Analysis of Post Earthquake Disease Pattern in a Camp at Gyampesal Gorkha

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ABSTRACT

Background

A major earthquake occurred in Nepal on 25th April 2015 with magnitude of 7.8 causing mass panic amongst people.

Objective

To analyze scenario, experience and disease pattern of Post Earthquake camp at Gyampesal, Gorkha.

Method

A prospective observational study done on 13th and 14th June 2015 in a population who attended the health camp at health post, Gyampesal Gorkha. Analysis was done for age, sex, and disease pattern. Medicines for their health problems was provided by Manipal Teaching Hospital, Pokhara, Nepal Pediatric Society and Children Welfare in Nepal, Kathmandu.

Result

Total 159 patients [80.5% children and 19.5% adults] had attended the health camp. The mean age of children was 6.18±4.27 SD with maximum between 2-5 years (39%) and mean age of adults was 37.87±14.07 SD. Among the children males were more (50.8%) than females but in adult group females (83.9%) were more. Most common complaints were earthquake related fear (Children- 60.23% / adults -71%), insect bite [children -25.8% /adults -35.5%], pain abdomen (children- 64.1% / adult -38.7%) and decreased appetite (children- 83.6% / adults - 16.1%). Pain abdomen and decreased appetite was significantly high in children with p <0.009 and 0.001 respectively. The common disease patterns noted in children were recurrent abdominal pain (25%), acute gastroenteritis (19.5%), upper respiratory tract infections (15.6%), Impetigo (15.6%), Dental caries(10%), Pityriasis alba (10%). In adults Acid peptic disease (51.6%), Headache (32.5%), hypertension, Upper respiratory infections, scabies and Urinary tract infection (16%), Acute gastroenteritis (13%) was common.

Conclusion

Earthquake related fear, insect bite and Communicable diseases both airborne and water borne were the commonest findings observed. Therefore basic needs and services like safe water and sanitation, adequate shelter, primary healthcare services and vector-control campaigns are crucial and essential for these displaced populations.

KEY WORDS

Children, disease pattern, earthquake

INTRODUCTION

On Saturday, 25 April 2015, a 7.8 magnitude earthquake rocked Nepal, killing about 9000 people and injuring more than 23000.[1] This was the worst quake to strike the region since the 1934 Nepal-Bihar earthquake.[2] It was simply overwhelming for a developing country like ours with around 27 million people to suddenly have the capacity to respond to such a calamity for urgent care. In such a scenario outbreak of disease was very obvious.

The risk factors for outbreaks after disasters are associated primarily with population displacement, availability of safe water and sanitation facilities, the degree of crowding, the underlying health status of the population, and the availability of healthcare services. Nepal being a developing country lack resources, infrastructure, and disaster-preparedness systems, hence was disproportionately affected by this natural disaster. We outline the age sex and disease pattern of affected population after the disaster and also review the diseases likely to be important in disaster settings. We describe an adventure trip to Gyampesal, Gorkha-just 90 km from Barpak the main epicenter of earthquake of 7.8 magnitude on 25th April 2015. We knew this would be a difficult trip but it was a challenge we decided to take on.

METHODS

This was a prospective observational study carried out in a camp in Gyampesal, Gorkha on 13th and 14th June 2015 that was 50 days post earthquake. Ethical approval was taken from the Ethical committee of Manipal Teaching Hospital before enrollment of cases. The purpose of the study was explained to the parents and a written consent was also taken.

All children who attended the camp was examined and their age, sex, effect of earthquake, complains, examination findings and diagnosis was noted in a preset questionnaire. Also the guardians who seeked medical help were examined. The demographic profile of the location was also noted. Medicines were distributed according to their requirements. The inclusion criteria for the study was i) All children and their parents attending the health camps, ii) All types of health problems. The exclusion criteria was i) Adults except the guardians/parents of children attending the health camp. Data analysis was done using statistical package SPSS version 19. Microsoft Excel (2003) and SPSS were used for plotting figures. Chi-sqaure test was used to compare the parameters. A p value of <0.05 was taken as significant for all statistical analysis.

