



ORIGINAL ARTICLE

## The Role of Surgical Nurse in International Disaster Response (IDR) in Japan : Recognition of the Medical Workers with Experience in IDR

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### ABSTRACT

**Objective:** With regard to medical doctors and nurses who had participated in international disaster response (IDR), the purposes of the study were as follows: ① To identify the factors related to recognition of the need for “surgical nursing practice” in IDR provided by Japan ② To clarify the role of Surgical Nurse in future IDR.

**Method:** The survey was conducted between June 20, 2016 and July 31, 2016 targeting medical professionals (doctors and nurses) with experience in IDR. We distributed self-report questionnaires to authors and coauthors of academic papers that described studies examining IDR and been published within the preceding 5 years.

**Results:** We received responses from 54 of the 110 participants (recovery rate: 49.1%). Data for 51 subjects (valid response rate: 94.4%) were ultimately analyzed. “Organization (Governmental Organization [GO] group and Nongovernmental Organizations [NGO] group) at the time of dispatch” differed significantly recognition of the need for “surgical nursing practice” in IDR.

**Discussion:** “Organization at the time of dispatch;” was the main factor related to recognition of the need for “surgical nursing practice” in IDR. GO group recognized that the role of Surgical Nurse in IDR was not only nursing care through the perioperative period but also disaster nursing care to perform a wide variety of activities will be required in the provision of medical support following international disasters. NGO group recognized the importance of nursing care during operations as the role of Surgical Nurse in IDR.

<Key-words>

surgical nurse, disaster relief, international disaster response, natural disasters

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## I. Introduction

Natural disasters, which occur in various parts of the world, exert a serious impact on society, economies, and the global environment. In 2015, nine of the top ten countries with disaster victims were low- and middle-income countries and accounted for 69.9% of all such countries (Guha-Sapir, Hoyois & Below, 2015). Because most disasters occur in low- and middle-income countries, in which economic and social infrastructure is underdeveloped, victims do not receive sufficient relief at a local level and require support from other countries. Regarding disaster support in medicine, medical support teams from various countries are dispatched to affected countries. However, there are no unified standards for this support, and it is managed inefficiently and has been unable to provide sufficient assistance thus far (World Health Organization [WHO], 2013). In an effort to address these issues at an international level, the WHO created new standards in 2013. These standards aim to improve the quality of surgical treatment provided in conjunction with other types of medical support during the month following the occurrence of a disaster (WHO, 2013). In accordance with these standards, medical teams dispatched from overseas are classified into the following four categories according to their abilities: (1) outpatient emergency care, (2) inpatient surgical emergency care, (3) inpatient referral care, and (4) additional specialized care (Norton, von Schreeb, Aitken et al., 2013). According to this classification, medical teams that are appropriate for a given situation are dispatched to disaster areas.

When disasters occur outside Japan, the Japan Medical Team for Disaster Relief (JMTDR), which is a Governmental Organization (GO), and the Self-Defense Force are dispatched if requested by the affected countries. Medical teams from Nongovernmental Organizations (NGO) also provide support in disaster-affected areas. During the medical support activity that followed the earthquake in Nepal in 2015, the JMTDR dispatched a new functional expansion team, which was capable of providing hospitalization and surgery, and expanded the quality and range of disaster aid and medical care. In addition to performing this surgical function, the JMTDR dispatched surgical nurses for the first time. The typical role of surgical nursing practice in Japan is to provide expert knowledge and skills that facilitate surgery and ensure patient safety during the perioperative period (Japanese Association for Operative Medicine, 2013).

Research examining international emergency medical assistance has been conducted in Japan since the 1990s. Although some studies clarified the role of nurses in medical activities without surgical functions, no studies have examined surgical nursing practice, and most previous research has involved analyses and reports regarding activity content. Ukai (2013) posited that most research has involved reports and analysis because IDR are conducted when disasters occur, activity is infrequent, and events differ. Therefore, studies tend to be limited to the presentation of empirical reports, because collecting data from research subjects is a difficult process, and

individuals are unlikely to report repeated experiences (Ukai, 2013). However, to ensure high specificity for short-term international emergency medical assistance that requires effective results, it is important to look beyond activity reports and discover legal qualities via quantitative analysis, which leads to future activity.

Outside Japan, many developed countries are actively engaged in activities with surgical functions, and numerous reports regarding surgery-related activity content have been published. However, as in Japan, no studies have examined surgical nursing practice in IDR.

