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Literature review of disaster health research in Japan: focusing on nursing disaster education

Abstract

Introduction: Japan has a long history of disaster due to its geographical location: that is, in the *Pacific rim of fire*. The frequency of earthquakes experienced in recent years has had significant influence on the theme of disaster health research in Japan. This paper presents a systematised review of disaster health research undertaken in Japan, and discusses the trends in disaster health research, particularly in disaster nursing research over the last eight years in the field of nursing.

Method: The most commonly used database in Japan, *ichushi ver.4*, was used for this literature review. The keywords and sub keywords used were: *disaster, disaster nursing, practice, education, ability, response, emergency, licensure, capability, function, prevention, planning and research*. The authors used these key words, sometimes in combination, to identify relevant literature.

Result: A total of 222 articles were reviewed, with the number of research papers available having increased gradually since 2001, peaking in 2007. The most common articles used were found using the search category of ‘disaster nursing and research’. Among the search category, the area of ‘disaster nursing, education’ always seemed to have a high number of publications. This category also peaked in 2007.

Conclusion: The recent experiences of natural disaster in Japan accelerated the impetus to explore and implement a disaster nursing concept into practice and nursing curricula. Further evidence-based studies for the purpose of developing methodology and other areas of studies in disaster nursing including other languages databases are to be expected in the future.

Key words: *literature review, disaster nursing, research methodology, Japanese, concept.*

INTRODUCTION

Japan has a long history of developing disaster-planning systems due to both its geographical characteristics and the frequent occurrence of disasters in the South East Asia region. There were 2,909 reported disasters between 1999 and 2008 with 1,023, 081 people reported killed during this period.¹ The Asian region has the highest number of disasters with 38% of these disasters having occurred between 1975 and 2000 affecting as many as 88% of the population of a region.² This frequent occurrence of disasters becomes a serious socio-financial burden to the countries involved.

The frequency of earthquakes experienced in recent years has had a significant influence on the disaster health research sector in Japan. Sakai surveyed the trend of disaster nursing research, and found that disaster nursing research articles have appeared in the literature since 1991.³ Their review demonstrated that disaster nursing research has become more diversified reflecting the occurrences of various other types of disaster, such as the Sarin Gas underground incident in Tokyo, the Great Hanshin-Awaji earthquake of 1995, and the Great East Japan earthquake in 2011.

Disaster health research now has quite a broad area of focus, including areas such as disaster planning, disaster management, and community capacity building among others. Disaster health is a practice that also calls for multidisciplinary research as emphasised by Kuroda and Sakai.⁴

Although the number of disaster health research article has increased and the focus has expanded, the studies have not yet been systematically reviewed, particularly in Japanese nursing journals. It is also not known if unique language usage exist that prevent the comparison of Japanese disaster nursing research findings with those of other countries. In order to determine the extent and focus of disaster health research literature, in particular disaster nursing research in the Japanese language, the authors reviewed the literature to investigate tendencies and characteristics manifest in current

disaster health research. This report will particularly focus on the review of the disaster nursing education literature.

METHODS

Article selection process and inclusion criteria

The Japanese literature search was conducted using the Japanese database (*Ichushi ver.4.0*) since this database is the sole database of health professionals research articles. The key words for disaster nursing were: 1. *disaster nursing, education*; 2. *function, disaster nursing*; 3. *practice, disaster nursing*; 4. *capability, disaster nursing*; 5. *disaster response, planning*; 6. *emergency, response, planning*; 7. *disaster prevention, disaster nursing*; 8. *licensure, disaster nursing*; 9. *ability, disaster nursing*; and 10. *research, disaster nursing*. Relevant literature published between 2001 and 2007 was chosen for review in order to capture that period in which there were increased numbers of disasters nationally and internationally. Translation from Japanese into English was carefully performed by checking that the term and context used in the Japanese article were the same used in English-language context. If this was not the case, the authors tried to seek the most comparable term. Inclusion of article criteria was peer reviewed and research based articles in disaster nursing area. Grey literature such as government reports and non-peer reviewed articles were excluded.

