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Health status of transitional resettlement sites after the earthquake in Mianyang city of Sichuan province

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ABSTRACT

Objective: To understand the health status of transitional resettlement sites and the needs of residents on health education, and to provide basis for conducting health education after ear- thquakes and other public emergencies. Method: From May 31 to June 2, 2008 (19 to 21 days after the earthquake), field observation, questionnaire survey, and structured interviews were conducted in five transitional resettlement sites. Information on health status, health service, health education, and residents' needs on health education was collected. Results: 430 questionnaires were distributed and 424 valid completed ones were returned. Food and water were adequately supplied. Clinics for health assistance were established and environment disinfecting was conducted regularly by public health professionals. Health education was available to residents. The large proportion (98.6%, 97.9%, 88.7%, and 93.2% respectively) of the residents acknowledged that water supply, food supply, lavatories, and health service were adequate to fulfill basic needs. The overall disease incidence of surveyed residents was 44.8%, and diarrhea and fever with respiratory symptoms were the most common diseases. Among residents' needs on disease prevention knowledge and skills, basic knowledge of infectious diseases was most desirable (49.8%), and safety knowledge of water uses was secondarily most desirable (36.8%). The most favored approach of obtaining knowledge was watching television. Conclusions: In the period of 20 days after the earthquake, Living security, health facilities, and health care service could satisfy residents' basic needs. Post-disaster health education should concentrate on basic knowledge and skills of communicable diseases and health- risky behavior. Timely distributing disease prevention materials could be effective.

Keywords: Earthquake; Disaster Areas; Health Status; Health Education; Needs;

1. INTRODUCTION

On May 12, 2008, an earthquake with magnitude 8.0 hit Wenchuan, Sichuan Province. The quake caused thousands of deaths and injured, destroyed buildings and roads, and brought about huge financial loss. In the affected area, water and electricity supply were interrupted, and health care facilities and systems were enormously damaged, which resulted in the high risk for the outbreak and epidemic of intestinal communicable diseases, vector-borne diseases, food-borne diseases, diseases of natural focus, and infectious diseases transmissible between human and animals. Food and water safety, environmental health, health care service, and post-earthquake health education were the most important issues in disaster relief. To understand the health condition of transitional resettlement sites and residents' needs on health education, Health Education Institute, Chinese Center for Disease Control and Prevention (China CDC) (Note：now named Chinese Center for Health Education/ Heath News Communication Center, Ministry of Health of China) conducted this study from May 31 to June 2, 19 to 21 days after the earthquake.

2. METHODS

2.1. Participant

The resident in five transitional resettlement sites in Mianyang city, Sichuan Province were surveyed by the same questionnair, and they were from Beichuan county, one of the worst-hit areas. Four hundred and thirty questionnaires were distributed, and four hundred and twenty four valid questionnaires were re-

turned. Sixty participants (14.2%) were currently living in Huangtu transitional resettlement sites, seventy two (17.0%) in Anzhou driving school, one hundred and fourteen (25.9%) in Leigu, Beichuan, and sixty eight（16.0%) in Gaoxin. Participants were Beichuan County residents, 208 males and 216 females. The average age was 35.3±13.3,, the minimum age was 10 and the maximum age 84. Most of them (70.5%）had an elementary or middle school degree,and 78.3% of them were from Qiang minority race.

2.2 Sampling Methods

Convenience sampling method was used to select five sites for observation and participants for survey. Age and gender were proportionally distribute.

2.3. Observation

Administrators examined the heath condition, health care, and health education at transitional resettlement sites. Collected information included water and food supply, living health condition, environmental health (i.e., lavatories, and garbage collection and management), health care and drug supply, and the condition of health education.

2.4. Questionnaire Survey

The questionnaire was self-designed and some contents were derived from environmental assessment questionnaire developed by China CDC and WHO [1-3], including several dimensions: water and food supply, health condition, health care, incidence of diseases, and post-disaster needs. Participants were interviewed face-to-face by administrators.

