

Impacts of Flood on health - Epidemiologic Evidence from Hanoi, Vietnam

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Introduction

Flooding accounts for 40% of all natural disasters worldwide and causes about half of all deaths from natural disasters.⁹ Many floods occur in developing countries where the impact on public health is substantial, the number of people displaced is often large, and the number of deaths is high. In the aftermath of a flood deaths and injuries not only result from the physical characteristics of the event but are also determined by the prevailing socioeconomic and health conditions of the community and any endemic infectious diseases. Increased rates of diarrhoea (including cholera and dysentery), respiratory infections, hepatitis A and E, typhoid fever, leptospirosis, and diseases borne by insects have been described as occurring after floods in developing areas.^{3,7}

The long term effects of flooding on psychological health may perhaps be even more important than illness or injury. For most people the emotional trauma continues long after the water has receded. Making repairs, cleaning up can be stressful. If there is a lack of support during the recovery process, stress levels may increase further. Research from the United States indicates that providing increased social support can significantly lower illness burdens after natural disasters.⁸ Flood victims frequently report feeling depressed and isolated.¹⁰ Furthermore, being evacuated from home and losing personal possessions may undermine people's sense of place as well as their sense of attachment and self identity.⁷

Floods are the most common and threatening natural disasters in Vietnam. According to Ministry of Agriculture and Rural Development, among many kinds of natural disasters that occur in

Vietnam floods are the ones which bring about greatest loss and take a lot of time to overcome therefore its impacts to production and social life are enormous.¹² In 2007 Vietnam lost 11.500 billion Vietnam dongs and 400 people died of floods; during the period 2001-2006 annual loss due to natural disasters was equivalent to 1% of the country's GDP (Deputy Prime Minister Hoang Trung Hai 17-5-2008). Floods with long duration cause serious problems to health of local people, particularly of the elderly and disabled family members living in poor conditions with limited food stocks, un-hygienic water sources and poor sanitation. Epidemic diseases such as dengue fever, diarrhea, among many others also appeared when floods occurred.⁵

In the last days of October and the first week of November 2008 long and heavy rains with high intensity and large magnitude in Hanoi resulted in a historic flood in Hanoi capital city in the last 35 years (ever since 1973). Heavy rain in the inner part of Hanoi on the 31st of October caused 90 points inundated locally with average depth of 0.3 m to 0.8 m. Particularly, there were points inundated with the depth up to 1.2 m such as in Thai Ha, Truong Chinh, Giap Bat, and from 1.0 to 2.5 m such as in Tan Mai, Dinh Cong. Up to the 3rd of November, there were still 44 traffic points and residential points inundated.¹¹

According to a primary evaluation of the 10 days of heavy rains and flooding (from 31st October to the 9th of November, 2008), there were 22 people died, 3 injured and material loss could go up to 3,000 billion dongs. About a month after those heavy rains in Hanoi, still some areas in the new area of Hanoi were still deeply inundated. The above mentioned damages of the historic flood in Hanoi recently were just very preliminary. Its long-term impacts on the economic, social, environmental and health aspects of people living in Hanoi have been anticipated enormously.¹¹

In order to ascertain the flood vulnerability and health risks, social and economic impacts of the historic flood Hanoi, a cross-sectional study was conducted through household survey. This paper using data collected from the Microdis household survey early 2009 in Hanoi, Vietnam, aims to identify the differences in mortality, injuries and morbidity patterns (dengue, red eye diseases, and skin diseases, psychological problems and hypertension) between flood affected and non-affected households in Hanoi after the historic flood. The ultimate aim of this paper is to provide information for designing appropriate preventive strategies for areas that prone to flood.

Methodology

Data source

The data in this paper obtained from the Microdis project's household survey, 2009 conducted in two districts – Hoang Mai (urban district) and Chuong My (rural district) in Hanoi capital city of Vietnam. Subjects of this study were head of the household or his/her counterpart and greater than 18 years old. In each district a severely flooded commune and a less affected commune (control commune) were selected then households were randomly selected from the lists of households of each selected commune. The survey questionnaire was adapted from the Microdis integrated questionnaire including three main themes: health, economic and social, each theme was adapted from internationally validated questionnaire that later agreed by members in each working group of the Microdis project. Data was collected through household survey at a household level and administered by a trained fourth year students of the Hanoi School of Public

Health. Data quality was controlled by the field supervisors as well as investigators of this survey.

