ETHNOGRAPHIC ANALYSIS OF INDIVIDUAL BEHAVIOR FOLLOWING THE HANSHIN-AWAJI EARTHQUAKE DISASTER

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SUMMARY

The Hanshin-Awaji earthquake disaster has developed a new paradigm for disaster research. In term of the lifeline earthquake engineering, post-disaster human behavior is an important issue for developing the restoration strategies. This paper presents an ethnographic analysis of post-disaster human behavior focusing on the transition of the victim's residence and its determinants after the Hanshin-Awaji earthquake disaster. The item-category data were semi-structured interviews of 32 victims in Nishinomiya-city. The three sites were selected in the city, downtown, midtown and uptown. Each interview took about 2 hours in total to acquire the information of the significant events in their post-disaster response including their residence transition for the first one year after the earthquake. Based on the item-category data sets, multi-dimensional quantification analyses were carried out to identify key factors for determining the transition of their residence throughout one year after the earthquake. From the analysis, three different time phases for victim's behavior are identified. For the first 10 hours, victims tended to be inactive. For the first 100 hours, the loci of residence were divided into three groups such as home, shelter and relocated to other jurisdiction. For the first 1000 hours, the victims restarted their life through their personal contacts. In addition, the transition of the victim's residence is deeply dependent on the life stage of each individual. The lessons learned are compiled to"Disaster Ethnography"to understand the disaster process for the future disaster management.

INTRODUCTION

In the Hanshin-Awaji earthquake disaster, both the sufferers and the disaster relief task force were faced with unprecedented situations that they had never before experienced. It was all they could do to cope with problems arising moment to moment without knowing what would happen next and how the disaster would develop.

When a disaster occurs, if people in the stricken area are to choose the wisest method of coping with the disaster, it is important to understand and judge the kind of measures that should be taken to prepare for possible subsequent events.

Accordingly, it is important for the citizens in the Hanshin and Awaji areas to fully understand and share their knowledge of the various events that have occurred since the earthquake so that we can prepare to better weather any subsequent disaster.

The primary method of researching the behavior of disaster sufferers has been questionnaire surveys to identify problems and challenges. Questionnaire surveys are an effective way to quantitatively grasp the problem at a certain stage. However, answers that are not covered by those questionnaires sometimes contain important facts that we should learn.

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For this reason, in our study, we conducted interviews with those who were hit by the Hanshin-Awaji earthquake disaster, then reviewed the disaster process from the sufferer's point of view.

DEFINITION OF DISASTER PHASES

Concerning the development of disaster processes, several suggestions have been made from the viewpoint of disaster relief task forces. It was found that there are 3 representative phases: emergency, recovery and reconstruction.The emergency phase mainly involves life-protective activities, and refers to the first 72 hours after the occurrence of a disaster, which is the critical time limit for rescue operations. The recovery phase primarily involves activities to recover the functions of flow systems of the community, and it refers to the period until the lifeline is temporarily restored. The reconstruction phase focuses on the reconstruction of community stocks, and refers to the period where the lifeline is completely restored and housing and lives are reconstructed to normal.

The existence of these phases is a useful piece of information for the administration and businesses dealing with the disaster. The phases can be used as an index of the transitional points for their actions. In contrast, when examining the disaster process from the viewpoint of sufferers who receive relief services, much remains unidentified. For example, among the sufferers who are able to continue to live in their homes after the quake, the recovery of the lifeline is an important piece of information in the process of returning home and restoring their lives.

However, for those stricken sufferers who are forced to evacuate their completely destroyed houses, the most important information revolves around the reconstruction of housing; information on recovery of the lifeline is only of secondary importance. In order to efficiently execute actions and raise their quality, it is necessary to correctly grasp what needs the sufferers in this area have, identify the order in which judgments need to be made in the area, and specify the time frame within which those judgements should be made.

TARGET AREA AND PEOPLE

We chose Nishinomiya City, Hyogo Prefecture, as the target area for the questionnaire survey. Nishinomiya City holds a population of 400,000, and it is likely the result of the survey on Nishinomiya as an average city of Japan will be utilized also for other cities in Japan. In addition, regarding the severity of damage from the Hanshin-Awaji earthquake disaster, city areas ranged from hard-hit (seismic intensity of 7) to relatively lightly stricken areas.