2.5. Personal In-Depth Interview

Participants were randomly selected from those who were recruited for questionnaire survey. Interviews focused on post-disaster water and food supply, personal hygiene stuff, the interruption of cooking food, residents' evaluation on health education materials, and the major difficulties they were facing.

2.6. Quality Control Survey Administrators Received Standardized Trainings

They were guided and supported by local health departments. Participants were informed of the intent and importance of the study. Leaders of each survey group supervised the information collection process and assessed every returned questionnaire

2.7. Statistical Analysis

Epi data 3.0 was used to help data entry, and SPSS 13.0 was used to conduct statistical analysis.

3. RESULTS

3.1. Health Condition and Health Care

It was indicated by observation and survey that there was sufficient drinking water and food supply in transitional sites. Lavatories were enough to serve temporary residents. Every transitional site had established temporary health assistance and professionals to carry out environmental disinfection. Health education in form of health materials, posts, lectures, and volunteer in-door health promotion was delivered. However, water for living was not adequate at several sites, and the types of medicine were limited, as shown in **Table 1** and **Table 2**.

3.2. Diseases and Sought for Health Care

Fifty eight participants (13.7%) ever had diseases or symptoms. Diarrhea (54.2%) and fever with respiratory symptoms (32.1%) were the most common health problems.

3.3. Health Education Condition and Needs

3.3.1. Residents' Health Knowledge, Belief and Practice

Participants had some health-related knowledge and high level of awareness of drinking water safety and rabid. However, unhealthy behaviors occurred among residents, including drinking uncooked or unprocessed water, using domestic water that had not been disinfected, and failing to discharge leftovers as shown in **Table 3**.

3.3.2. Health Education Needs

In response to the question of the two most desirable things, 101 participants (23.8%) expressed that one of them should be health and disease prevention knowledge, while the majority of them supported that they should be the living necessities including water, food, and residence. Thirteen participants thought that they did not need any assistance. In response the question of the two most desirable medical assistances, 188 participants (44.3%) supported that one of them should be diseases prevention knowledge and skills, while the majority of them wanted convenient health care service. Twenty six participants (6.1%) thought they did not need any health assistance. When it came to knowledge and skills of diseases prevention, basic information about communicable diseases was most favored, as shown in **Table 4.**

3.3.3. Where to Access the Knowledge and Skills of Disease Prevention

Participants gained knowledge and skills mainly from the health education materials, including booklets, brochures, foldouts, and posts, and the programs broad casted by the speakers in transitional sites were the most popular strategy to deliver health education. The most favorable way is television and materials.

3.4. Personal Interview Results

One hundred and thirteen participants were interviewed. Twenty eight (24.8%) were currently living in Huangtu transitional resettlement sites, twenty five (22.1%) in Anzhou driving school, thirty six (31.9%) in Leigu, Beichuan, eighteen (15.9%) in Yong'an, and six (5.3%) in Gaoxin. There were 43 males (38.1%) and 70 females (61.9%). The average age was 40.3± 6.5, the minimum age was 10 and the maximum age was 71. Most of them (78.9%) were from 18 to 59 years old.

The percentages of participants who experienced interruption of food, drinking water, domestic water, lavatory, safe living places, health care, bathroom stuff, and food processing stuff were 45.0%, 45.5%, 44.4%, 46.2%, 53.3%, 48.1%, 53.8% and 83.0%, respectively.

Table 1. Health condition and Health care.