Measurement

Five health conditions (two non-communicable: psychological problem and hypertension and three communicable diseases: dengue fever, red eye diseases and skin diseases) of family members of the selected household were measured through self-reported method of the head of the household as follows

Key respondent was asked “Have any of the family members ever have Psychological problems, e.g. Stress, nervous, anxious, sleeplessness etc.” The answering options were yes or no. If the answer is yes, then each diseased person in the household was asked through key respondent whether the psychological problem occurred before for the heavy rains or after? and 2) If it occurred before the heavy rains then whether the condition got worse by the heavy rains/flood. Similar pattern was asked for hypertension with the special emphasis that hypertension diagnosed by a health officer.

For communicable diseases, respondent was first asked “Have any of the family members ever been diagnosed by a health staff as having the disease”. The answering options were yes or no. Then respondent was asked for each diseased person in the household through key respondent whether the disease occurred within one month after the heavy rains/flood/

Mortality and Injuries of family members of study subjects were also measured by self reported method within one month since the heavy rains started

Information on socio-demographic status of study subjects included educational level, gender, religion, age, marital status and income per person per month.

Data analysis

Epidata 3.0 was used for data entry. SPSS software version 17 was used to perform both descriptive and analytical statistics. A conventional significance level of $p < 0.05$ was used.

Ethical considerations

The study was presented and discussed among provincial authorities to get approval. Approval was also received from key informants before carrying out the interview.

Results

Characteristics of study population

A total of 781 respondents participated in the Microdis household survey, 2009. The description of the final sample was presented in table 1. Among the respondents the proportion of males seemed to be higher than that of the female, except for Thanh Tri commune where the proportion of female was a little bit higher (50.8% vs. 49.2%). The average number of person per household was highest in Nam Phuong Tien (4.91), a severely flooded commune in rural area of Hanoi and lowest in Thanh Tri, a less affected common in urban area of Hanoi. Almost all of respondents in our sample said that their religion is to pray ancestors, only about 12% of respondents in Dong son commune said that Catholic is their religion. The proportion of respondents who are Buddhist is about 1% in Thanh Tri and Thinh Liet – urban area of Hanoi and those of Dong Son and Nam P Tien were 4.5% and 3.1% respectively. The income per person per month of

communes in urban area of Hanoi is almost double that of rural commune of Hanoi. Within rural area, there is a significant difference in income between the severely affected commune and the less affected commune (33\$ vs. 26\$ per person per month).

With regards to marital status, about half of the respondents in all four communes were married, and about 2 fifths of them were unmarried and about 5 % was widowed.

Table 1: Characteristics of study population

	Rural area of Hanoi		Urban area of Hanoi		Total
	Dong son Non-flooded	Nam P. Tien Flooded	Thanh Tri Non-flooded	Thinh Liet Flooded	
No. of HH	n= 194	n= 205	n= 250	n= 222	n= 871
Average No. of persons/HH	4.55	4.91	4.23	4.34	4.49
Gender of respondents	n= 883	n= 1007	n= 1057	n= 963	n= 3910
<i>Male</i>	57.2	61.0	49.2	53.6	54.9
<i>Female</i>	42.9	39.0	50.8	46.4	45.1
Religion	n= 883	n= 1007	n= 1057	n= 963	n= 3910
<i>Catholic</i>	12.7	0.1	0.1	0.9	3.2
<i>Protestant</i>	0	0.1	0	0	0
<i>Buddhist</i>	4.5	3.1	0.9	0.7	2.2
<i>Ancestor</i>	79.0	96.7	95.9	93.5	91.7
<i>Other</i>	3.7	0	3.1	4.9	2.9
Income/person/month 1 USD~17,813 VND	587.650 ~ 33 \$	462130 ~ 26 \$	1111160 ~ 63\$	1096710 62\$	822220
Marital Status	n= 883	n= 1007	n= 1057	n= 963	n= 3910
<i>Married</i>	49.7	50.4	57.3	56.1	53.5
<i>Unmarried</i>	45.6	43.6	38.0	38.7	41.4
<i>Separated</i>	0.2	0.1	0.2	0	0.1
<i>Divorced</i>	0.2	0.2	0.2	0.5	0.3
<i>Widowed</i>	4.2	5.7	4.3	4.7	4.7

