PUBLIC HEALTH CONDITION IN KAMPUNG MELAYU DUE TO URBAN FLOODING IN JAKARTA

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ABSTRACT

Flood has both direct and indirect impacts. The incidence of sick people whom are affected by flood is one of its indirect impacts. This research studies and analyzes the impact of urban flooding in Jakarta to the people's health condition in Kampung Melayu Village. The condition of available diseases in the study area was taken as the primary data which was collected through household surveys in non-flood and flood seasons. A non-parametric analysis was applied to test the difference of morbidity rates between two seasons, i.e. non-flood and flood, in each group of respondents, as well as between two groups of respondents, i.e. non-flooded and flooded, in each season. The method used was mainly Chi-square independence test. As a result, the profile of groups of respondents in the study area is obtained and it shows that the condition is significantly different between the non-flooded and flooded respondents in terms of both socio-economic and health (i.e. available diseases). Some particular diseases have significant difference in term of morbidity rates in between the groups of respondents in both non-flood and flood seasons. However, in non-flood season, the morbidity rates of some particular diseases are dependent on the individual condition of respondents (i.e. being flooded or not in the flood season) instead of the area condition (i.e. non-flooded and flooded areas); but in flood season, no disease is dependent on the respondents' individual condition. In each group of respondents, different diseases are dependent on the season. All those findings implies that other inter-related factors have impact on public health condition. However, some particular diseases can be justified as the impacts of or related to the flood season or condition of being flooded.

Keywords: flood, incidence, morbidity rate, public health, urban flooding

1. INTRODUCTION

Jakarta is the biggest and most densely populated city in Indonesia which is more of a province with special status of country capital. Consequently, it becomes the centre of governance with more than 70% money circulation and the best available education, cultural, health, and sport facilities (Bappeda DKI Jakarta, 2005-2006). Hence, it attracts people to come and do economic, trade and service, social, and cultural activities. It is inhabited by more than 9 millions people who live in its five municipalities (*kotamadya*) and one administrative regency (*kabupaten administratif*) on 661.52 km^2 land area. This means that its population density is more than 15,000 inhabitants/km^2. Topographically, Jakarta is a low land which is elevated +7.00 meters above MSL on average. Geographically, it is situated at 106°49'35"E and 5°10'37"S, therefore, it has tropical climate with annual average temperature of 27°C, ranges from the minimum of 25.4°C in the night time to the maximum of 31.4°C in the day time, and humidity of 80-90%. Its average annual rainfall is 2,000 mm which is highest in January and lowest in September. Java Sea in the north, Bekasi Regency/City in the east, Bogor and Depok Regencies/Cities in the south, and Tangerang Regency/City in the west, are surrounding Jakarta. The shore in its northern side is 35 km long. Thirteen rivers and canals flow in Jakarta and are used for water supply, drainage, fishery as well as urban business. Ciliwung as a main river is originated from Mount Gede Pangrango in the south of Jakarta in West Java Province, passing through Bogor, Depok, Jakarta, and finally ended in Java Sea in the north of Jakarta as shown in Figure 1. Due to these conditions Jakarta suffers from frequent floods, despite its strategic positions in many importance sectors. At times, the 5-year return period flood is enough to cause severe inundation in terms of area, depth, and duration.

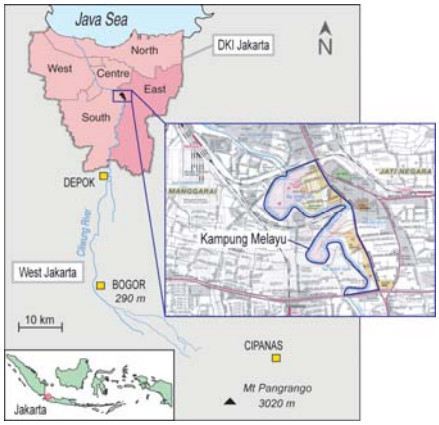

Figure 1. Situation of Jakarta and its vicinity, Ciliwung River, and Kampung Melayu Village
Source: ACF, 2004