Items	Condition	Identified problems
Food	Collectively and adequately supplied; Mainly packaged food; Infant formula milk powder supplied; A few cooked food supplied.	Singleness of food types; Impossible for cooking processing.
Drinking water	Mainly bottled; Collectively supplied.	Cooked water supply not sufficient
Domestic water	Water disinfection by big water processing equipments; Collectively supplied; Water collection sites with 50 meters or five-minute walking distance.	If water from rivers or springs was used, disinfection could not be done by residents.
Residence condition	Mainly tents set by governments; Approximately 12 square meters for 8-10 residents; Temporary wood buildings established for health care assistance use.	Extreme density.
Lavatory	Mainly dry lavatories build after the tremor; Cleaned every day; Within 50 meters and five-minute walking distance.	The hygiene of the lavatories survived from the tremor and commercial lavatories were not acceptable.
Environmental health	Most garbage cans topped and depleted every day; Insecticide applied two times a day; Mosquito nets distributed to children; Livestock feeding stuff possible at several sites and animals fenced.	Uncanned garbage found in transitional sites.
Health care	One or more health care place for each site, within 50 meters and five-minute walking distance.	Supply of medicine for chronic diseases adequate.
Health education	Posts and brochures distributed; Health knowledge promoted by medical professionals and volunteers; Broadcasting programs available in some sites.	Materials mainly in the form of leaflets and brochures; Content deficient in diversity.

Table 2. Residents' evaluation on health condition and health care.

Items	Reaction	Number	%
Drinking water	Completely satisfied	316	74.5
	Basically satisfied	102	24.1
	unsatisfied	6	1.4
Food	Completely satisfied	295	69.6
	Basically satisfied	120	28.3
	unsatisfied	9	2.1
Lavatory	Completely satisfied	222	52.4
	Basically satisfied	154	36.3
	unsatisfied	48	11.3
Lavatory condition	Clean	341	80.4
	Fairly clean	61	14.4
	Less clean	22	5.2
Commit nuisance	Commonly	14	3.3
	Less commonly	73	17.2
	Rarely	337	79.5
Mosquitoes and flies	Many	143	33.8
	Comparatively less	155	36.6
	Few	126	29.7
Health care	Completely satisfied	251	59.2
	Basically satisfied	144	34.0
	unsatisfied	29	6.8

Table 3. Health knowledge, belief, and practice.

Questions	The number of yes responses	%
Knowledge and belief		
Drinking uncooked or unprocessed water could do harm to health.	402	94.8
Do not share washbasins and towels with relatives who had pink-eye disease.	295	69.6
Rabid vaccine is needed after being biting or scratched by dogs and cats.	391	92.2
Behavior		
Ever drunk uncooked or unprocessed water	55	13.0
Disinfected domestic water that was collected by themselves (n=110)*	51	46.3
Ate overdue food (n=167)*	6	3.6
Discharged waste water everywhere	27	6.4
Cleaned garbage everyday	62	14.6
Made efforts to prevent mosquitoes, flies, and rats	195	46.0
Ventilated living places	378	89.2
Washed hands before meals and after using the restroom.	396	93.4
Leftover reheating (n=163)*		
Completely reheated	123	75.5
Just warmed	16	9.8
Did not reheat, because of lack of needed equipments	19	11.7
Did not reheat, since it is not needed	5	3.1
Separated the raw and the cooked (n=58)*		
Yes.	54	93.1
No, since not allowed by living situations.	4	6.9
No, since it is not needed.	0	0.0

Note:* indicated that only those ever had overdue food, needed stuff for cooking, and self collected water were surveyed.

Table 4. Participants' needs on general support, health care, and disease prevention.

Items	Number	%
General supports（The most desirable two）		
Safe living places	259	61.1
Sufficient water and food supply	178	42.0
Knowledge and skills of health and diseases prevention	101	23.8
Ability and skills of escaping from the tremor and helping each other	63	14.9
Psychological assistance	26	6.1
Others	65	15.3
Needs on health and disease prevention（The most desirable two）		
Convenient health care service	191	45.0
Knowledge and skills	188	44.3
Disinfectants	182	42.9
Medicines	4	0.9
Needs on knowledge and skills of disease prevention		
Basic knowledge of communicable diseases	211	49.8
Drinking water safety	156	36.8
Food safety	140	33.0
Prevent mosquitoes, flies, and rats	132	31.3
Local communicable diseases	126	29.7

Table 5. Where to access the knowledge and skills of disease prevention.