Experience with flood

Because the heavy rain occurred in the whole area of Hanoi capital city during last days of November 2008, therefore almost all people in the selected houses of our sample were present at the time of flood. About half of the people of in Nam Phuong Tien had to migrate due to flooded and about a fifth of the people in selected households in Thinh Liet was migrated due to flood.

The proportions of people in the two less affected commune had to migrate due to flood were very low (1.6% in Dong Son and 2.3% in Thanh Tri). Majority of people who were migrated due to flood stayed in their relative's or friend's house. All people in less severely affected communes mentioned that they stayed in their relative's or friend's house. In communes who were severely affected by flood, some people reported that they stayed in temporary shelters provided by the government such as some place in schools, community house etc.

About a fifth of the members of our selected household sample was going to school before the heavy rains that led to the historic flood in Hanoi. School activities were reported affected by the flood by almost all school goers in two severely affected communes, more than 90%, in less affected communes two thirds of school goers in Dong Son and three quarters of school goers in

Thanh Tri said that school activities were affected by flood. Daily routine work of respondents also was mentioned to be affected subsequent to flood by 90% of respondents at the two severely affected commune and about a half of the less affected communes.

Table 2: Experience with Flood

	Rural area of Hanoi		Urban area of Hanoi		Total
	Dong son Non-flooded	Nam P. Tien Flooded	Thanh Tri Non-flooded	Thinh Liet Flooded	
Present at the time of flood	n= 883	n= 1007	n= 1057	n= 963	n= 3910
<i>Yes</i>	98.0	98.0	97.4	99.6	98.2
Migrated due to flood	1.6	54.6	2.3	22.6	20.7
Place to stay after displacement	n= 14	n= 550	n= 24	n= 218	n= 806
<i>Relative/Friend</i>	100.0	85.3	100.0	89.4	87.1
<i>Temporary shelter from relief agencies</i>	0	1.1	0	1.8	1.2
<i>Temporary shelter from government</i>	0	5.3	0	0.9	3.8
<i>Others</i>	0	8.4	0	7.8	7.8
School going before flood?	23.9	23.5	21.9	24.5	23.4
School activities affected by flood	59.1	90.3	77.5	92.8	80.6
Your daily routine affected subsequent to flood?	48.6	89.0	53.8	89.3	70.5

Access to and use of usual health care service/medication

Almost half of the respondents in both severely flooded communes said that the access to and use of usual health care/medication was compromised during one month since the heavy rains and flood. These proportions were much lower in two communes which were not severely flooded (7 or 8%). Among those who said that the access to usual health care or medication, about two third mentioned that one of the reason was due to road damaged and a third mentioned it was due to transportation unavailable. A fifth of the respondents in Thanh Tri and a third of the respondents in Thinh Liet said that the health centre was destroyed. About 15% of respondents in Nam Phuong Tien commune said that it was due to lack of medication or lack of money.

Table 3: Access to Health care services

	Rural area of Hanoi		Urban area of Hanoi		Total
	Dong son Non-flooded	Nam P. Tien Flooded	Thanh Tri Non-flooded	Thinh Liet Flooded	
	n= 194	n= 205	n= 250	n= 222	n= 871
Access and use of usual health care/medication compromised?	7.2	50.7	8.0	56.4	27.7
Reasons	n= 14	n= 105	n= 19	n= 103	n= 241
<i>Road damaged</i>	78.6	69.5	63.2	68.0	68.9
<i>Lack of medication</i>	0	15.2	0	1.0	7.1
<i>Health centres destroyed</i>	0	3.8	21.1	34.0	17.8

<i>Not enough health care professionals</i>	0	3.8	0	0	1.7
<i>Transportation unavailable</i>	21.4	39.6	21.1	24.3	30.6
<i>Lack of money</i>	21.4	13.3	0	4.9	9.1
<i>Others, specify</i>	0	11.3	31.6	25.2	18.2