Also, given the local characteristics of Nishinomiya and its damage status, we chose Uegahara district (hilly section in the north of the city), Takamatsu-cho (central section) and Imazuminami-cho (seaside section), all of which lie along the Hankyu-Imazu Line railway that runs from north to south through the middle of the city.A preparatory polling was conducted among all households in these 3 districts. A total of 32 households were chosen, taking the following factors into account: family make-up and life environments at the time of the earthquake; status of the damage; whether they have spent time in shelters or temporary housing; and state of the rebuilding of their houses.

In order to identify the process of damage that the 32 households suffered, we conducted detailed interviews, spending a total of 60 hours to obtain information on their behavior for about one year after the disaster, starting from immediately after the quake. The interviews were conducted in a semi-structured approach based on the development of talks by sufferers so that the process of the talks would not be hindered and the interviewees would be urged to speak further. Special consideration was given so that detailed information on experiences of individual interviewees could be obtained in addition to common premise-based questions by the interviewer.The data obtained were complied into a database while historical data on spatial-temporal behaviors were input into GIS.

CHANGES OF HOUSING LOCATIONS

What the sufferers are deprived of in disasters can basically be divided into 3 factors: life, housing and occupation. Of them, the housing factor serves as the basis for determining a future lifestyle and the supporting program to be officially applied, and thus, it is the core of the whole process of restoring the sufferer's life. Accordingly, careful and swift judgments are required in succession immediately after a disaster occurs. For this reason, it is extremely important for the sufferer to determine a method for dwelling at each stage. Having analyzed the changes in the sufferers' housing locations using the GIS database, we have found that their housing locations in the one year following a disaster can be categorized into the following 3 types:

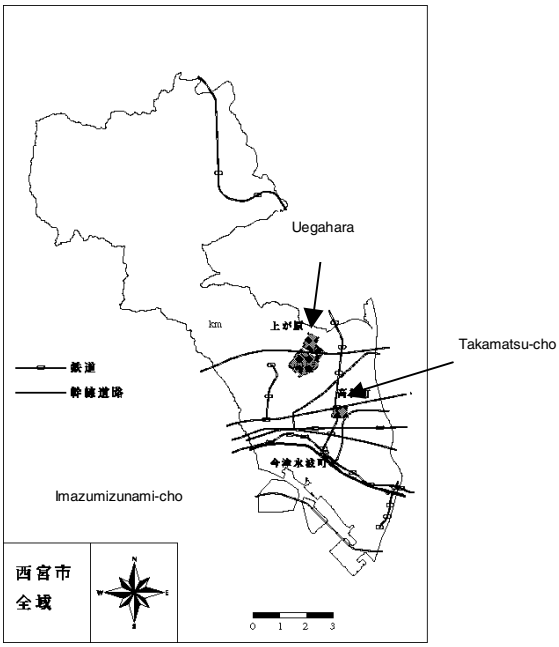


Figure1:Target Area(Nishinomiya-City)

1) Returning home (home type)

2) Relocating to a different place within the city (intracity relocation type)

3) Relocating to a place outside the city (out-of-city relocation type).

In order to identify decisive factors in these patterns in choosing housing locations, we categorized the suffers' behaviors by individual, household, local attribute, and post-quake actions in terms of 7 points of time: the day of the quake, 3 days after the quake, 7 days, 1 month, 3 months, 6 months, and 1 year after the earthquake(see Table:1). Then, we conducted a discriminate analysis using the type II quantifying method.

The result of analyzing the 3 groups (home, intra-city relocation and out-of-city relations) is presented in table 2.