Under the leadership of the WHO, the number of medical activities that focus on improving the quality of surgical treatment in international emergency medical assistance is expected to increase. The provision of activities associated with surgical functions for surgical nurses has just begun in Japan's international emergency medical assistance, and training for surgical nurses has become a challenge. Therefore, the current study sought to clarify surgical nurses' role in association with surgical functions. Determination of the role recognized as necessary by working medical practitioners could lead to efficient and effective activities.

The results are expected to provide important foundational data via for the expansion of surgical functions in future international emergency medical assistance, and they could be included in education and training for surgical nurses and contribute to personnel training.

### **1. Research Purpose**

With regard to medical doctors and nurses who had participated in IDR, the purposes of the study were as follows:

1. To identify the factors related to recognition of the need for "surgical nursing practice" in IDR provided by Japan
2. To clarify the role of Surgical Nurse in future IDR

### **2. Definitions of Terms**

1. IDR (International Disaster Response) refer to medical support provided in areas affected by large-scale disasters outside Japan.
2. GO (Governmental Organization) are organizations under the jurisdiction of a government involved in the execution of international medical activities.
3. NGO (Nongovernmental Organizations) are private organizations that conduct international medical activities and are managed independently of the government.

## II. Subjects and Methods

### 1. Study Design

A cross-sectional quantitative study was conducted using a self-administered questionnaire survey.

### 2. Survey Details

The survey collected data regarding basic attributes (age, sex, occupation, number of years' experience in occupation, number of dispatches, year of dispatch, duration of dispatch, and dispatching organization) and performed or supported experience in surgical procedures at the time of dispatch.

The following questions were measured using a five-point scale (1 = unnecessary, 2 = somewhat unnecessary, 3 = neither necessary nor unnecessary, 4 = somewhat necessary, 5 = necessary):

1. The need for "surgical nursing practice" in IDR
2. The role of Surgical Nurse recognized as necessary for IDR

Subjects' responses to 24 items based on the Practical Guidelines for Operative Medicine, which were produced by the Japanese Association for Operative Medicine, were measured to examine surgical nurses' perceived responsibility for domestic surgical management (Japanese Association for Operative Medicine, 2013).

We also included six items pertaining to roles necessary for general nurses in IDR, which represented roles for nurses who do not undertake surgical functions in IDR, based on previous studies (Furukawa, Shinchi, Fukuyama et al., 2007; Fukuyama, Koichi Shinchi, Toyoka Shinchi et al., 2007).

Five items pertaining to roles other than those described above were established according to the opinions of one doctor, one emergency specialist, two disaster medicine experts, and one surgical nurse with experience in IDR.

### 3. Survey Methods

#### 1) Subjects

In total, 110 medical professionals (doctors and nurses) with experience in IDR were invited to participate.

#### 2) Data Collection Methods

We distributed self-report questionnaires to authors and coauthors of academic papers that described studies examining IDR and been published within the preceding 5 years. The questionnaires were sent to their affiliation addresses via mail. Respondents returned the completed surveys via mail.

#### 3) Data Collection Period

June 20, 2016 to July 31, 2016

#### 4. Analytical Methods

Fundamental statistics were calculated for all items. Shapiro-Wilk normality was assessed during analysis, and age and years of experience were normally distributed, while all other items were not. Mann-Whitney's U test was used to determine the difference between variables with non-normal distributions. All analyses were performed using JMP Pro 12 statistical analysis software. The significance level was set at  $p < .05$ , and 95% confidence intervals were calculated.

#### 5. Ethical Considerations

This study was approved by the ethics committee at the institution with which the authors were affiliated. Subjects received a form containing an explanation regarding the study purpose and assurance that participation was voluntary, subjects would not be disadvantaged if they declined to participate, the study would be anonymous and would not contain identifying information, and their data would be used only for academic purposes. This form was distributed with the questionnaire, and return of the questionnaire implied consent.

### III. Results

Of the 110 medical professionals to whom surveys were sent, 54 returned completed questionnaires (recovery rate: 49.1%). One individual without disaster dispatch experience, one individual who was not a medical worker, and one individual whose questionnaire was incomplete were excluded from the study; therefore, data for 51 subjects (valid response rate: 94.4%) were ultimately analyzed.

#### 1. Overview of Subjects

##### 1) Basic Attributes

Subjects' basic characteristics are shown in Table 1. Of the 51 subjects, 74.5% were men, and 25.5% were women. Their ages ranged from 28 to 68 years (median: 43.0 years, interquartile range [IQR]: 38–52 years). With respect to profession, 68.6% were physicians and 31.4% were nurses, and the nurses included a midwife. Numbers of years' experience ranged from 5 to 46 years (median: 19 years, IQR: 14–27 years).