Mortality

In our study, during one month after the heavy rain in Hanoi that led to flooding, 7 deaths were reported, 3 from Nam Phuong Tien and 2 from Thinh Liet and one death occurred in each less affected commune. Of the two deaths in Thinh Liet, one occurred in the day of the flood and one occurred in the week following the flood. One death in Nam Phuong Tien, and one death in Thanh Tri occurred during the month following the flood. One death in Dong Son and two deaths in Nam Phuong Tien occurred more than one month after the flood. Two out of seven deaths were reported to be cancer, three others were due to stroke and the rest two were from other causes. And the cause of death reported to be confirmed by a physician or nurse was only 4 out of 7 deaths. And all 7 deaths were reported to be died at home.

Table 4: Mortality

	Rural area of Hanoi		Urban area of Hanoi		Total
	Dong son Non-flooded	Nam P. Tien Flooded	Thanh Tri Non-flooded	Thinh Liet Flooded	
Mortality (n)	1	3	1	2	7
When did the death occur?					
<i>The day of the flood</i>	0	0	0	1	1
<i>During the week following the flood</i>	0	0	0	1	1
<i>During the month following the flood</i>	0	1	1	0	2
<i>More than one month after the flood</i>	1	2	0	0	3
Cause of death (n)					
<i>Cancer</i>	0	0	1	1	2
<i>Stroke</i>	1	1	0	1	3
<i>Other</i>	0	2	0	0	2
The cause of death confirmed by a physician/nurse? (n)					
<i>Yes</i>	1	1	1	1	4
Where did the person die? (n)					
<i>At home</i>	1	3	1	2	7

Injuries

There were 27 injuries were reported to happened one month after flooding, types of injuries were reported in Table 5, three persons suffered from bone fracture one from Dong Son and two from Nam Phuong Tien. Out of twelve people suffered from laceration/confusion, 7 were from Nam Phuong Tien, 2 from Thanh Tri and 3 from Thinh Liet. Two thirds of the causes of injuries were reported due to fall. Among 13 injuries occurred in Nam Phuong Tien, 9 were reported due to fall, there was one injured in Thinh Liet was due to drowning and one in Thanh Tri was reported was traffic accident.

Table 5: Injuries

	Rural area of Hanoi		Urban area of Hanoi		Total
	Dong son Non-flooded	Nam P. Tien Flooded	Thanh Tri Non-flooded	Thinh Liet Flooded	
Injured (n)	2	13	4	8	27
Type of Injury (n)	2	13	4	8	27
<i>Bone fracture</i>	1	2	0	0	3
<i>Laceration/Contusion</i>	0	7	2	3	12
<i>Cuts</i>	0	1	0	5	6
<i>Multiple trauma</i>	0	0	1	0	1
<i>Other</i>	1	3	1	0	5
Cause of Injury (n)	2	13	4	8	27
<i>Fall</i>	2	9	2	3	16
<i>Drowning</i>	0	0	0	1	1
<i>Traffic accident</i>	0	0	1	0	1
<i>Other</i>	0	4	1	4	9

Health Conditions

Health condition of people in this survey was measured through self-reported method. There was a significant increase in proportion of respondents in severely affected commune reported that his/her family members ever had psychological problem in comparison with that of respondents in less affected communes. In less affected communes about 90% of people who reported ever suffered from psychological problems said that they had it before the heavy rain and the flood, while these proportions in two severely affected communes Nam Phuong Tien and Thinh Liet were 72% and 50% respectively. About only a third of suffered people in less affected communes mentioned that their psychological problem got worse during and after the flood, while that of people in Nam Phuong Tien and Thinh Liet were 84.1% and 63.1% respectively. There is no difference in proportion of respondents reporting that his/her family members ever being diagnosed by doctor as contracting hypertension between flood affected commune and less affected commune in rural district of Hanoi or urban district of Hanoi. Although almost all reported cases of hypertension occurred before the heavy rain and flood the proportion of people reported that the hypertension situation got worse after the flood was significant higher in severely affected commune as comparison with that of the less affected commune both in rural district (33.3% in Dong Son, 51.25 in Nam Phuong Tien) and in urban district (20.3% in Thanh Tri and 42.9% in Thinh Liet).