Essentially, flood is a natural phenomenon. However, it brings unfavourable impacts that might be damaging, destroying, and harmful. The flood is not necessarily in a large scale, such as flash flood, to be disadvantageous. Smaller scale flood is potentially detrimental when it occurs frequently in productive or valuable areas and effects people in the communities. The condition will be worsened by rapid urbanization which is characterized by high population density such as in countries' capitals. Flood impacts can be direct and indirect as well as tangible and intangible. One of the indirect-intangible impacts of flooding is in term of public health condition. People live in frequently flooded area are understandably more susceptible to waterborne diseases. However, it has not yet been completely explained and understood in what way the health condition of the affected people is influenced by the flood. This condition leads to the demand of serious attention and measures in order to cope with the situation and diminish its impacts since it is almost impossible to completely eradicate flood. The objective of this research is to study and analyze the impact of urban flooding in Jakarta to the people's health condition in Kampung Melayu Village.

2. METHODOLOGY

This research took Kampung Melayu Village, which is located on the east side of Ciliwung River, precisely in the river flood plain and one of the most routinely flooded areas, as the specific study area. It is also well known as one of the slum areas in Jakarta although several good, big, and luxurious houses are present in the village. The adjacent area surround it are the Ciliwung River on the west, the one-way thoroughfare Jatinegara Barat on the east, the trunk road Kampung Melayu Besar on the south, and the Manggarai railway on the north. Together with other seven villages (*kelurahan*), Kampung Melayu constitutes Jatinegara District (*kecamatan*) in East Jakarta Municipality. The area of Kampung Melayu is 0.48 km^2 and inhabited by 22,600 people of 6,395 households (*Kepala Keluarga/KK*) which are grouped into 8 hamlets (*Rukun Warga/RW*) and 114 neighbourhoods (*Rukun Tetangga/RT*). Hence, the population density is more than 47,000 people/km^2 (ranges between 6,000 to over 200,000 people/km^2) with an average of 3.5 people/household, higher than the overall Jakarta.

The main data in this research was primarily obtained by distributing household-based questionnaires in two periods of surveys, i.e. in non-flood season (and 3-9 October 2004) and flood season (28 January-3 February 2005). The questionnaire was designed to collect the data about the socio-economic and health conditions of respondents as well as the incidences number of 26 selected diseases in both non-flood and flood seasons. There were two groups of respondents, i.e. non-flooded and flooded areas, whom were kept the same for both surveys. The identification of non-flooded and flooded areas was based on the secondary data about previous flooding. Hamlets 1, 5, and 6 were identified as normally non-flooded while hamlets 2, 3, 4, 7, and 8 were identified as normally flooded. Stratified random sampling method for two-tail test on 0.05 significance level was used to determine the required number of allocated questionnaire. The stratification was based on the hamlet. Equal number was expected from each group of non-flooded and flooded respondents, i.e. 160 households. Later on, an adjustment was required in the analysis since some houses which were initially identified in the non-flooded area were flooded and vice versa, i.e. houses located in the flooded area were not flooded, during the second survey. Hence, the respondents' exposure to the flood in the time of survey was taken as the basis of analysis. The final distribution of allocated questionnaires is summarized in Table 1. Secondary data of households were obtained from the village office of Kampung Melayu. Every household was then given a identity number. A random table was developed to determine which households to be picked up into the survey.

In order to obtain as much as possible data from the respondents, social approach was taken by involving the cadres of women association, i.e. Family Welfare Program (*Program Kesejahteraan Keluarga/PKK*) present in the hamlets and neighbourhoods. Every coordinator of the association in the hamlet levels was responsible for a proportional number of allocated questionnaires which were distributed and re-collected by the cadres in the neighbourhood levels. Hence, one cadre was responsible for approximately ten questionnaires. This was based on the needs of collecting the disease incidence data for one full week (seven consecutive days) in both periods of surveys. On the other hand, it was observed that women in the families, especially housewives, know best about the family condition since they intensively deal with the house chores and other family activities on daily basis. This was proven by the high number of filled up and returned questionnaires as well as the accountable data.