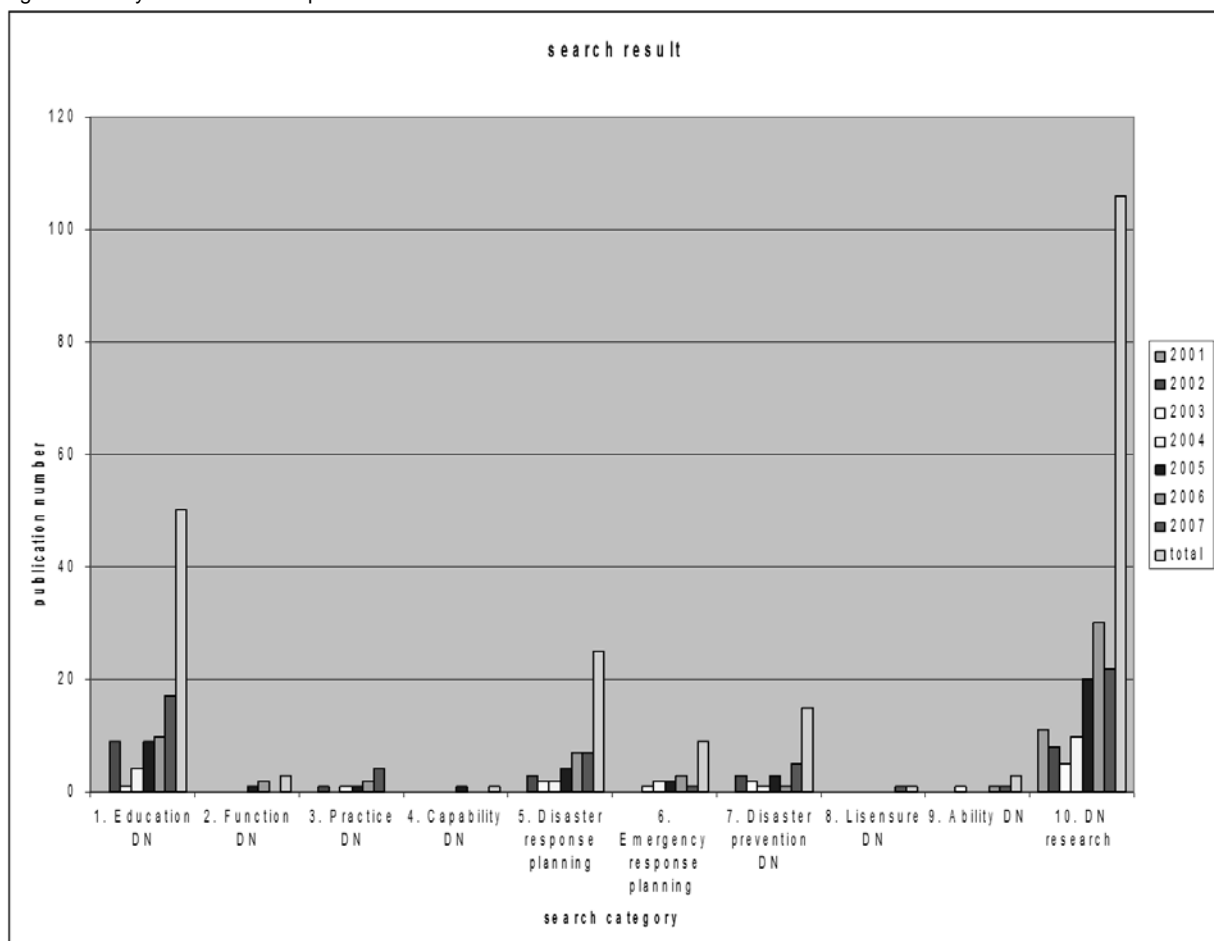
There were duplicated articles in searches. Six searches out of 10 searches contained the duplicated articles. For example, the search using key words: *function, disaster nursing* included one duplicate article. This article was included for analysis as the article was retrieved first time in number of searches. Thus duplicated articles that appeared in the different searches were only used for analysis at the first time appearance in searches.

The retrieved information from each search was tabulated for data synthesis. Information from each reviewed article was synthesised according to themes, in order to identify the issues and trends in disaster nursing articles in Japan. These results also were analysed by year of publication in order to investigate trends. The articles were sorted into the following four themes: *learning outcome/experience; drills and training in nursing education; discipline/curriculum development; and attributes of disaster relief nurses.*

RESULTS

A total of 222 articles were retrieved. Among the keyword search categories, the search: *disaster nursing and research* yielded the largest number of articles (n=106, 48%). This search also yielded articles published every year from 2001 and 2007 (Figure 1).