Table 6: Health condition

	Rural area of Hanoi		Urban area of Hanoi		Total
	Dong son Non-flooded	Nam P. Tien Flooded	Thanh Tri Non-flooded	Thinh Liet Flooded	
	n=194	n= 205	n= 250	n= 222	n= 871
Any of the family ever have Psychological problems, e.g. Stress, nervous, anxious, sleeplessness? (%)	33	58	21.6	33.8	35.8
Psychological problems, e.g. Stress, nervous, anxious, sleeplessness <i>before</i> the heavy rain and flood? (%)	n=82	n= 192	n= 69	n= 111	n= 454
	90.2	71.4	89.9	50.5	72.5
Did the Psychological problems, e.g. Stress, nervous, anxious, sleeplessness <i>get worse</i> after the heavy rain and flood? (%)	n=82	n= 192	n= 69	n= 111	n= 454
	36.6	84.1	34.8	63.1	62.7
Any of the family ever been diagnosed by doctor as contracting hypertension? (%)	17.5	18.5	26.8	27.0	22.8
Hypertension <i>before</i> the heavy rain and flood? (%)	33	41	74	63	211
	100	80.5	95.9	93.7	92.9
Did the hypertension <i>get worse</i> after the heavy rain and flood? (%)	n= 33	n= 41	n= 74	n= 63	n= 211
	33.3	51.2	20.3	42.9	35.1
Any of the family ever been diagnosed by doctor as having red eye diseases? (%)	14.4	22.4	4.0	4.5	10.8
Having red eye diseases <i>after</i> the heavy rain and flood? (%)	n= 42	n= 69	n= 11	n= 10	n= 132
	64.3	92.8	45.5	100	80.3
Any of the family ever been diagnosed by doctor as having dengue fever? (%)	1	4.4	1.2	2.7	2.1
Having dengue fever <i>after</i> the heavy rain and flood? (%)	n= 1	n= 15	n= 3	n= 7	n= 25
	0	86.7	66.7	85.7	84.0

Any of the family ever been diagnosed by doctor as having skin diseases? (%)	13.9	55.6	7.2	12.6	21.5
Having skin diseases after the heavy rain and flood? (%)	n= 38	n= 229	n= 23	N= 34	n= 326
	57.9	96.5	95.7	88.2	91.0

With regards to red eye diseases, the proportion of respondents mentioned that his/her family member ever had red eye diseases is quite low, about 4% in both affected and less affected commune in urban area of Hanoi, these proportions were a bit higher in rural area of Hanoi (14.4% in Dong Son and 22.4% in Nam Phuong Tien. There is no significant difference in proportion of respondents reported that his/her family members had ever been diagnosed by a doctor as having red eye diseases in two communes in both urban and rural districts of Hanoi. Almost all diseased people in both affected communes were reported to have the disease after the flood (92.8% in Nam Phuong Tien and 100% in Thinh Liet), these proportions in two less affected communes were lower 64.3% in Dong Son and 45.5% in Thanh Tri.

In our sample 25 people were reported had ever been diagnosed by a doctor as having dengue fever, of that 15 cases were found in Nam Phuong Tien and 7 cases in Thinh Liet, only one case occurred in Dong Son and 3 cases in Thanh Tri. Almost all cases in affected commune reported that they were diagnosed with dengue fever after the flood (86.7% in Nam Phuong Tien and 85.7% in Thinh Liet). Two out of three cases in Thanh Tri occurred after the flood.

With regards to skin diseases, about 56% of respondents in Nam Phuong Tien reported that his/her family had ever been diagnosed by a doctor as having skin diseases, this proportion was much lower in its control commune, Dong Son 13.9%. The proportion of people in urban district reported as having dengue fever was lower 12.6% in Thinh Liet and a little bit lower in its control commune Thanh Tri. And almost all dengue cases reported to have been diagnosed after the flood.