A descriptive analysis was applied to the socio-economic data while a non-parametric analysis, i.e. Chi-square independence tests at 0.05 significance level, were applied to test the difference of morbidity rates data between two seasons, i.e. non-flood and flood, in each group of respondents, as well as between two groups of respondents, i.e. non-flooded and flooded, in each season. Whenever the significance is lower than 0.05, it indicates that both variables are not independent from each other and vice versa.

Table 1. Final allocation of questionnaires in each hamlet based on household and individual

Ham	HH	%HH	Resp	%Resp	NF HH	%NF HH	NF Resp	%NF Resp	F HH	% F HH	F Resp	%F Resp
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)		
1	49	15.9	253	17.1	21	6.8	97	6.5	28	9.1	156	10.5
2	32	10.4	147	9.9	8	2.6	38	2.6	24	7.8	109	7.4
3	31	10.0	138	9.3	2	0.6	5	0.3	29	9.4	133	9.0
4	30	9.7	199	13.4	6	1.9	42	2.8	24	7.8	157	10.6
5	54	17.5	208	14.0	36	11.7	136	9.2	18	5.8	72	4.9
6	52	16.8	221	14.9	42	13.6	174	11.7	10	3.2	47	3.2
7	31	10.0	153	10.3	1	0.3	6	0.4	30	9.7	147	9.9
8	30	9.7	162	10.9	4	1.3	15	1.0	26	8.4	147	9.9
Total	**309**	**100.0**	**1481**	**100.0**	**120**	**38.8**	**513**	**34.6**	**189**	**61.2**	**968**	**65.4**

Note: Ham = hamlet, HH = household, Resp = respondent, NF = non-flooded in 2005, F = flooded in 2005

3. RESULTS AND DISCUSSIONS

Year of flood

Table 2 summarizes the number of flooded household from year to year in 1995-2005. It is apparent that the condition is relatively consistent. Other than the years of severe flooding, i.e. 1996, 2002, and 2005, the ratio of non-flooded and flooded households is approximately 70/30. In the non-flooded households of 2005, the ratio that they were not flooded in any other years is approximately 90/10 over the flooded ones. In the flooded community in 2005, the ratio is mostly 50/50. The 1996 and 2002 flood events result in the ratio between non-flooded/flooded households of approximately 30/70. In January 2005, the proportion is slightly lower, i.e. 40/60. This difference is significant based on the Chi-square independence test. Furthermore, ACF (2004) stated that the 1996 flood was slightly more significant than in 2002, similar to the data of this research.

Table 2: Condition of flooding years in1995-2005

	HH				NF HH in 2005				F HH in 2005			
Year	NF	% NF	F	% F	NF	% NF	F	% F	NF	% NF	F	% F
1995	207	71	102	35	111	93	9	8	96	51	93	49
1996	**88**	**30**	**221**	**75**	**79**	**66**	**41**	**34**	**9**	**5**	**180**	**95**
1997	206	70	103	35	111	93	9	8	95	50	94	50
1998	211	72	98	33	112	93	8	7	99	52	90	48
1999	217	74	92	31	111	93	9	8	106	56	83	44
2000	198	68	111	38	108	90	12	10	90	48	99	52
2001	199	68	110	38	107	89	13	11	92	49	97	51
2002	**97**	**33**	**212**	**72**	**86**	**72**	**34**	**28**	**11**	**6**	**178**	**94**
2003	208	71	101	34	110	92	10	8	98	52	91	48
2004	228	78	81	28	107	89	13	11	121	64	68	36
2005	**120**	**41**	**189**	**65**	120	100	0	0	0	0	189	100

Note: HH = household, NF = non-flooded, F = flooded

Socio-economic condition (household basis)

