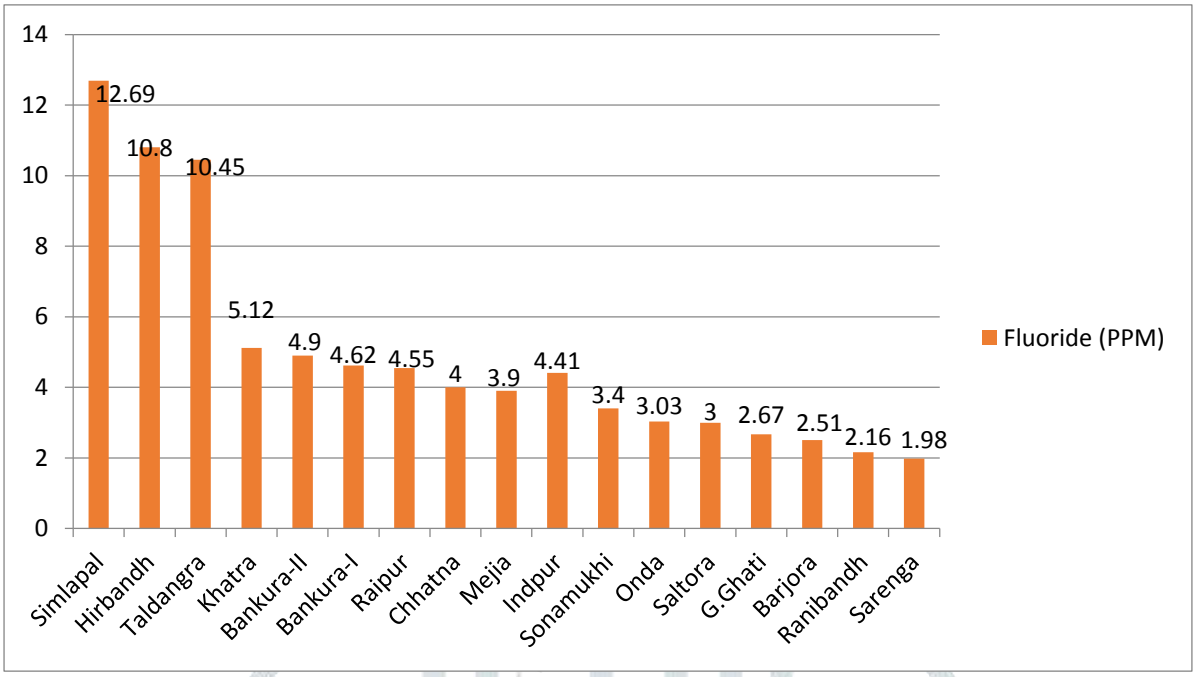
Average knowledge on fluorosis and malaria were observed in school children.

Graph 3 : Malaria status of Bankura district year wise



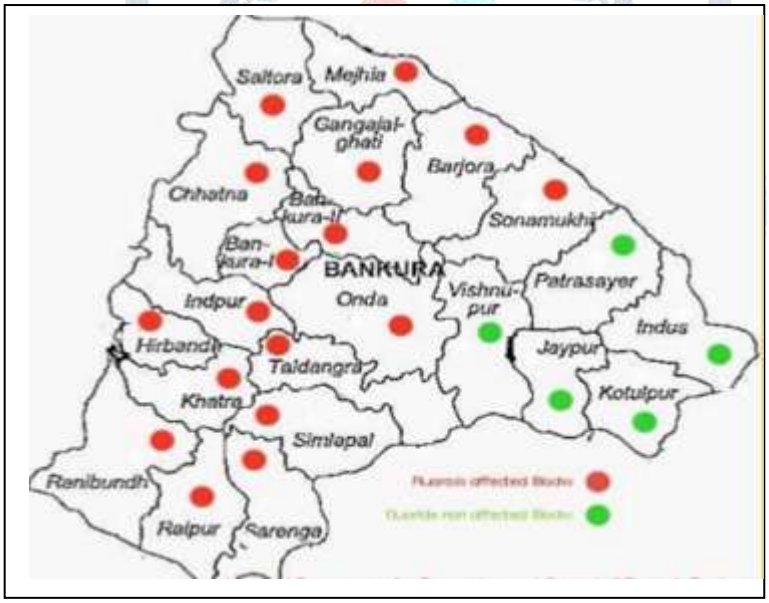
Cases of malaria decreases from 1252 in the year 2014 to 758 in the year 2017. Exponentially decreasing of malaria cases noted here by plotting linier line. PV cases were also noted as decreasing from 905 in the year 2014 to 785 in the year 2017. But PF cases which usually called mortal malaria increasing without exponential patterned in the districtBankura.