Figure 1: The year articles were published and the number of retrieved articles



* DN in the table is used as the abbreviation for disaster nursing. None of the years has articles in all search categories

The smallest number of retrievals was the search using key words: *practice, capability, disaster nursing* and the search using key words: *licensure and disaster nursing* (n=1 in both categories).

With the exception of the year 2003 and 2004, the number of research articles published in the area of disaster nursing increased gradually each year with the greatest number of articles published in 2007. After 2003 the number kept increasing with a peak in 2007.

Table 1 shows article search results. These 222 retrieved articles were carefully sorted for data analysis. The articles that did not focus on a disaster context or in the nursing context were excluded from analysis.

Table 1: Summary of the key words and number retrieved

Search	Key words	Number retrieved	Number of article selected to analyse
1	disaster nursing, education	50	16
2	function, disaster nursing	3	3 (1)
3	practice, disaster nursing	9	9 (1)
4	practice, capability, disaster nursing	1	1
5	disaster, response, planning	25	21
6	emergency, response, planning	9	5 (5)
7	disaster, prevention, disaster nursing	15	15 (7)
8	licensure, disaster nursing	1	1
9	ability, disaster nursing	3	5 (4)
10	disaster nursing, research	106	0 (82)
Total		222	76

* Numbers in brackets indicate articles that overlapped with other categories.

All retrieved articles from the search using key words: *disaster nursing and research* was excluded from analysis; most of these articles (n=82) overlapped with other search category results with remaining 24 articles not focused on nursing. The searches using the key words *disaster nursing, education; practice, capability, disaster nursing; disaster response, planning* and: *licensure, disaster nursing* did not yield articles that were duplicated in other searches.

Of the retrieved articles, the search using *disaster nursing, education* was the highest number of articles for analysis (n=16). The content of these articles varied to include case study reports of both disaster drills^{9, 10,11,13,14,} evaluation of disaster educational courses,^{5, 6, 7, 8, 24} and discussion of disaster nursing as a discipline.^{16, 17, 18, 19} As this is the main interest of this study the authors will concentrate on the results and analysis of this search.

Learning outcome and experience articles

Table 2 shows the summary of articles that were categorised as having a students’ learning outcome and experience focus. With the exception of one article by Nimi and Horii, the articles focused on teaching styles.⁵ Ohara introduced triage education and training in nursing students’ final year of clinical work.⁶ The self-evaluated results following the education showed that the triage decision-making of the final year nursing students was more accurate in some scenarios than registered nurses working in the clinical setting. Tozawa et al. surveyed nursing students’ abilities during a survival camping experience, and compared the findings nursing students’ with those not experienced in camping.⁷ This descriptive report was a unique study illustrating students’ experiences during challenging circumstances, and showed that life experiences may influence students’ motivation to study disaster nursing. Ishikawa et al. used a survey of nursing students to evaluate the topic ‘disaster nursing and the community’.⁸ She reported that, the use of group case studies was a valuable way to teach disaster nursing content. The inclusion of fieldwork as well as drills was important for students in obtaining practical knowledge.

Table 2. The summary of articles with the theme “Learning outcome and experience”

Study citation	Methods	Key findings
Tozawa et al. (2007) ⁷	Questionnaire to 70 third-year students and making comparisons between the group not having the seminar and the group that had the seminar (on camping experience)	The group experienced the camping (n=33) and not experience (controlled group, n=37) indicated differences in the degree of disaster preparedness. The group experienced the camping showed that broader and deeper recognition process toward disaster preparedness.
Nimi and Horii (2004) ⁵	5 students’ report was randomly selected for context analysis. Face to face interviews were conducted with these students.	The result showed that the nursing students’ understanding of the importance of nursing basic nursing care such as triage, assessment of the casualties physical conditions, prioritising their needs. These were also indications for professional nursing standards which students to be obtained when they are in professional practice.