The collected data from questionnaires are able to provide brief description upon some parameters of the socio-economic condition of the respondents. The findings go in line with the earlier study conducted by Action Contre la Faim/ACF (2004) despite several insignificant differences in the values of data. This research finds that the heads of household are mostly male (about 70%) in both non-flooded and flooded households. However, the point about the number of family in the house was excluded from the analysis due to the indication that it was not clearly understood by both respondents and assigned cadres despite earlier briefing given to the cadres. The average floor area of house is larger in non-flooded area ($75m^2$) than flooded area ($60m^2$) although the largest one is present in the flooded area. This condition indicates that the socio-economic condition of non-flooded households is better than the flooded one. It also supported the earlier finding by ACF (2004) which said that "houses of less than 20 m^2 are more frequent in flooded areas (30% against 20%), and houses over 81 m^2 are more common in non-flooded areas (13% against 4%). Most of the houses have a size ranging from 21-40 m^2 in both flooded and non-flooded areas. On average houses in Kampung Melayu are smaller than other houses in Jakarta." Another finding that similar to this is related to food and non-food expense. Non-flooded and flooded households share the similar proportion in term of food expense but slightly different in term of non-food expense. Thirty eight percent of non-flooded households spend more than Rp. 500,000/month for non-food expense while only 30% of flooded households spend the same amount of expense. On the other hand, more flooded households (66%) spend lower non-food expense (less than Rp 500,000) while 60% non-flooded households spend that much expense. However, the Chi-square independence test does not reveal any dependency of the parameters (floor area and expenses) on the condition of being flooded or not. In other words, those conditions are not significantly different between the non-flooded and flooded respondents. Regarding the length of stay in Kampung Melayu, both respondents in non-flooded and flooded households, share the similar condition, i.e. most respondents (approximately 87%) have stayed in the area for more than ten years (compared to ACF report (2004) of 85%). Least number of respondents (approximately 5%) has stayed for five to ten years. The rest of respondents (less than 10%) are new comers to the area with the length of stay less than five years.

Socio-economic condition (individual basis)

Almost equal numbers of male and female respondents were involved in the survey. However, it was a slightly higher number of females, i.e. 762 than male, i.e. 719 or 52% to 49%. The portions of respondents with no formal education, on-going elementary school, unfinished elementary school, graduated elementary school, and graduated junior high school, are higher for the flooded respondents than non-flooded ones, with the total of 69.1% to 56.7%. On the other hand, the portions of respondents whose education are graduated senior high school and university, are higher in the non-flooded respondents than the flooded ones, with the total of 43.1% to 30.6%. The Chi-square independence test reveals that the non-flooded and flooded respondents' educations are different from each other. More than half of respondents in both non-flooded and flooded area are jobless (54% non-flooded respondents and 58.8% flooded respondents). The rest of them work in various private and public sectors as well as formal and informal sectors. Consequently, the similarly high number of no-income respondents presents; it is as much as 56.3% and 59.9% in the non-flooded and flooded respondents respectively. However, the total portion of respondents whose monthly income is more than Rp. 1 million is higher in the non-flooded respondents than flooded ones (12.5% to 4.6%). In contrary, lower income respondents with less than Rp. 1 million/month is higher in the flooded respondents than the non-flooded ones (35.5% to 30.9%). It indicates that the socio-economic condition of non-flooded respondents is better than flooded ones, similar to the earlier analysis about floor area. In addition, ACF (2004) 41% of adult residents of Kampung Melayu was unemployed. It included housewives (*ibu rumah tangga*). This gave as much as 2/3 of unemployed residents were female. In term of income, about half of working adults earned Rp. 500.000 to 1.000.000/month, 35% earned lower than Rp. 500.000 (below the standard of Minimum Wage for Jakarta, i.e. Rp. 600.000), and only 17% earned more than Rp. 1.000.000. However, the Chi-square independence tests only reveals the dependency of respondents' job on respondents' condition (non-flooded or flooded) but not the dependency of respondents' income on that condition. In term of house type, both groups share similar condition, i.e. most respondents (approximately 50%) own permanent houses and then followed by the semi-permanent and non-permanent ones (approximately 35% and 15% respectively). The number/percentage of permanent houses is higher in the non-flooded respondents (more than 50%) than flooded ones (about 46%) whereas the number/percentage of semi- and non-permanent houses are higher in the flooded respondents (more than 50%) than non-flooded ones (about 45%). This condition is shown in Figure 3. It reveals the significant difference of house type between both groups of respondents after the Chi-square independence test applied.