RESULTS

The demographics of Ghyampesal is shown in table 1.[3] Out of total 159 patients 128(80.50%) were children and 31(19.50%) were adults. The mean age of children and adults attending the camp is shown in table 2. There were 50.80% males and 49.20% females in children group and 16.11% males and 83.90% females in adult group (Table 2). Most common complaints of these patients were Earthquake related fear, insect bite, pain abdomen and decreased appetite. Pain abdomen and decreased appetite was significantly high in children age group (Table 3).

Table 1. Demographics of Ghyampesal

Region		**Pashchimanchal**
Zone		Gandaki
District		Gorkha
VDC		Masel VDC -9
Area	Latitude	28^0 2'45.1"[28.0459^0] North
	Longitude	84^0 43'28.9"[84.7247^0] East
	Average elevation	950 meter(3,117 feet)
Earthquake on 25 April 2015		7.8 Magnitude
Demographics		**Number %**
Total population of Gorkha		2,71,061
Total population of Gyampesal		704
	Males	278
	Females	426
Total houses		200
	Total damage home	166
	Partial damaged home	34
Death	Human death Total	8
	Injured	2
	Animal dead	44
Total loss		22.6163 thousand
	Food damage : rice	54,500 kg
	Wheat	52,022 kg

Table 2. Age, sex of cases ethnicity of cases.

		Child (n=128)	**Adult (n=31)**
Mean Age ± SD		6.18± 4.27	37.87±14.07
Sex:	Male	65(50.8%)	5 (16.1%)
	Females	63(49.2%)	26(83.9%)
Age:	<1 year	13(10.15%)	0
	2-5 years	50(39%)	0
	6-10 years	44(34.37%)	0
	10-18 years	21(16.40%)	0
	>18 years	0	31(100%)

Table 3. Common symptoms.

	Child (n=128)	Adult (n=31)	Chi- square test	P value
Earthquake fear: Yes	77(60.23%)	22(71%)	1.242	0.183
No	51(39.8%)	9(29%)		
Insect bite: Yes	33(25.8%)	11(35.5%)	1.174	0.194
No	95 (74.2%)	20(64.5%)		
Pain abdomen: Yes	82(64.1%)	12(38.7%)	6.637	0.009
No	46(35.9%)	19(61.3%)		
Decreased appetite: Yes	107(83.6%)	5(16.1%)	54.550	0.001
No	21(16.4%)	26(83.9%)		

Table 4. Disease pattern children Vs adult.

Diagnosis	Total N=159	Children (n=128)		Adult (n=31)	
		N	%	N	%
RAP	32	32	25	0	0
AGE	29	25	19.5	4	13
URI	25	20	15.6	5	16
APD	22	6	4.7	16	51.6
Impetigo	20	20	15.6	0	0
Dental caries	13	13	10	0	0
Pityriasis alba	13	13	10	0	0
Enlarged lymph nodes	12	12	9.4	0	0
Headache	12	2	9.4	10	32.5
UTI	10	5	7.8	5	16
Malnutrition	10	10	7.8	0	0
Anemia clinically	10	10	7.8	0	0
Conjunctivitis	8	8	6.25	0	0
Pneumonia	8	8	6.25	0	0
Normal child	5	5	3.9	0	0
Scabies	8	3	2.34	5	16
Tinea versicolor	8	5	3.9	3	9.7
Nocturnal eneuresis	5	5	3.9	0	0
Vulvovaginitis	5	5	3.9	0	0
Hypertension	5	0	0	5	16
ASOM	4	4	3.12	0	0
Chicken pox	3	3	2.34	0	0
Tinea capitis	3	3	2.34	0	0
VSD	3	3	2.34	0	0
Dysmenorrhea	3	3	2.34	0	0
RAD	3	3	2.34	0	0
Pompholics	2	2	1.6	0	0
Bronchiolitis	2	2	1.6	0	0
Bronchial Asthma	2	1	0.8	1	3.2
Muscle spasm	2	0	0	2	6.5
Breath holding spell	1	1	0.8	0	0
Down syndrome	1	0	0	1	3.2
Gilbert syndrome	1	0	0	1	3.2
Seizure disorder	1	1	0.8	0	0
Pterigium	1	0	0	1	0
Ankle sprain	1	1	0.8	0	0

Table 5. Relation of Earthquake fear with pain abdomen.