Numbers of dispatches ranged from 1 to 30 (median: 2, IQR: 1–3). Of the dispatching organizations, 68.6% were GOs and 31.4% were NGOs. Years of dispatch fell between 1998 and 2015: with 7.8%, 11.8%, 5.9%, and 74.5% of dispatches recorded in 1998, 2000–2005, 2006–2010, and 2011–2015, respectively. Dispatch durations ranged from 7 to 150 days, with 80.4%, 5.9%, and 13.7% lasting  $\leq 14$  days, 15–28 days, and  $\geq 29$  days, respectively. With respect to experience of surgical treatment at the time of dispatch, 70.6% of subjects were experienced, and 29.4% lacked experience.

<Table 1> Subjects' basic characteristics (N = 51)

Item	Group	n	%	Median (IQR)	Range
Sex	Male	38	74.5		
	Female	13	25.5		
Age (years)				43 (38–52)	28–68
	28–39	17	33.3		
	40–49	19	37.2		
	50–59	12	23.5		
	≥60	3	5.9		
Occupation	Physician	35	68.6		
	Nurse	16	31.4		
Work experience (years)				19 (14–27)	5–46
	5–10	7	13.7		
	11–15	11	21.6		
	16–20	14	27.5		
	21–30	15	29.4		
	≥31	4	7.8		
Number of dispatches				2 (1–3)	1–30
	1	21	41.1		
	2	8	15.7		
	3	11	21.6		
	≥4	11	21.6		
Dispatching organization	GO	35	68.6		
	NGO	16	31.4		
Year of Dispatch	1998	4	7.8		
	2000–2005	6	11.8		
	2006–2010	3	5.9		
	2011–2015	38	74.5		
Duration of dispatch (days)				14.0	7–150
	≤14	41	80.4		
	15–28	3	5.9		
	≥28	7	13.7		
Surgical experience during dispatch	Yes	36	70.6		
	No	15	29.4		

IQR = interquartile range; GO = governmental organization;  
NGO = nongovernmental organization

**2) The need for "surgical nursing practice in IDR**

With respect to recognition of the need for surgical nursing practice in IDR, scores ranged from 1 to 5 (median: 4, IQR: 3–5), and the proportion of subjects whose responses were “somewhat necessary” or “necessary” was 72.5% (Table 2).

<Table 2> Recognition of the need for surgical nursing practice in IDR (N = 51)

Grouping	n	%	Median (IQR)
			4 (3–5)
1. Unnecessary	1	2.1	
2. Somewhat unnecessary	4	7.8	
3. Neither necessary nor unnecessary	9	17.6	
4. Somewhat necessary	15	29.4	
5. Necessary	22	43.1	

IQR = interquartile range

**2. Factors Related to Recognition of the Need for Surgical Nursing Practice in IDR**

**1) Recognition of the Need for Surgical Nursing Practice and Correlations Between Basic Attributes**

Subjects were divided into two groups according to their median scores for age (median: 43 years), years of experience (median: 19), number of dispatches (median: 2), and dispatch duration (median: 14 days). In addition, years of dispatch were divided into two groups based on the 2013 introduction of uniform WHO standards, and statistical tests were performed. The results showed that dispatching organizations differed significantly between the two groups (Table 3).

<Table 3> Recognition of the need for surgical nursing practice and their relationships with basic attributes (N = 51)

Item	Group	n	%	Need for surgical nursing practice p-value
Sex	Male	38	74.5	.676
	Female	13	25.5	
Age (years)	28–43	26	51.0	.389
	44–68	25	49.0	
Occupation	Physician	35	68.6	.206
	Nurse	16	31.4	
Work experience (years)	5–19	25	49.0	.235
	20–46	26	51.0	

Number of dispatches	1	21	41.2	.096
	2–30	30	58.8	
Year of Dispatch	1998–2012	17	33.3	.595
	2013–2015	34	66.7	
Dispatch duration (days)	7–14	41	80.4	.371
	15–150	10	19.6	
Type of dispatch organization	GO	35	68.6	<b>.030*</b>
	NGO	16	31.4	
Surgical experience at the time of dispatch	Yes	36	70.6	.293
	No	15	29.4	

GO = governmental organization; NGO = nongovernmental organization

## 2) Recognition of the Need for Surgical Nursing Practice in Each Organization at the Time of Dispatch

The proportions of subjects who were affiliated with GOs and NGOs were 77.1% and 68.8%, respectively, and they provided responses of “somewhat necessary” or “necessary” (Table 4).