Discussion

Chuong My district – rural district located in the expended area of Hanoi in August 2008 and Hoang Mai district – urban district located in the old area of Hanoi were selected to study by the Hanoi’s flood study sites because they are districts which were most seriously inundated districts of Hanoi city after the heavy rains in last day of October and first days of November, 2008 (Report of the UBNDHN). Table 1 - characteristics of study population showed that there is a little bit difference in demographic characteristics of study subjects between communes in rural district and urban district of Hanoi such as income per person per month, average number of persons per household and marital status. This difference reflects the difference between urban district and urban district and the reason why separated our data analysis for urban and rural districts. Within each district there seems to be similar demographic characteristics between severely flooded commune and its control, this is a good indicator for our later comparison of flood impact on health access and health conditions.

Because the heavy rain occurred in the whole area of Hanoi capital city during last days of November 2008, therefore almost all people in the selected houses of our sample were present at the time of flood. The proportion of people in Nam Phuong Tien who was displaced was quite high due to the geographical condition of the area – located in the flood dividing area of Hanoi city. And due to the culture characteristics of Vietnam people to have close relationship with relatives and friends so people who had to evacuate from their houses tend to stay in their relatives/friends.

Access to usual health care services and medication of people was compromised by 50% of people in both urban and rural flood affected communes mostly due to road damage, transportation unavailable. This reflects the fact that inundation was seriously in these two communes.

Epidemiologic review revealed that mortality statistics are generally only available for flood disasters and datasets may be subject to bias. In developing countries accurate information on the mortality impact of flood events is particularly limited. Although the self-reported number of death and injuries reported in this study within one month after the heavy rain happened were small, still by eye balling we can see a bit higher number of deaths and injured people in severely affected communes of our study.⁵

With regards to health conditions, although this study is just a snap-shot of the health situation of people in four studied communes within one month after the heavy rains that led to historic flood in Hanoi, the findings showed higher proportions of cases of dengue fever, red eye diseases and psychological problems in communes severely affected by flood as compared with that of controlled communes. These findings contribute more evidence to the presently weak-base to assess the health impacts of flooding.^{2,5}

Results from this study suggest that there is a need to pay special attention to the health of people in flood prone area not only after flood happening but also in the preparation period of health care sector before rainy and flooding season. There is a need also for rigorous epidemiological studies to assess the attribution of cause with longitudinal data.

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REFERENCE

1. Beck RJ, Franke DI. Rehabilitation of victims of natural disasters. *J Rehabil.* 1996;62:28–32.
2. Bennet G. Bristol floods 1968: controlled survey of effects on health of local community disaster. *BMJ.* 1970;3:454–458.
3. Centers for Disease Control and Prevention. Health assessment of the population affected by flood conditions—Khartoum, Sudan. *MMWR Morbid Mortal Wkly Rep.* 1989;37:785–788.
4. Christopher A Ohl and Sue Tapsell Flooding and human health. The dangers posed are not always obvious. *BMJ.* 2000 November 11; 321(7270): 1167–1168.
5. Few, R., S. Kovats, F. Matthies, and M. Ahern Floods, health and climate change: A strategic review. *Tyndall Centre Working Papers*, 2004
6. *11.* Fullilove MT. Psychiatric implications of displacement: contributions from the psychology of place. *Am J Psychiatry.* 1996;153:1516–1523.
7. Howard MJ, Brillman MD, Burkle FM. Infectious disease emergencies in disasters. *Emerg Med Clin North Am.* 1996;14:413–428.
8. Lutgendorf SK, Antoni MH, Ironson G, Fletcher MA, Penedo S, Baum A, et al. Physical symptoms of chronic fatigue syndrome are exacerbated by the stress of Hurricane Andrew. *Psychosom Med.* 1995;57:310–323.
9. Noji EK. Natural disaster. *Crit Care Clin.* 1991;14:271–292.
10. Tapsell SM. Follow-up study of the health effects of the Easter 1998 flooding in Banbury and Kadlington. Report to the Environment Agency. Enfield: Flood Hazard Research Centre; 2000.
11. Report of Hanoi capital city's People Committee on Heavy rain situation, inundation, damages and measures to overcome the situation dated 03 November 2008.
12. Vietnam News Agency 23/05/2008 -- 11:17 AM