		Pain abdomen		Chi square test	P value
		Yes(n=94)	No (n-65)		
Earthquake fear	Yes (n=99)	51 (54.3%)	48 (73.8 %)	6.277	0.009
	No (n=60)	43 (45.7%)	17 (26.2%)		

Table 4 highlights the common disease patterns of the patients where recurrent abdominal pain (25%), acute gastroenteritis (AGE) (19.50%), upper respiratory tract infections (URTI) (15.60%), Impetigo (15.60%), Dental caries (10%), Pityriasis alba (10%) were common disease pattern seen in children. Other disease noted were acid peptic disease (APD), enlarged lymph nodes, headache, urinary tract infection (UTI), malnutrition, anemia, conjunctivitis, pneumonia, scabies, tinea versicolor, vulvovaginitis, nocturnal eneuresis, acute suppurative otitis media (ASOM), chicken pox, tinea capitis, ventricular septal defect (VSD), Dysmenorrhea, reactive airway dsease (RAD), pompholics, bronchiolitis, bronchial asthma, breath holding spells, seizure disorder ankle sprain. The disease pattern in adults were APD (51.60%), Headache (32.50%), hypertension, URTI scabies and UTI (16%), AGE (13%). Other disease noted were tinea versicolor, bronchial asthma, muscle spasm, down syndrome, gilbert syndrome [Table 4]. Pain abdomen had statistically significant relationship with earthquake fear. [Table 5]

DISCUSSION

According to United Nations Children's Fund (UNICEF) the 7.8 magnitude earthquake that hit Nepal on Saturday, April 25 has had a devastating impact, with an estimated 7 million people affected, including 2.8 million children.[4]

Observations from previous natural disasters including earthquake aftermath suggest that diarrheal, skin and respiratory infections are the most common infectious diseases in survivors.[5] We have also noted a similar pattern of diseases in our observation. In addition to this recurrent abdominal pain and decreased appetite was another significant finding noted in children by us. Maybe the fear for earthquake had aggravated this condition in children. 19.50% children and 13% adults had diarrhea in this study post earthquake. The risk for diarrheal disease outbreaks following natural disasters is higher in developing countries

than in industrialized countries.[6,7] In Aceh Province, 85% of residents reported diarrhea in two weeks after the December 2004 tsunami,[8] which is much higher than our observation. In Muzaffarabad, Pakistan, an outbreak of acute watery diarrhea was reported in a camp after the 2005 earthquake.[9] Sporadic hepatitis E cases was also reported after the 2005 earthquake in Pakistan.[10] Clusters of both hepatitis A and hepatitis E were noted in Aceh after the December 2004 tsunami.[11] We did not find any hepatitis cases. We cannot say that there was no feco-oral contamination as diarrhea did occur but at lower rate. Possibly the water was not so contaminated and maybe people were more immune. Cholera epidemic was reported in October 2010, in Haiti, nine months after the earthquake.[12] But in our observation no one had clinically presented with cholera like stool. We did not have any facility to isolate the organisms there so could not give an accurate diagnosis for gastroenteritis.