Motoyama and Sakaguchi (2003) ²¹	To investigate the degree of recognition of disaster hazard, surveys were distributed to the third-year students (n=not known). 113 returned surveys were used for analysis.	Nursing students' recognition in hazards was higher in natural disaster than in man-made disaster. It was discovered that there was less recognition of disaster hazard from the students as well as a lower preparedness toward disaster.
Ohara (2002) ⁶	The armchair triage was conducted with final year nursing students as a component of acute care nursing. Questionnaire/evaluation after the seminar (the number of the questionnaires/evaluations collected not known)	Analysis of the self-evaluation form indicated that students recognised the importance of decision making processes in triage and knowledge involving into this process. There is only summary of the study available and the statistical details not known.
Ishikawa et al. (2006) ⁸	Questionnaire/evaluation of the topic by the students (number of students unknown)	The context of the topic was evaluated by students, with 32 elements retrieved and including 5 elements that students had learnt about health needs in the community. The topic involved activities such as fieldwork and drills.

Drills and training in nursing education

Six articles were retrieved that focused on the issue of drills and training in nursing education (Table 3). The methods used for studies varied and included report analyse, semi-structured interviews, and questionnaires. Comprised four of six articles in this category were on course evaluation. The studies included students' reflections on learning from participation in disaster drills,^{9,10,11,12} as well as their role in the simulated disaster situation.^{13,14} All six of the articles in this category report on the students' involvement in drills (some studies with the health professional working in both hospitals and community) and the effectiveness of participating in these drills.

Table 3. The summary articles with the theme "Drills and trainings in nursing education"

Study citation	Methods	Key findings
Bouta et al. (2007) ⁹	Nursing students (the final year students total 280 students) conducted the rally triage. Questionnaire given to the 280 final-year students after the triage training	The summary of the result shows that the importance of the physiological knowledge in assessing on patients. Students also indicated that improvement of experiencing in cases. It is also pointed out that the lack of opportunities for students to experience decision making in practice and suggested active involvement of students in this occasion.
Hatayoshi et al. (2007) ¹³	For developing the 'checklist of the activities in disaster nursing', the authors analysed the 32 students' report (second year students) and focused on the nurses' activities in the report. Authors took the nurses' activities and categorised them as non-verbal or verbal activities.	The investigators categorisation of nursing activities indicated that the basic nursing care in both verbal and non-verbal activities. These are not specific to disaster situations and these nursing skills are used in the daily nursing activities.
Imaeda et al. (2005) ¹²	Semi-structured interviews were conducted with the students to investigate the students' experience in earthquake disaster drill.	The result showed that there are 8 categories such as preparedness for natural disaster, recognition of the hazards around the area and understanding

		approach/ emergency in disaster situation.
Kumatani et al. (2007) ¹⁴	Questionnaire to 31 second-year students to investigate the role of nurse in disaster situation and what the role of nursing students.	The finding shows that the role of nurses and the experience of the patients was an essential component of disaster preparation. The results recommend that implementation of these topics into the disaster nursing topic in curriculum.
Nimi et al. (2006) ¹⁰	Report analysis of 40 first-year students after the drill	The result of analysis showed that the importance of the experience of drills and having concrete protocol – what to do in an emergency situation was essential to increase the preparedness.
Yamamoto A et al. (2002) ¹¹	Report of students' learning by participating the drill (n=not known).	The report showed that the importance of the participating in the drill to experience the situation. Experience can make the students bring more concrete idea of disaster situations.

Discipline and curriculum development

Four articles were retrieved that focused on discipline and curriculum development (Table 4) with two of these articles reporting on the availability of disaster nursing topic in Japanese university curricula. Yoshida reported that 13% of the nursing undergraduate programs provided disaster nursing topics.¹⁶ Matsumoto et al. also surveyed the availability of disaster nursing topics in nursing undergraduate programs with 15 out of 61 schools replying that they provided these courses.¹⁷ Yamamoto A et al. also surveyed 39 Red Cross nursing schools in Japan to explore the disaster nursing course context.¹⁹ They summarised the seven areas to teach disaster nursing context; disaster theory; preparedness for disaster; nursing at disaster situation; protection of health care worker in disaster situation; volunteerism and nursing; ethical issues in disaster nursing; international cooperation.

Only one article focused on the construction of the discipline of disaster nursing.¹⁸ All other articles focused on the availability of disaster nursing in Japan but did not address the context of the discipline development.

