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RESEARCH ARTICLE

EFFECT OF 'CYCLONE PHAILIN' ON PEDIATRIC AGE GROUP OF SOUTH ODISHA

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ABSTRACT

Background : Tropical cyclones are the worst enemy of the state (Geographic situation, dense population in coastal belt along with poor housing is major causes of increased mortality and morbidity due to these cyclones). Out of these cyclones 'super cyclone 1999' and 'phailin 2013' had deadliest and most devastating effect on coastal odisha. The objectives of this study was to observe, record, compare and enumerate the effect of 'cyclone phailin' on the pediatric group age of south odisha where it had maximum impact.

Methods: A retrospective study was undertaken using data on the impact of cyclones that was compiled from previous hospital admission records. Two groups were made according to admission rates one month before phailin (n=624) and after phailin (n=636) in the department of paediatrics, MKCG Medical College, Berhampur. The statistical analysis was done using SPSS software.

Conclusions: The incidence of infections, poisonings is much increased in the post phailin period. Infections like malaria and acute gastroenteritis are seen in high number, but the incidence of pneumonia was low. There was significantly high number of cases with kerosene poisoning along with emergence of carbon monoxide poisoning. There was increased mortality due to sepsis.

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INTRODUCTION

A tropical cyclone usually originates over tropical or sub-tropical waters and rotates clockwise in the southern hemisphere and counter-clockwise in the northern hemisphere^{1,2}. Indian sub-continent is the worst affected region of the world, having a coast line of 7516 kms, exposed to nearly 10% of the world's Tropical Cyclones^{3,4}. In interval of every 15-20 yrs there is a huge cyclone, destroying east coast. A very Severe Cyclonic Storm (VSCS) 'PHAILIN' hit coast of odisha near Gopalpur (Berhampur, odisha) around 22:30 hrs IST of 12th October 2013 with a sustained maximum surface wind speed of 200-210 kmph gusting to 220 kmph^{5,6}. The cyclone was followed by heavy torrential rain and a flood in whole state with heavy damage to involved place. The point of primary impact was Gopalpur (adjacent to berhampur, Ganjam district) and maximum damage was seen in this area. There is a dearth of studies on the health effects of cyclone on childhood population. Our institute MKCG Medical College and Hospital is the apex tertiary care and referral centre of this area. This prompted us to undertake a retrospective study to compare the morbidity and mortality pattern in children from area affected with phailin.

METHODS

The study was conducted in department of paediatrics of MKCG Medical College and Hospital. All the admitted patients in department of paediatrics from 12.10.2013 to 10.11.2013 (post phailin) were taken in study group. A control cluster was formed taking account of admitted patients from 12.9.2013 to 11.10.2013 (pre phailin). The entire patient's data were collected from the case sheets obtained from records

section. The two groups were categorised under broad headings of systemic diseases.

RESULTS

The study group (post phailin) consisted of 636 children, 1-14 years of age admitted from 12.10.2013 to 10.11.2013. The control group (pre phailin), consists of all the admitted children from 12.9.2013 to 11.10.2013 (30 days before phailin). The study population and control population were divided into several subgroups according to clinical presentation. The number of patients admitted to post phailin and pre phailin group are tabulated in table 1. The number of deaths in each group depicted in same table with brackets.

In the post phailin month the children coming for blood transfusion for various haematological conditions continued to be the highest number of admissions. There was an insignificant increase in the number of admissions due to various infective disorders. The cases due to pneumonia are significantly lower in the post phailin group.

The number of cases admitted for poisoning were significantly higher in post phailin group, and there was an emergence of cases due to carbon monoxide poisoning (n=11). All the cases of carbon monoxide poisoning were from affluent families who were using generator (genset) for electricity. The children lost 4 adults (parents) due to such poisoning. Five children of this group were living in a hostel, and were sleeping using generator, however all of them survived. The infectious disease accounted for highest mortality. The statistical analysis between the groups was done using Fishers exact test using SPSS software. P value less than 0.05 was considered significant.