Diseases associated with crowding

Common disease associated with crowding is acute respiratory infections, measles, skin infections and Neisseria meningitides. Acute respiratory infections (ARI) are a major cause of illness and death among displaced populations, particularly in children <5 years of age. Lack of access to health services and to antimicrobial agents for treatment further increases the risk for death from ARI. Risk factors among displaced persons include crowding, exposure to indoor cooking using open flame, and poor nutrition. ARI accounted for the highest number of cases and deaths among those displaced by the 2005 earthquake in Pakistan.[10] In our study we had observed 31.60% (15.60% in children and 16% in adults) of URTI. Other respiratory problems noted in this study were pneumonia (6.25%), bronchiolitis (1.60 %), RAD (2.34%) and bronchial asthma (0.8% in children and 3.2% in adults) but there were no measles or N. meningitis cases. Measles and the risk for transmission after a natural disaster are dependent on baseline immunization coverage among the affected population, and in particular among children <15 years of age. The measles vaccination coverage is good in Nepal so maybe this was the reason there were no mealses cases seen. However chicken pox was observed in 2.34% children. In Pakistan, after the 2005 South Asia earthquake, sporadic cases and clusters of measles (>400 clinical cases in the six months after the earthquake) had occurred.[10] Cases of N Meningitis was also noted.[10]

Disease associated with skin

In this study various skin problems were also noted. Impetigo (15.6%) was the most common problem seen in children. It is highly contagious and this spreads by direct contact with lesions. Even touching or scratching the sores may easily spread the infection to other parts of the body.[13]

Pityriasis alba was another common skin condition noted in 10% children attending the camp. This mostly occurs in children and usually seen as dry, fine-scaled, pale patches on the face. Variable rates have been reported from various places 8.40% from India, 9.90% from Brazil, 13.49% from Egypt, which are consistent with our observation.[14-16] It was noted to be higher in those with poor socioeconomic conditions,[17] and our cases possibly belonged to poor socioeconomic background.

Fungal infection by Coccidioides immitis, is not transmitted person to person but is associated with exposure to increased levels of airborne dust after landslides in the aftermath of the earthquake.[18] An unusual outbreak of coccidiomycosis occurred after the January 1994 Southern California earthquake.[18] Though landslides had occurred in locality we did not notice such infection. The fungal infections we noted were tinea versicolor, tinea capitis along with scabies which is a parasitic infection. Insect bite was one of the commonest findings (25.80% in children and 35.50% in adults) we had observed. As the weather was hot and damp and people had to stay and sleep in open air with just roof as a shelter it was very obvious for them to have insect bites.

Disease associated with nutrition

Before the quake, In Nepal, 41% of children under five were stunted, 29% were underweight and 11%were emaciated, according to the World Food Programme.[19] A government survey revealed that malnutrition in children had worsened considerably some three months after the quake, with the most undernourished being Tamang and Chepang peoples.[19] In our observation 7.8% children were malnourished and anemic .

Other diseases associated with natural disasters

Contaminated wounds, particularly in populations where vaccination coverage levels are low, are associated with illness and death from tetanus. A cluster of 106 cases of tetanus, including 20 deaths, occurred in Aceh and peaked 2-1/2 weeks after the tsunami.[20] Cases were also reported in Pakistan following the 2005 earthquake.[10] In our case we had evaluated the patients 50 days after earthquake so did not come across any contaminated wounds or tetanus. However we came across other infections like vulvovaginitis, symptoms of UTI, ASOM and conjunctivitis.

Health problems not related to disaster

Since this was a health camp disease not related to aftermath was also observed. In children they were Dental caries, APD, Headache, Nocturnal eneuresis, VSD, Dysmenorrhea, Breath holding spells, seizure disorder and in adults APD, Headache, hypertension, muscle spasm, down syndrome, gilbert syndrome. We had higher rates of APD and headache which may be due to post earthquake stress.

Earthquake-related fear among people

The unexpected collapse of houses, repeated aftershocks post earthquake, seeing so many dead bodies of own

people and animals in the aftermath of earthquake can create fear and panic in the affected population and was the most common symptom noted in this camp 60.23% and 71% in children and adults respectively .

In the author's literature review there were many articles stating the rescues, reliefs, damages and mortalities but there were no study showing the outbreak or disease pattern in different earthquake affected areas in Nepal. Therefore we could not compare and conclude about the commonest diseases pattern of the country.

CONCLUSION

Surveillance on common disease pattern in different part of earthquake affected regions in the country is important so that a planning can be made for both therapeutic and preventive interventions such as the rapid delivery of safe water and the provision of rehydration materials, antimicrobial agents, measles vaccination materials, nutritional and psychosocial support.

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