<Table 4>Proportion of organizations that recognized a need for surgical nursing practice

	GO group (n = 35)		NGO group (n = 16)	
	n	%	n	%
1. Unnecessary	0	0.0	1	6.2
2. Somewhat unnecessary	1	2.9	3	18.8
3. Neither necessary nor unnecessary	7	20.0	1	6.2
4. Somewhat necessary	7	20.0	8	50.0
5. Necessary	20	57.1	3	18.8

GO = governmental organization; NGO = nongovernmental organization

## 3. Role of Surgical Nursing Practices Recognized as Necessary for IDR

Cronbach’s  $\alpha$  for this item was 0.95, and the mean score ( $\pm$  SD) was  $4.25 \pm 1.15$ . Subjects who exhibited high levels of recognition of the need for surgical nursing practice were assigned to the GO group, and those who exhibited low levels of recognition of the need for surgical nursing practice were assigned to the NGO group. Mean scores for organizations for which a significant difference was observed at the time of dispatch are shown in Table 5.

<Table 5> Role of surgical nursing practices recognized as necessary during IDR

		GO group (n = 35)	NGO group (n = 16)
		Mean ± SD	Mean ± SD
<b>Roles based on the Practical Guidelines for Operative Medicine</b>			
1)	Preparation of instruments used for surgery, necessary items	5.00 ± 0.00	4.69 ± 0.87
2)	Confirming instrument count and condition to prevent leaving materials in patient body	5.00 ± 0.00	4.50 ± 0.89
3)	Introduction to anesthesia assistance during awakening	4.97 ± 0.18	4.31 ± 1.08
4)	Preparation of surgical nursing record	4.97 ± 0.18	4.31 ± 1.01
5)	Instrument delivery to the operator in Clean area	4.97 ± 0.18	4.56 ± 0.89
6)	Provision of reliable sterilization in cleanliness areas	4.97 ± 0.18	4.58 ± 1.26
7)	Prevention of residual materials in the body	4.97 ± 0.18	4.19 ± 1.05
8)	Managing patient temperature Response to sudden changes	4.94 ± 0.25	4.38 ± 0.89
9)	Prevention of skin disorders and neuropathy due to surgical posture	4.94 ± 0.25	4.38 ± 0.89
10)	Preventing falls and injuries	4.90 ± 0.31	4.56 ± 0.81
11)	Preparation of operating room instruments	4.87 ± 0.34	4.44 ± 0.89
12)	Preventing falls and injuries	4.87 ± 0.34	4.44 ± 0.89
13)	Assistance during anesthetization	4.84 ± 0.37	4.13 ± 1.09
14)	Placement in the operating room	4.81 ± 0.59	4.31 ± 0.95
15)	Surgical nursing care plan and practice	4.77 ± 0.56	4.13 ± 1.09
16)	Psychological support for patients	4.74 ± 0.63	4.31 ± 0.95
17)	Temperature adjustment in the operating room	4.55 ± 0.72	4.06 ± 1.00
18)	Consideration for ambient sounds during surgery	4.48 ± 0.81	4.00 ± 1.32
19)	Continuing nursing (handover to local medical personnel)	4.48 ± 0.85	4.13 ± 1.20
20)	Patient visits before and after surgery (including listening to medical history)	4.29 ± 0.90	3.81 ± 1.10
21)	Management of excised specimens	3.71 ± 1.13	2.88 ± 1.54
22)	Management of implants to be transplanted	2.97 ± 1.56	2.94 ± 1.57
23)	Supporting endoscopic surgery in clean zones	2.74 ± 1.65	1.88 ± 1.36
24)	Providing endoscopic surgery	2.42 ± 1.50	1.81 ± 1.38
<b>Necessary duties of general nurses in IDR</b>			
25)	Internal arrangement (placement of devices in consideration of flow lines)	4.52 ± 0.77	3.75 ± 1.29
26)	Management of medical equipment	4.26 ± 1.06	3.88 ± 1.02
27)	Supporting Outpatient Medical Treatment	4.16 ± 1.11	3.94 ± 1.12
28)	Management of medical waste	4.16 ± 1.04	3.82 ± 1.13
29)	Reception triage	4.10 ± 1.03	3.81 ± 1.05
30)	Health management of team members	3.94 ± 1.15	3.69 ± 1.30
<b>Other roles</b>			
31)	Infection control	4.63 ± 0.60	4.06 ± 1.24
32)	Coordinating duties between multiple specialties	4.52 ± 0.77	4.13 ± 1.02
33)	Postoperative patient care	4.52 ± 0.77	3.56 ± 1.15
34)	Supporting surgeries in clean zones	4.42 ± 0.92	4.00 ± 1.32
35)	Procurement of medical equipment	3.42 ± 1.20	3.63 ± 1.15