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DISCUSSIONS

Few studies in the past showed the impact of natural disaster increased child mortality^{7,8}. Only one study has examined the impact of several different natural disasters of varying types on child health using data from Guatemala⁹. The study found that most disasters had negative and often large effects on children’s long-term health; each disaster occurrence reduced children’s height for age by 0.1-0.2 SD⁹. Another Indian study is available about the impact of natural disasters on children health and investments in rural India¹⁰. It states about both the long term and immediate effect of natural disaster on children. There are very small number isolated studies available on post cyclone diseases in paediatric age group. In our study we tried to analyse the change of hospital admission patterns in the region where PHAILIN 13 (VSCS Cyclone) had its maximum destruction. Cyclones can affect child’s health in three main ways. The first is a direct effect on children’s morbidity and mortality (e.g., drowning, acute gastroenteritis and family disruption). The second effect is through the disaster’s impact on the supply of health care by destroying, damaging, or straining health infrastructure. The third effect is through the disaster’s impact on the demand for health inputs, mainly through loss of income as well as increased expenditures needed to cope with a disaster. Most of the hazards are traumatic¹¹. Along with that other infective diseases are also in high incidence¹². The top three cyclone-related injuries are lacerations, blunt trauma, and puncture wounds, with 80 per cent of these injuries being confined to the feet and lower limbs⁴. The other immediate effects (non traumatic effects) like infections, snake bites, scorpion stings, poisonings and all other condition which needs hospitalisation were taken in account in our study. In our analysis we got many differences which were seen newly after phailin. In both the study groups the number of admissions due to haematological diseases is high. This area of India is highly populated with tribes having sickle cell trait. Thalassemia is not uncommon here. In our institute there is a blood transfusion unit for these haemolytic anaemia patients. Due to well preparedness and good management of the post cyclone transport system all these patients could come for blood transfusion¹³. Natural hazards like phailin directly and indirectly cause several infections to paediatric age groups^{6, 14, 15}. Our study population had high incidence of infections (42.1% of total admissions) with comparison to the control group (35.4% of total admissions). Out of all the infections acute gastroenteritis and malaria had high incidence, which was similar with all previous studies of natural disaster^{16, 17}. Unhygienic conditions and contamination of drinking water can be the sole cause of upsurge of infections at that time. There was also rise in septicaemia which was not statistically significant. The number of deaths due to septicaemia was higher in the post phailin group (5/25 vs 1/25). This could be due to breach in hygiene, maintenance and delayed health seeking in light of other priorities. In the post phailin group, the numbers of admissions due to respiratory conditions were significantly less in contrast to studies from other natural disasters which could be due to management of such illness in the ground level or climatic milieu change, that might have affected the incidence of respiratory tract infections^{16, 17, 18}. There was also a mild increase in incidence of measles and enteric fever incidence which could have been due to breach in process of vaccination. There was no significant rise in non infective diseases of CNS,

Table: 1 Morbidity and mortality among patients in post phailin and pre phailin group