Graph 4 : Graphical representation of Maximum fluoride levelin PPM of different Blocks of Bankuradistrict



High underground fluoride level was found in the simlapal block. 17blocks were contaminated in the district bankura. Fluoride level in underground drinking water (Tube well/ digging well / deep tube well /boring well) were very high more than 1 PPM – 1.5 PPM (Standarization of water fluoride contamination by BIS and WHO -2009) cause fluorosis .

Fig 1 : GIS Mapping of Bankura District fluoride affected blocks

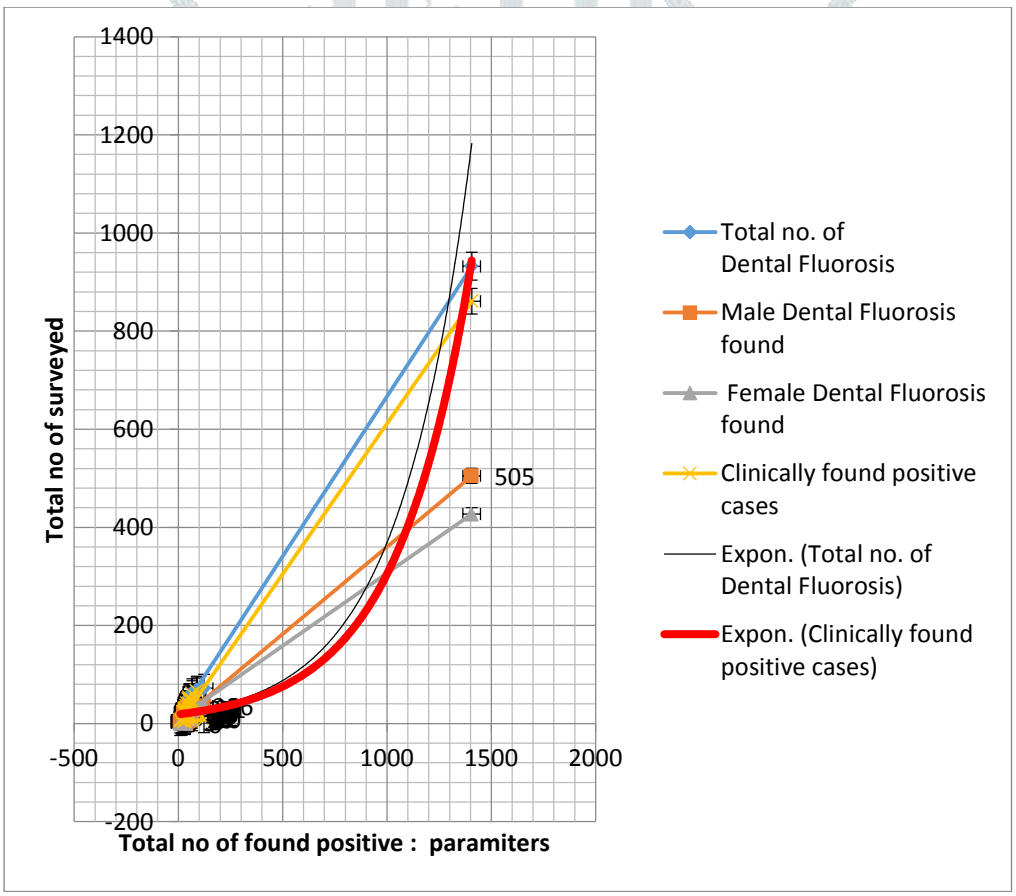


17 blocks out of total 22 blocks in the bankura district has found as fluoride endemic area. Greens rounds indicates the non-fluoride affected blocks where as red rounds indicating the fluoridated blocks.