Table 4. Summary of articles with the theme “Discipline and curriculum development”

Study citation	Methods	Key findings
Matumoto et al. (2007) ²²	Questionnaire to 84 universities in 2004 to investigate the availability of disaster-nursing courses in Japan.	15 schools of the 61 replies had the disaster nursing courses available.
Yamamoto A. et al. (2002) ¹¹	39 Red Cross schools in Japan were surveyed. Literature review and group discussion and focus group by disaster nursing experts.	Owing to the philosophy of the Red Cross, these schools provided the topic of disaster nursing. There are slight differences between the RC and other schools, as they tend to combine disaster with other topics, such as <i>acute nursing</i> . The authors pointed out that continuing education in practice will need to bridge the context of disaster nursing in undergraduate courses so that the consistency and

		continuity of education may be maintained.
Yoshida (2005) ¹⁵	Questionnaire distributed to 84 universities in Japan (2000)	69 replies were analysed with disaster-nursing topics being provided by 13% of these universities.
Yamamoto A et al. (2005) ¹⁹	19 Red Cross nursing schools including Red Cross universities were investigated, and then The literature review and the group discussion were conducted for the purpose of curriculum development.	The 7 categories used to construct the teaching context were: <i>disaster theory; preparedness for disaster; nursing at disaster situation; protection of health care worker in disaster situation; volunteerism and nursing; ethical issues in disaster nursing; international cooperation.</i>

Attributes of disaster relief nurses

Only one article directly addressed the attributes of the disaster relief nurse. Hirano surveyed 62 nursing students to investigate their attributes and made comparisons between those who were not interested in being relief nurses, and those who were.²⁰ The result shows that there is quite a significant difference between these two groups, with the attributes of disaster relief nurses being those of self-commitment, self-devotedness and willingness to participate in disaster relief activities.

DISCUSSION

Developing research methodology in disaster nursing education

Yamamoto A et al. pointed out that there was an urgent need for a theoretical frame development for disaster nursing, however no article discussing a methodology or theoretical framework of disaster nursing was sighted throughout this review.¹⁹ This could be due to the nature of disaster that people could not really predict when it will happen and health professionals need to concentrated on relief activities when it happens so that there is not enough time to conduct research in this situation (Sakai & Kuroda). Therefore it is understood that there has been an emphasis on increasing preparedness in case of disaster situations. If theoretical frame is well developed, researchers can explore further this area of study depending on which stage of disaster cycles and what are needs of patients. It is necessary to develop theoretical framework in disaster nursing, however it is also important to focus on peoples' stories who are victims of disasters and relievers for them, because these stories could also point out needs in nursing disaster research (Yanagida cited Sakai & Kuroda). Hence, both focus on individual and organisational will be essential.

In this literature review, the majority of study at the institutional settings focused largely on the pre and post changes of training, and with assessing the present status of preparedness. This was due mainly to the fact that this review focused on disaster nursing education, and the qualitative method was more frequently employed to evaluate the effectiveness of the programs/sessions and training. The area of disaster nursing involves various life stage of nursing such as older people, adult, mental and paediatrics and so forth. The expertise of these areas is required to investigate further in association with disaster nursing context. If the disaster nursing theoretical framework is defined, the deficiency area of disaster nursing research could be further indicated. Due to the various stage of life and area of study, disciplinary area of disaster nursing seems to be scattered and needs to be categorised into the area of study. By doing so, disaster nursing research area would be more comprehensive.

Measuring the preparedness in disaster nursing area is an important concept and requires continuity in its training and awareness. However, surprisingly none of the study undertook a longitudinal perspective in the study. Although preparedness is the index for the current status to show how much prepared you are and could indicate deficiency of preparedness in terms of resources, knowledge and education. This area needs to be further investigated while disaster nursing theoretical frame is developed and various situations and scenarios could be applied to this framework. A research methodology in disaster nursing could also be developed after real life experience of disasters, by sharing nurses' and other people's community experiences to enhance the effectiveness of these programs and sessions by drawing upon the real understanding of what they learn from being involved in these experiences. While the theoretical framework for disaster nursing is clarified, methodological approach will also need to be developed.

Disaster nursing topics in curriculum

Drills and training were considered to be an important part of the curriculum in nursing education. Due to the curriculum revision in 2009, nursing schools in Japan are required to implement disaster

nursing topics and the content of topic will also be included the national nursing registration examination, which is required to sit the exam to be qualified as a registered nurses in Japan. This revision will influence on the disaster nursing content in nursing schools in the future. It would be interesting to see these changed before and after the 2009 nursing curriculum revision.