Disease	Group-1 (n=636)	Group-2 (n=624)	'p' value
Hematological diseases	229(36.0%)	236(37.8%)	0.6644
<i>Thalassemia</i>	163	165	0.9425
<i>Sickle cell anemia</i>	60	60	0.9186
<i>Others</i>	6	11	0.3262
Infective disease	287(45.1%)	250(40.06%)	0.2570
<i>Malaria</i>	52(2-d)	46 (2-d)	0.8242
<i>Pneumonia</i>	27(2-d)	43(3-d)	0.0146
<i>Acute gastroenteritis</i>	78(1-d)	32(2-d)	0.0019
<i>P u o</i>	20	22	0.4209
<i>Sepsis</i>	25(5-d)	14(1-d)	0.3160
<i>Viral fever</i>	12	12	0.8353
<i>Meningitis</i>	13(2-d)	12	1.0000
<i>Tuberculosis</i>	6	10	0.3094
<i>Bronchiolitis</i>	8	8	0.8048
<i>Enteric fever</i>	9	5	0.5890
<i>Measles</i>	6	1	0.1304
<i>Dengue</i>	3	6	0.3170
<i>Wheezy lrti</i>	16	28	0.0403
<i>Pleural effusion</i>	2	1	1.0000
<i>Others</i>	10	10	0.8218
Central nervous system(neuroinfection excluded)	42(6.6%)	51(8.1%)	0.3353
<i>Seizure disorder</i>	19	31	0.4794
<i>Febrile seizure</i>	19	17	0.5557
<i>G b s</i>	2	1	0.5917
<i>Others</i>	2	2	1.0000
Cardiovascular system	11(1.7%)	20(3.2%)	0.1053
<i>Rhd</i>	6	4	0.2697
<i>Vsd</i>	1	8	0.2332
<i>Others</i>	4	8	1.0000
Renal(infection excluded)	12(1.8%)	16(2.5%)	0.4508
<i>Nephrotic syndrome</i>	10	13(1-d)	1.0000
<i>Acute glomerulonephritis</i>	2	2	1.0000
<i>Others</i>	0	1	1.0000
Acute poisoning	50(7.8%)	25(4.0%)	0.0115
<i>Snake bite</i>	9	5(1-d)	1.0000
<i>Unknown bite</i>	0	4	0.0158
<i>Kerosene poisoning</i>	26	3	0.0251
<i>Carbon monoxide poisoning</i>	11(1-d)	0	0.0289
<i>Unknown poisoning</i>	1(1-d)	4	0.0553
<i>Scorpion sting</i>	2	4	0.1803
<i>Others</i>	1	5	0.0242
<i>Miscellaneous</i>	5(0.7%)	26(4.1%)	0.0002

(d-death, P U O-Pyrexia of unknown origin, G B S –Gullen Barre Syndrome, RHD-rheumatic heart disease, VSD –ventricular septal defect)

CVS, GI and Renal systems. Post phailin study group showed increase in admissions for acute poisoning like snake bites, scorpion stings. Snakebites are very common hazards in floods and cyclones in our area. Increase in snakebite and unknown bite is a well studied occurrence in previous studies^{18, 19}. Hydrocarbon poisoning (11/50 with 1 death in study group comparison to 0/25 in control group) and kerosene poisonings (26/50 in study group and 3/25 in control group) are two emerging epidemics in such situations. The main sources of CO are charcoal and generator smoke (incomplete combustion of hydrocarbon)^{20, 21}. Frequent long term power cut, use of generators for electricity and use of mosquito coil in a closed room are the prominent aetiologies. Both the use of newer and older generators (powered by all hydrocarbon sources) used during night time while sleeping accounted for such occurrence. The victims were from affluent class. They were

asleep keeping generators in the next rooms. Six patients were using air conditioners, and this caused death of a nine month infant. There were four casualties of the parents of above mentioned children. This had a hard impact on the family structure. The carbon monoxide poisonings we encountered are just like the tip of an ice berg. Actual numbers of patients with early features of carbon monoxide poisoning (dizziness, headache, nausea, breathlessness) are much higher. Similarly due to lack of electricity, there was increase in purchase of kerosene. It was stored in beverage bottles. This increased chance of children reaching them in darkness.

Our study shows a good light on the casualties in post cyclone period. We found that the casualties of post cyclone era showed much increase in infective diseases, animal bites, acute poisoning. The incidence of kerosene and carbon monoxide is poisoning very high in post phailin era. This sends a caution in the disaster preparedness regarding use of generators and appropriate storage of kerosene in the community. There is an increased need to look into the long term outcome of such disasters in child health.

Competitive Interest: none

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