Fig 2 : Status of fluoridated villages –habitations of Bankura District fluoride affected blocks

Sl. No.	Name of Blocks	Number of Samples Tested	Fluoride Concentration				Affected Habitation with Fluoride Concentration	
			> 1.5(mg/l)		1.0 - 1.5(mg/l)		> 1.5(mg/l)	1.0 - 1.5(mg/l)
			Nos	%	Nos	%		
1	Bankura I	1854	2	0.11%	29	1.56%	2	18
2	Bankura II	2657	25	0.94%	95	3.58%	19	53
3	Barjora	2751	18	0.65%	35	1.27%	13	20
4	Bishnupur	2368	0	0.00%	3	0.13%	0	3
5	Chhatna	5250	67	1.28%	198	3.77%	47	137
6	Ganjagalghati	5007	26	0.52%	259	5.17%	20	107
7	Hirabandh	1684	10	0.59%	53	3.15%	10	41
8	Indpur	2651	7	0.26%	36	1.36%	7	27
9	Indus	2077	2	0.10%	2	0.10%	2	2
10	Jaypur	2054	0	0.00%	0	0.00%	0	0
11	Khatra	1842	6	0.33%	4	0.22%	5	4
12	Kotulpur	1737	0	0.00%	2	0.12%	0	2
13	Mejia	867	4	0.46%	61	7.04%	4	23
14	Onda	3378	1	0.03%	1	0.03%	1	1
15	Patrasayer	1704	0	0.00%	0	0.00%	0	0
16	Raipur	2462	11	0.45%	29	1.18%	5	22
17	Ranibundh	2104	0	0.00%	6	0.29%	0	5
18	Saltora	1969	43	2.18%	131	6.65%	31	59
19	Sarenga	1425	2	0.14%	0	0.00%	2	0
20	Simlipal	2149	167	7.77%	68	3.16%	95	57
21	Sonamukhi	1704	1	0.06%	0	0.00%	1	0
22	Taldangra	3140	21	0.67%	33	1.05%	12	19
	TOTAL	52834	413	0.78%	1046	1.98%	276	600

Graph 5: Comparative study of factors : Total no of surveyed , Screening suspected dental fluorosis , male child dental fluorosis, female child dental fluorosis with clinically positive cases found in Bankura district



Clinically found positive cases of fluorosis cases is going high day by day. More than 600 cases found during survey .

Fig 3: Study of the economic status of the specific community people by using the Modified Kuppaswami scale ,2016

Sl NO		N=1406 (Total)	Upper class 26-29	%	Upper middle class 16-25	%	Lower middle class 11-15	%	Upper lower class 5-10	%	Lower class <5	%
1	Jagadalla Pr. School	25	0	0	0	0.00	6	24.00	7	28.00	12	48.00
2	Patakola Pr. School	52	0	0	0	0.00	11	21.15	12	23.08	29	55.77
3	Bikna JRB School	15	0	0	1	6.67	0	0.00	3	20.00	11	73.33
4	Mithila Pr. School	9	0	0	0	0.00	0	0.00	3	33.33	6	66.67
5	Bhangaharia Sisu Sikhya Kendra	32	0	0	0	0.00	2	6.25	15	46.88	15	46.88
6	Shamdaspur BJ Pr. School	88	0	0	1	1.14	8	9.09	18	20.45	61	69.32
7	Kamladanga Pr. Schhol	54	0	0	0	0.00	2	3.70	20	37.04	32	59.26
8	Panja New Pr. School	23	0	0	0	0.00	2	8.70	4	17.39	17	73.91
9	Kulmura Pr. School	55	0	0	0	0.00	0	0.00	26	47.27	29	52.73
10	Kamladanga Pr. Schhol	42	0	0	0	0.00	0	0.00	5	11.90	37	88.10
11	Ekteswar Pr. School	51	0	0	0	0.00	0	0.00	20	39.22	31	60.78
12	Arrha Boys. Pr. School	35	0	0	0	0.00	0	0.00	21	60.00	14	40.00
13	Sukhanibas Board Pr. School	50	0	0	0	0.00	0	0.00	21	42.00	29	58.00
14	Laxmisol Pr. School	29	0	0	0	0.00	0	0.00	9	31.03	20	68.97
15	Dumuria JR high School	64	0	0	0	0.00	2	3.13	25	39.06	37	57.81
16	Deuli JB Pr. School	51	0	0	0	0.00	1	1.96	19	37.25	31	60.78
17	G.Ghati Boys Pr. School	31	0	0	0	0.00	0	0.00	7	22.58	24	77.42
18	G.Ghati Girls Pr. School	37	0	0	0	0.00	2	5.41	6	16.22	29	78.38
19	Amdanga Sisu Siksya Kendra	47	0	0	0	0.00	3	6.38	12	25.53	32	68.09
20	Nandanpur Pr. School	30	0	0	0	0.00	0	0.00	4	13.33	26	86.67
21	Daradubrajpur Pr. School	60	0	0	0	0.00	0	0.00	11	18.33	49	81.67
22	Jphala Sishu siksya Kendra	39	0	0	0	0.00	0	0.00	7	17.95	32	82.05
23	Simlapal Jr Pr. School	66	0	0	0	0.00	0	0.00	19	28.79	47	71.21
24	Laxmisagar Attach Pr. School	66	0	0	0	0.00	0	0.00	20	30.30	46	69.70
25	Laxmisagar No-2 Pr. School	53	0	0	0	0.00	1	1.89	11	20.75	41	77.36
26	Kendberia Pr. School	31	0	0	0	0.00	0	0.00	3	9.68	28	90.32
27	Laxmisagar Loharpara Pr. School	52	0	0	0	0.00	0	0.00	14	26.92	38	73.08
28	Natungarh Pr. School	29	0	0	0	0.00	0	0.00	10	34.48	19	65.52
29	Laldihi Pr. School	18	0	0	0	0.00	0	0.00	4	22.22	14	77.78
30	Namopara Pr. School	123	0	0	1	0.81	4	3.25	9	7.32	109	88.62
31	Jamda Pr. School	49	0	0	0	0.00	0	0.00	11	22.45	38	77.55
	Total	1406	0	0	3	8.62	44	3.13	376	26.74	983	69.91