Where	Already gained		Expected to gain	
	Number	%	Number	%
Television	131	30.9	195	46.0
Broadcasting	159	37.5	127	30.0
Newspapers	102	24.1	94	22.2
Books	61	14.4	89	21.0
Medical professionals	100	23.6	123	29.0
CDC staff	123	29.0	126	29.7
Relatives/ friends	62	14.6	42	9.9
Propaganda materials	209	49.3	160	37.7
The speakers in transitional sites	24	5.7	20	4.7
Never gained	22	5.2	—	—

Although the problem of cooking food remained unresolved, other life necessities were fully supplied by governments. The total period of the interruption was controlled to be within two days at every site. The existing difficulties include the singleness of food which caused digest problems and stomach upset of the elder and children, extreme density of living places where both temperature and humidity were at a high level, lacking of bathing stuff, children education, job interruption, the loss of household asset, and financial crisis.

86.9% of participants supported that post-earthquake health education was needed, and 41.6% of them thought that brochures and books were the best method of education since the content could contain a wide range of information, be systematic, and be understandable. 78.2% of them had a positive evaluation toward the delivered or posted health education materials.

4. DISCUSSION

The survey was conducted 19-21 days after the earthquake. The results indicated that basic life necessities and health care facilities and service could fulfill residents' needs. Water and food supply were adequate, and there were sufficient lavatories and garbage recycling sites that were cleaned every day. Environmental disinfection, mosquito, fly, and rat prevention had remarkable effects. Few flies and rats were observed by residents. However, many problems had been identified. There is the risk of food safety issue since food was from outside of the earthquake hit areas [4]. The mainly supplied food was packaged noodles and cookies, which could effectively prevent intestinal infectious diseases. However, more efforts should be made to enrich the types of food and provide appropriate food to the elder and children. It was fairly crowded in temporary tents where the temperature and humidity were high. Tents were not enough to ensure family as the small unit to be accommodated. Many health care sites only had emergency drugs like anti-bacteria and flu treatment drugs, but the drugs for chronic disease such as high blood pressure and diabetes were not enough to satisfy the needs. Moreover, the bathing stuff were so insufficient that residents could not shower every day.

There were three kinds of lavatories available at each site: dry ones established after the tremor, remaining ones that survived from the tremor, and commercial mobile lavatories. The dry lavatories were the most appropriate ones for environmental health. They were easy to build at a lower cost and could serve many people. The other two kinds of lavatory could not be cleaned easily since the water supply was interrupted, which could result in the proliferation of flies and mosquitoes [5]. Additionally, commercial mobile lavatories were not easy to transport and their cost was high. Thus, it was suggested that dry lavatories should be established in time after earthquake.

The most common health problems among residents were diarrhea, fever with respiratory symptoms, heatstroke, cold, and dermatitis. The post-tsunami effects caused by stress sources such as lifestyle changes, the death of relative, and the loss of incomes could cause disorders of the immune system, make residents vulnerable to varieties of diseases. The density and humidity of the residence might be the cause for dermatitis.

The environment changed dramatically after the earthquake. If residents lacked the knowledge and willingness of disease prevention, or there were not enough health facilities such as lavatories, personal hygiene stuff, or even if related facilities were available but residents did not have a healthy behavior pattern, communicable disease could break out easily. Thus, post-earthquake health education was highly important. According to the results of the survey, residents had some unhealthy behaviors, like using non-disinfected river water as living water. Post-earthquake health education should follow the principles applying to outbreak public health emergencies, be delivered in time, and focus on those at high risk[6]. Booklets/brochures were the most favorable materials since they can have a wide range of information, be systematic and understandable, be kept easily. Television was the most method favored by the residents. It was highly appropriate for those who receive less education. As residents were being relocated, televisions should be equipped. Furthermore, the speakers at each site should be fully used to implement health education.

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