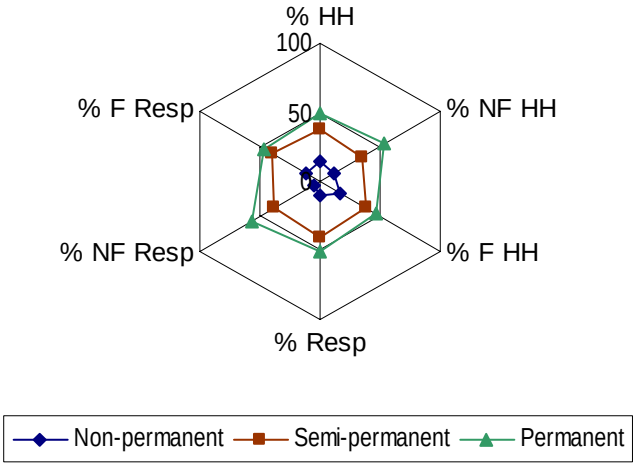

Figure 2. House type on household and individual basis

Water supply and sanitation facilities condition (household and individual basis)

Figure 3 describes the similarity in both household and individual basis of any parameter in the analysis. The source of respondents' drinking water is mostly groundwater (more than 50%) and pipe water (approximately 40%). On average, 70% respondents use groundwater for bathing and washing and close to 30% of them use pipe water. However, the preference of non-flooded respondents in using groundwater is slightly lower than the flooded ones consequently they have higher preference in using the pipe water compared to the flooded ones. No respondent of non-flooded group use river water for bathing or washing while a few number (less than 5%) respondents of flooded group do and the number is higher in washing (4.2% on household basis or 3.5% on individual basis) than bathing (1.6% on household basis or 1.2% on individual basis). It can be said that almost all (more than 99%) respondents treat the drinking water (mostly by boiling it). The latrine and septic tank availability are not proportional, that is, higher number/percentage of latrine than septic tank in both groups of respondent despite the worse condition in flooded group. It indicates that some latrines are not equipped with septic tank. With the exception of drinking water treatment, all other parameters tested with the Chi-square independence test are dependent on the respondents' condition of being flooded or not.

Health condition/disease incidences (individual basis)

The morbidity rates of selected diseases during two times one week surveys and their percentage are presented in Table 3. In general, twelve out of 26 diseases have increased morbidity rates from non-flood to flood season, seven diseases have constant rates in both seasons (with 3 of them do not manifest in both seasons), and seven diseases have lower morbidity rates in the flood season than in the non-flood season. The twelve diseases are cough, high blood pressure, fever, diarrhea, influenza, wounded/injured, running nose, headache, skin diseases, stomach ache, earache, and short breathing. The four diseases with constant rates are throat ache, difficulty to think/concentrate, stressed, and miscellaneous diseases. The three absent diseases are measles, dysentery, and cholera. Two diseases, i.e. dengue fever and typhoid, are present in non-flood season but not in flood season; while diabetes mellitus, vomiting, heartache, eye ache, and insomnia have lower incidence in flood season than non-flood one.

In non-flooded group, there are eight diseases with higher morbidity rates in the flood than non-flood season, i.e. high blood pressure, fever, diarrhea, wounded/injured, running nose, skin disease, throat ache, short breathing and miscellaneous diseases. On the other hand, in the flooded group, more diseases (i.e. 11) have higher percentage in the flood than non-flood season, i.e. cough, fever, diarrhea, influenza, wounded/injured, running nose, headache, skin disease, stomach ache, ear ache, short breathing and difficulty to think/concentrate. Hence, the diseases which share the same characteristics in term of morbidity rates in different seasons are diarrhea, wounded/injured, running nose, skin disease, and short breathing. However, according to the result of Chi-square independence test, five diseases in flooded respondents which have different morbidity rates between the non-flood and flood seasons, i.e. cough, fever, diarrhea, influenza, skin disease while only one (i.e. fever) in non-flooded respondents.