Percentage of lower cast low grade economically poor families provide the fluorosis cases . 69% of families were poor found during survey.

Fig-4 : Nutritional status of the Children in different schools according to Gomez's classification

School	Total Students	Normal	%	Grade I	%	Grade II	%	Grade III	%
1	25	18	72.00	6	24.00	1	4.00	0	0.00
2	52	18	34.62	6	11.54	1	1.92	0	0.00
3	15	18	120.00	6	40.00	1	6.67	0	0.00
4	9	18	200.00	6	66.67	1	11.11	0	0.00
5	32	18	56.25	6	18.75	1	3.13	0	0.00
6	88	18	20.45	6	6.82	1	1.14	0	0.00
7	54	18	33.33	6	11.11	1	1.85	0	0.00
8	23	18	78.26	6	26.09	1	4.35	0	0.00
9	55	18	32.73	6	10.91	1	1.82	0	0.00
10	42	18	42.86	6	14.29	1	2.38	0	0.00
11	51	18	35.29	6	11.76	1	1.96	0	0.00
12	35	18	51.43	6	17.14	1	2.86	0	0.00
13	50	18	36.00	6	12.00	1	2.00	0	0.00

14	29	18	62.07	6	20.69	1	3.45	0	0.00
15	64	18	28.13	6	9.38	1	1.56	0	0.00
16	51	18	35.29	6	11.76	1	1.96	0	0.00
17	31	18	58.06	6	19.35	1	3.23	0	0.00
18	37	18	48.65	6	16.22	1	2.70	0	0.00
19	47	18	38.30	6	12.77	1	2.13	0	0.00
20	30	18	60.00	6	20.00	1	3.33	0	0.00
21	60	18	30.00	6	10.00	1	1.67	0	0.00
22	39	18	46.15	6	15.38	1	2.56	0	0.00
23	66	18	27.27	6	9.09	1	1.52	0	0.00
24	66	18	27.27	6	9.09	1	1.52	0	0.00
25	53	18	33.96	6	11.32	1	1.89	0	0.00
26	31	18	58.06	6	19.35	1	3.23	0	0.00
27	52	18	34.62	6	11.54	1	1.92	0	0.00
28	29	18	62.07	6	20.69	1	3.45	0	0.00
29	18	18	100.00	6	33.33	1	5.56	0	0.00
30	123	18	14.63	6	4.88	1	0.81	0	0.00
31	49	18	36.73	6	12.24	1	2.04	0	0.00
Total	**1406**	**558**	**39.69**	**186**	**13.23**	**31**	**2.20**	**0**	**0.00**

Grade 1 malnutrition in school students were found more.

Discussion

Malnutrition was found as a influencer to promote the hazards common in public health. 13.23% school students were grade 1 malnourished. Almost 50% of populations were unaware about the prevention methods to control the malaria & fluorosis diseases. Low socio economics conditioned cases basically were more susceptible to the disease fluorosis. Proper sanitations and well health habits were not found in school children. Children with low Calcium intake reflected as fluorosis cases where as low grade of knowledge , attitude to practices to protect malarial infection were found in same area. This study was clearly indicated that increasing KAP and proper nutritional habits with adequate in taking of Calcium , irons antioxidants helps to prevent the diseases.

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