The Red Cross has a long history of contributing to disaster relief activities in Japan, and therefore any school funded by the organisation would be expected to embrace Red Cross philosophy, which promotes first aid enlightenment in communities. Therefore, implementation of topics relevant to disaster nursing is naturally occurring. The content of the topic also varies and it is assumed that it has relevance to the particular school's geographical location. For example, one school includes snow as a natural disaster hazard because it often has heavy falls of snow around the school. As these schools and universities have managed to embed the Red Cross philosophy into the curriculum, so too is the continuity of education through professional development essential.¹⁸ The early exposure to disaster training and education in earlier stage of professional education is essential and shows its benefits. For example, it is found that the nursing students' participation into the drill at a hospital worked in positive way for both nurses and nursing students.¹⁵ This also result completely dispelled the assumption that nursing students are not yet ready to work in an emergency triage system that requires quick decision-making within both clinical and ethical aspects. It gave an indication of the effectiveness of triage training for nursing students and could be a potential topic for future research. Achieving the positive outcomes, a communal understanding of the drills between health professionals and nursing students would be necessary.

There are three venues where the buffering capacity may be constructed, and these are: in the work environment, within the educational scene and in the community. The articles involving communities were seen in the result section of search 5, and among these articles focus were how nurses should be involved in communities to protect them from disaster. This may be influenced by

the professional roles of nurses and public health nurses in Japan. Mizushima et al. reported that the role of Public Health Nurse in the case of the flood in the regional area was significant, providing long term and community-based health support.¹⁶ Although the differences in the focus on nursing are pointed out, a greater focus on community involvement is needed. This paper focused on nursing education articles for literature review purpose. A further focus on continuing education at work, community educational sessions and interventions will also be included as Yamamoto A pointed out, maintaining continuing education is essential, since health professionals need to utilise their ongoing knowledge and skills in practice.¹⁷

The characteristics of Japanese disaster nursing education studies

Japan experiences frequent disasters historically, and it could be said that their disaster health area of study has developed with need. Yamamoto A developed a project to establish a network in disaster nursing to encourage the establishment of disaster nursing research, as well as education.¹⁷ It is not only within Japanese nursing educational institutions, but also within Asian region in general that the demand for disaster nursing education is high. The survey study by Miura et al. showed that 44 schools out of 51 schools that replied in the Asian region offer disaster education.¹⁸

An increase in the number of articles published also reinforces this situation. It could be the strong influence of the Red Cross that states the fundamental philosophy of humanity and other six principles, as some authors' educational background is from the Red Cross nursing schools and universities. Nonetheless, not only these authors are active in disaster nursing. Health professionals, including nurses in the hospital setting, long term institutional settings and communities are also part of disaster nursing. Therefore, focusing on the various aspects for preparing for disasters will need a more inclusive development.

CONCLUSION

This study summarised current research trends and issues, with special attention to education in disaster nursing in Japan. Evaluation, as a primary purpose of studies was frequently seen. The results show that many varieties of disaster nursing study came to conclusion that the study influences practice. Disasters affect not only the institutional setting within an acute-hospital locale, but also affects people in communities, with the nurses' role expected to expand according to the focused area of disaster nursing. The curriculum revision in 2009 will also influence on the content of disaster nursing and it is expected that there will be more variety of studies in the future. Education in disaster nursing will be an important hub to build up the capacity in the community. Any further development in this area of study will be expected to explore the methodology including the further theoretical framework on disaster nursing, which is also evidence-based.