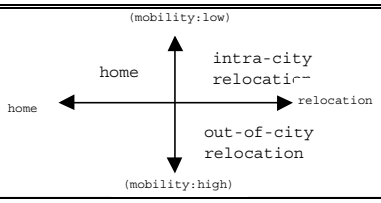
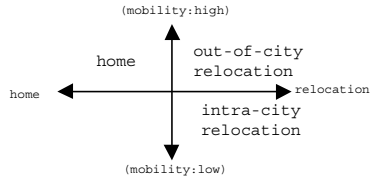
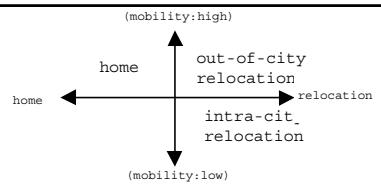
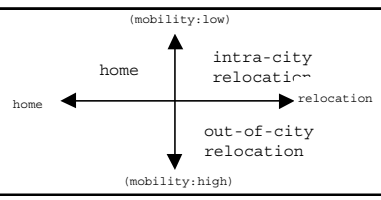
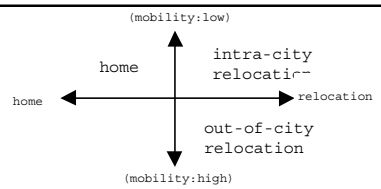
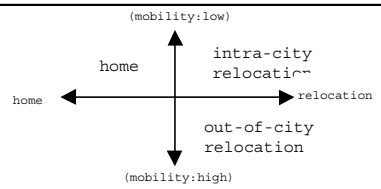
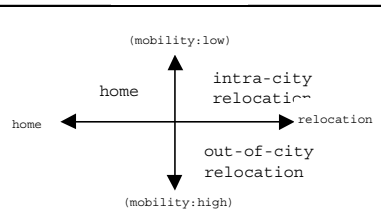
Given the significance of each ax at the 7 points of time, the first ax is for discriminating home and relocation types. This indicates that the possibility of living in the suffers' homes is a basic factor of disaster relief operations.

On the 2nd ax, data differed with "day of quake" and "within a month" from "3 days" and "7 days." The 2nd ax for "day of quake" and "within a month" discriminates out-of-city types from home and intra-city types. It indicated the level of mobility to distinguish between staying in the city and leaving the city.

The 3rd ax on "day 3" and "day 7" distinguished intra-city relocation from home and out-of-city relocation. Reading the items indicating highly deviated relative figures on the 2nd ax in the positive domain, this group was characteristic in that "maximum behavioral radius on the quake day" was 5 km or less; there were "the wounded in the family"; "occupation" was self-employed; "age" old in the 1st-term; "housing location at time of the quake" Takamatsu-cho or Imazuminami-cho; there were "the deceased in the family." It implies people who were closely related to the community or those with community-bound backgrounds.

In terms of the negative domain, this group was characterized by "maximum behavioral radius on the quake day" of 5 km or more, no "wounded in the family;" "occupation" was unemployed; "age" 24 or below; "housing location at time of the quake" Uegahara; no "deceased in the family." This group corresponds to those who behaved relatively actively in this period. From these characteristics, the 2nd ax's positive/negative can be considered the level of mobility.

Table2:Patterns in choosing housing and suffers' behavior with individual

time				indicating deviated relative	
the day of quake			maximum behavioral times of relocation:2 the old in the family:No	0.924 0.773 0.670	**** *** ***
			maximum behavioral radius:1- times of relocation:0 the old in the family:Yes		
3 days after the quake			times of relocation:0 maximum behavioral radius:5km the old in the family:Yes the wounded in the family:No	0.780 0.775 0.769 0.761	*** *** *** ***
			times of relocation:2 maximum behavioral radius:1- the old in the family:No the wounded in the family:Yes		
7 days after the quake			times of relocation:0 the wounded in the family:No age:0-14	0.689 0.600 0.572	*** ** **
			times of relocation:2 the wounded in the family:Yes age:65-74		
1 month the quake			age:0-14 damage of house:half collasped rented house	0.632 0.553 0.505	*** ** **
			age damage of house:No rent a room		
3 months the quake			age:65-74 damage of house:No times of relocation:4	0.621 0.564 0.557	*** ** **
			age:75- damage of house:half collasped times of relocation:0		
6 months the quake			age:65-74 damage of house:No times of relocation:4	0.631 0.597 0.517	*** ** **
			age:75- damage of house:half collasped times of relocation:1		
1year after the quake			rent a room damage of house:partial collasped times of relocation:4 age:65-74	0.580 0.574 0.540 0.518	** ** ** **
			rented house damage of house:half collasped times of relocation:0 age:35-44		