The comparison between groups of respondents in a season can be seen in Table 3 as well but it is even clearer in Table 4. In the non-flood season, cough has significant different morbidity rates between both groups of respondents but non in the flood season. This implies that there might be other factor(s) than flood that causes cough in the respondents. In fact, some factors exist in non-flood season might cause particular diseases to occur such as lack of clean water, poor sanitation or other factors which lead to the emergence of the diseases. The clean water is daily

needs for various purposes such as drinking, bathing and washing. Another possibility is the change of weather in transition between two seasons which normally caused people fell sick as they need to adjust their body to the change of the condition. Similarly with fever, in both non-flooded and flooded respondents, the morbidity rates are different from non-flood to flood seasons. However, the diseases that might be believed to be influenced by flood are diarrhea, influenza, and skin diseases. This is apparent since the morbidity rates of those diseases are dependent on the seasons for the flooded respondents but not for the non-flooded ones. Panuwan *et al.* (2006) revealed that the result of water samples analysis taken in the flood event of January 2005 indicated a higher health risk during flood events than the normal season sue to higher contamination of viruses and bacterial indicators found in floodwater than river water.

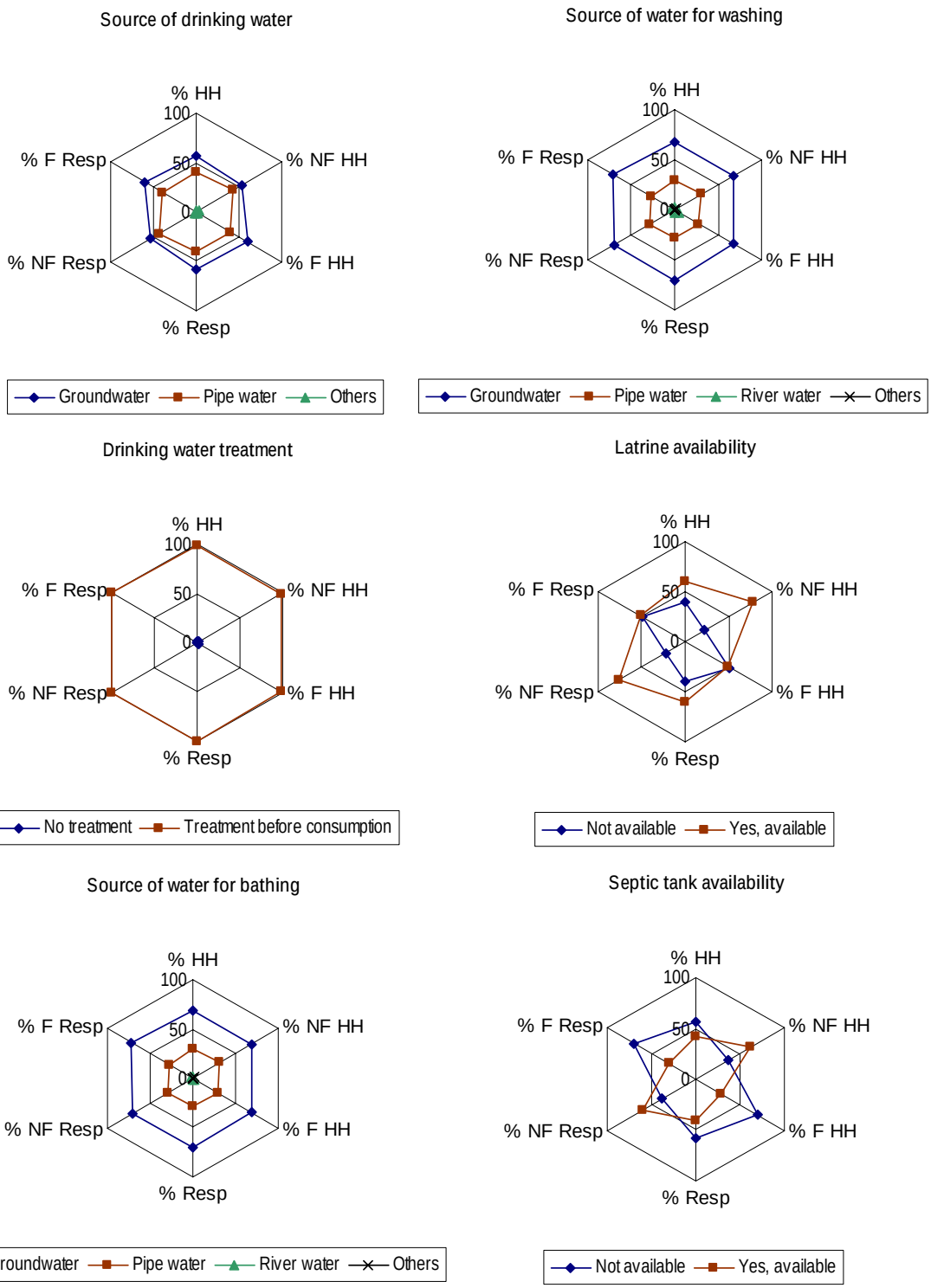