References

- ¹ International Federation of Red Cross and Red Crescent Societies World Disasters Report. Focus on early warning, early action Available at <http://www.ifrc.org/Docs/pubs/disasters/wdr2009/WDR2009-full.pdf>. Accessed 30 July 2009.
- ² Asian Disaster Reduction Centre. Natural Disasters Data Book 2002 (An analytical overview). Available at http://www.adrc.asia/publications/databook/ORG/databook_2002_eng/3_2_3.pdf. Accessed 30 July 2009.
- ³ Sakai A, Kikuchi S: *Disaster Nursing: Bridging between Integrated Specialised Nursing Knowledge and Practice*. Tokyo: Nankou Dou, 2008. pp. 198-93.
- ⁴ Kuroda Y, Sakai A: *New edition Disaster Nursing: Protecting Human Life*. Tokyo: Medica Publication, 2008.
- ⁵ Nimi A, Horii N: Discussion of disaster relief drills implementation in nursing foundation course: experience of nursing students who attended as casualties, *Japan Nursing and Medical Society Journal*. 2004; 6 (2): 23-32.
- ⁶ Ohara M: Investigation of learning effectiveness of triage simulation study, *Japan Disaster Nursing Society Journal*. 2002; 7 (1): 54-62.
- ⁷ Tozawa K, Takagi T, Hozaka Y, Yoshioka Y: Learning effectiveness of nursing students living through disaster mock situations, *Bulletin of Paz College*, 2007; 4: 541-9.
- ⁸ Ishikawa M, Yamada Y, Muto N, Sato N, Miyazaki M, Ushio Y: Discussion on elective topics of disaster community nursing in a bachelor of nursing course, *Chiba University School of Nursing Journal*. 2006; 28: 51-8.
- ⁹ Bouta K, Yokouchi M, Okada J, Fujimoto H, Nakashin K, Hori R, Ueda K: Educational objectives learnt from the result of nursing students disaster triage drill, *Japan Disaster Nursing Society Journal*. 2007; 9 (2): 25-39.
- ¹⁰ Nimi A, Horii N, Sugimoto A, Taguchi E, Sato H, Koshiya S: Communication immediate after a large scale of disaster: analysis of nursing students report who participated in a mock plane crush disaster drill, *Japan Nursing Education Society Journal*. 2006; 16 (2): 13-26.
- ¹¹ Yamamoto A, Kishi E, Eto S, Terakado T: Trial for learning method in disaster nursing: experience of nursing students who participated in Red Cross Fukuoka prefecture branch rescue training drill, *Japan Red Cross Kyushu International Nursing University, Intramural Research Report*. 2002; 1: 88-98.

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- ¹² Imaeda H, Mokuan T, Nishitani C, & Tobinaga M: Nursing students' experience of rescue role in an earthquake disaster drill, *Japan Nursing Annual Conference Report Nursing Education*. 2005; 35: 30-2.
- ¹³ Hatayoshi F, Maeda H, Yonetani J: Assessment of nursing activities in disaster relief drill: from students experience as mock patients and family in disaster drill, *Japan Nursing Annual Conference Journal Nursing Management*. 2007; 37: 457-9.
- ¹⁴ Kumatani H, Ebina K: Discussion of disaster nursing education in the bachelor of nursing course: experience of nursing students who participated in disaster drill at a hospital, *Japan Disaster Nursing Society Journal*. 2007; 8 (3): 31-9.
- ¹⁵ Yoshida Y: Availability in foundation nursing topics at Nursing Universities, *Medical Nursing Research*. 2005; 9 (2): 25-39.
- ¹⁶ Mizushima Y, Hayashi K: Report of medical institutions preparedness toward disasters and influential factors: a survey of nursing managers working at the medical institutions in Ishikawa Prefecture, *Ishikawa Nursing Journal*. 2006; 3 (2): 39-44.
- ¹⁷ Yamamoto A: Education and research on disaster nursing in Japan, *Perehospital and Disaster Medicine*. 2008; 23 (Suppl.1) s6.
- ¹⁸ Miura M, Ohara M, Ito N, Kuroda Y, Sakai A, Yamasaki T, Itagaki C: The current situation of disaster nursing education in Asian countries, *Japan Disaster Nursing Society Journal*. 2009; 10 (3): 28-35.
- ¹⁹ Yamamoto A, Masuno S, Tuda M, Nakanishi M, Ando S, Yamada H: Development of disaster nursing education program: extracts of disaster nursing context and curriculum development, *Japan Disaster Nursing Society Journal*. 2005; 6 (3): 15-29.
- ²⁰ Hirano M: A study of nursing students characteristics who wish to participate in disaster relief activities: a relationship between relief ethics awareness, sympathy, moral attitude and disasters, *Japan Disaster Nursing Society Journal*. 2002; 4 (3): 8-21.
- ²¹ Motoyama H. & Sakaguchi M: Nursing students risk recognition of disasters, *Japan Disaster Nursing Society Journal*. 2003; 5 (3): 3-9.
- ²² Matumoto S, Takahira S, Katahono K, Yoshida E, Utumi F: Construction of disaster nursing as a discipline: a survey of disaster nursing education at nursing universities and objectives for constructing disaster nursing, *Nagasaki Siebold University School of Nursing and Nutrition Journal*. 2007; 7: 53-60.