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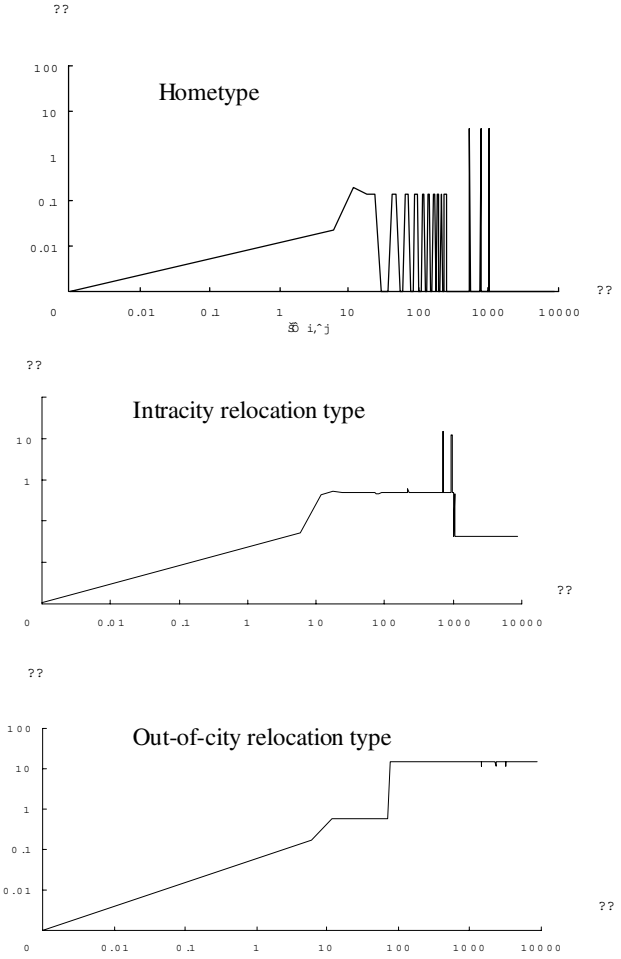

Figure2:relocation types after the quake

EXISTENCE OF 3 TIME PHASES

Given the above factors, it was found that there had been 3 time phases in the sufferers' behaviors (see figure 2). We have studied the meaning of these 3 time phases by expressing "the day of the quake" as 10 hours, "3 days and 7 days" as 100 hours, and "1 month or longer" as 1,000 hours.

The first phase, or "within 10 hours," is a "lost direction phase" of dealing with various happenings with only haphazard, temporary measures. The "within 100 hour" period is a "phase of shaping a stricken community" where the situation is mostly grasped, shelters are built, and support teams and rescue materials arrive, and thus factors constituting a stricken community are formed.

In this phase, the sufferers take measures to try and restore their lives by taking their household goods out of the damaged houses and securing dwellings through various bonds. The "within 1,000 hour" period is regarded as a "stabilizing phase for the stricken community" where a so-called "disaster utopia" is built as first-aid restoration works proceed for a lifeline and the likes, and volunteers start to serve the community. By this phase, many sufferers leave the community and gaps resulting from the severity of the damage become obvious.

Last, the "over 1,000 hour" period is a "transitional phase for returning to normal" where many sufferers remaining in the area restore their daily-life routines and resume commuting to their work places as the lifeline is recovered.

CONCLUSIONS

Through the interviews with sufferers of the Hanshin-Awaji earthquake disaster, this research studied the disaster process from a sufferer's point of view. In particular, focusing attention on the "housing" problem, we reviewed the development of the disaster process based on reactive behaviors of the sufferers. As a result of analyzing their behaviors using a quantitative theory, we have found that the sufferers' behaviors can be divided into 3 different phases: 10 hours, 100 hours and 1,000 hours.

These 3 time phases can be considered: 1) lost direction phase, 2) phase of shaping a stricken community and 3) transitional phase to normal. A stricken community will transit to normal via these phases.

Housing is the base for restoring sufferers' lives, and it is the second most important factor for them after "securing lives." It is necessary to finish important judgments, such as emergent evaluation of damages of stricken houses, within 10 hours after an earthquake occurs.

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LESSONS FROM RECENT EARTHQUAKES, Human activities, Nishinomiya City, Disaster victim, Hanshin Awaji Earthquake, Housing relocation,