Figure 3. Water supply and sanitation facilities on household and individual basis

Table 3. Distribution of incidence frequency and percentage of 26 selected diseases (total respondents = 1,481)

	Non-flood season (1), 3-9 Oct. 2004						Flood season (2), 28 Jan.-3Feb. 2005					
Disease	**NF**	**%NF**	**F**	**%F**	**Tot 1**	**%Tot 1**	**NF**	**%NF**	**F**	**%F**	**Tot 2**	**%Tot 2**
Cough	30	5.8	30	3.1	60	4.1	21	4.1	49	5.1	70	4.7
Measles	0	0	0	0	0	0	0	0	0	0	0	0
High blood pressure	6	1.2	12	1.2	18	1.2	11	2.1	11	1.1	22	1.5
Fever	8	1.6	22	2.3	30	2	19	3.7	47	4.9	66	4.5
Dengue fever	0	0	0	0	1	0.1	0	0	0	0	0	0
Dysentery	0	0	0	0	0	0	0	0	0	0	0	0
Diarrhea	2	0.4	5	0.5	7	0.5	6	1.2	16	1.7	22	1.5
Influenza	15	2.9	14	1.4	29	2	13	2.5	40	4.1	53	3.6
Diabetes mellitus	1	0.2	4	0.4	5	0.3	0	0	3	0.3	3	0.2
Cholera	0	0	0	0	0	0	0	0	0	0	0	0
Wounded/injured	1	0.2	2	0.2	3	0.2	2	0.4	3	0.3	5	0.3
Vomiting	3	0.6	1	0.1	4	0.3	1	0.2	0	0	1	0.1
Running nose	21	4.1	22	2.3	43	2.9	22	4.3	37	3.8	59	4
Heartache	1	0.2	2	0.2	3	0.2	0	0	1	0.1	1	0.1
Headache	12	2.3	15	1.5	27	1.8	8	1.6	27	2.8	35	2.4
Skin disease	2	0.4	7	0.7	9	0.6	4	0.8	19	2	23	1.6
Eye ache	2	0.4	4	0.4	6	0.4	2	0.4	2	0.2	4	0.3
Stomach ache	7	1.4	7	0.7	14	0.9	5	1	12	1.2	17	1.1
Earache	0	0	0	0	0	0	0	0	2	0.2	2	0.1
Throat ache	1	0.2	2	0.2	3	0.2	2	0.4	1	0.1	3	0.2
Short breathing	2	0.4	3	0.3	5	0.3	6	1.2	6	0.6	12	0.8
Typhoid	1	0.2	0	0	1	0.1	0	0	0	0	0	0
Diff.to think/concentr.	1	0.2	1	0.1	2	0.1	0	0	2	0.2	2	0.1
Insomnia	3	0.6	4	0.4	7	0.5	2	0.4	4	0.4	6	0.4
Stressed	0	0	1	0.1	1	0.1	0	0	1	0.1	1	0.1
Others	1	0.2	1	0.1	2	0.1	2	0.4	0	0	2	0.1

The flood impact on population health is a very complex issue (Flood Hazard Reseach Center/FHRC, 1999) and far-reaching (Hajat *et al*, 2003). The impact does not always emerge right away but it might occur after sometime. Even unexpectedly, no outbreak waterborne disease was identified within one month period (Morbidity and Mortality Weekly Report/MMWR, 1993) and nothing was reported from the flood-affected area (WHO Malawi, 2003). The Indiana State Department of Health explained that diseases rate may increase during the flood occurrence because of sanitation and living condition. However, outbreaks of communicable diseases are unusual.

Socio-economic condition has relationship with the flood impact on the people's health as some particular populations are more vulnerable, i.e. more likely to experience more severe impacts than other groups. FHRC (1999) stated in its publication that people with lower socio-economic status is one of the populations who is vulnerable to the impact. WHO (2002) also stated that people with lower income is one of the vulnerable populations who because of various constraints, i.e. social, political and economic, faces special required health care.

Various studies explained in different terminologies about stress or mental problem impact of flooding. However, in this study it is not obviously present. The discussion related to mental health is deep while the observation needs specific instrument that can give reliable result. Different instrument might give different result. The brief observation in this study might not be sufficient to disclose the existence of this problem. The other possibility of this condition is that the flood-affected people in the study area is already used to the condition. Hence, the present of stress or mental problem is not significantly obvious.

4. CONCLUSIONS

The condition of water supply and sanitation facilities in the study area in terms of source of water for drinking, bathing and washing, availability of sanitation facilities in the house, as well as the condition of socio-economic in terms of house type, education and income, were significantly different between the groups of non-flooded and flooded respondents. Regarding several observed diseases, it cannot be clearly indicated that their existence was the impact of flooding. This finding suggested the need of taking into account the other possible factors than flood that

might be the cause of the diseases. However, the diseases whose presence can be confirmed to have relation to flood are diarrhea, influenza, and skin disease.

Table 4. Result of Chi-Square independence test of health condition between seasons and respondents

	Asymp. Sig. (2-tailed) of NF vs. F seasons		Asymp. Sig. (2-tailed) of NF vs. F respondents	
Disease	**In NF respondents**	**In F respondents**	**In NF season**	**In F season**
Cough	0.250	**0.038**	**0.013**	0.442
Measles	-	-	-	-
High blood pressure	0.328	0.838	1.000	0.174
Fever	**0.049**	**0.003**	0.440	0.355
Dengue fever	-	-	-	-
Dysentery	-	-	-	-
Diarrhea	0.287	**0.026**	1.000	0.652
Influenza	0.848	**0.000**	0.074	0.141
Diabetes mellitus	1.000	1.000	0.664	0.556
Cholera	-	-	-	-
Wounded/injured	1.000	1.000	1.000	1.000
Vomiting	0.624	1.000	0.123	0.346
Running nose	1.000	0.063	*0.052*	0.677
Heartache	1.000	1.000	1.000	1.000
Headache	0.499	0.085	0.309	0.154
Skin disease	0.687	**0.028**	0.727	0.120
Eye ache	1.000	0.687	1.000	0.613
Stomachache	0.773	0.261	0.262	0.800
Earache	-	0.500	-	0.547
Throat ache	1.000	1.000	1.000	0.277
Short breathing	0.287	0.507	1.000	0.360
Typhoid	1.000	-	0.346	-
Diff. to think/concentr.	1.000	1.000	1.000	0.547
Insomnia	1.000	1.000	0.699	1.000
Stressed	-	1.000	1.000	1.000
Others	1.000	1.000	1.000	0.120

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