GO = governmental organization; NGO = nongovernmental organization;

SD = standard deviation

Cronbach's  $\alpha$  95%

### **1) Items Related to the Practical Guidelines for Operative Medicine**

In the NGO group, although the mean score did not reach 4.0 (somewhat necessary), the “patients’ visits before and after surgery (including listening to medical history)” item was recognized as necessary in the GO group. In both the GO and NGO groups, items for which mean scores did not reach 4.0 (somewhat necessary), showing low levels of recognition of need, were as follows: “able to provide endoscopic surgery,” “able to support endoscopic surgeries in clean areas,” “management of implants to be placed in the body,” and “management of excised implants.”

### **2) Necessary Roles for General Nurses in IDR**

In the NGO group, mean scores did not reach 4.0 (somewhat necessary); however, the “assistance providing outpatient treatment,” “reception triage,” “internal placement (placement of devices in consideration of flow lines),” “management of medical devices,” and “management of medical waste” items were recognized as necessary in the GO group.

In both the GO and NGO groups, the mean score for the “health management by team members” item did not reach 4.0 (somewhat necessary), indicating low levels of recognition of need.

### **3) Other Items**

The “patient care in postoperative hospital room” item was recognized as necessary in the GO group; however, the mean score for the item did not reach 4.0 (somewhat necessary) in the NGO group. In addition, mean scores for the “procurement of medical equipment” item did not reach 4.0 (somewhat necessary) in either the GO or NGO group, indicating low levels of recognition of need for the item.

## **IV. Discussion**

### **1. Recognition and Related Factors Affecting Surgical Nursing Practice in IDR**

The results showed that 72.5% of individuals experienced in IDR recognized the need for surgical nursing practice. As with surgical functions, the need for surgical nursing practice was recognized by organizations at the time of dispatch. The demand for surgical nursing practice is expected to increase as the WHO implements activities that focus on improving the quality of surgical treatment.

### **2. The Role of Surgical Nurse in IDR**

The results regarding the items based on the Practical Guidelines for Operative Medicine indicated that the special role of surgical nursing practice in IDR was almost identical to nurses’ everyday duties in Japan. For example, the items for which both the GO and NGO groups showed low levels of recognition of need included “providing endoscopic surgery,” “management of implants to be placed in the body,” “management of excised specimens,” and “supporting endoscopic surgeries in clean areas.” Much of the

surgery performed by medical support teams in disaster zones includes trauma surgery, such as orthopedic surgery for traumatic injuries; debridement; and sutures (Read, Holian, Moller et al., 2016; Chu, Stokes, Trelles et al., 2011; Rajpura, Boutros, Khan et al., 2010; Wong, Razek, Elsharkawi et al., 2015). Therefore, we believe that endoscopic surgery was of low priority and was not recognized as necessary in emergency disaster medical support activities. With respect to implantation operations, specialized teams of orthopedic surgeons perform open reduction and internal and external fixation procedures (Rajpura, Boutros, Khan et al., 2010). Moreover, the JMTDR provided orthopedic surgery to support activities following the Nepal earthquake. Therefore, it is possible that the need for implant management, including the management of specimens, will increase in the future.

The NGO group exhibited low recognition of the need for “patient visits before and after surgery (including listening to medical history),” but the item was considered necessary by the GO group. In addition, the results regarding “postoperative patient care” were similar to those for other items, and the GO group’s level of recognition of need for this item was significantly higher relative to that of the NGO group. This is considered one of the roles of Surgical Nurse in IDR, in addition to the typical duties of Japanese Surgical Nurses, during the perioperative period.

In addition, the items for which the recognition of need were highest in the GO group included “assistance for outpatients,” “reception triage,” “placement of devices (placement of devices in consideration of flow lines),” “management of medical devices,” and “management of medical waste.” In previous studies, these tasks were identified as duties necessary for nurses in ordinary IDR that did not involve surgical functions (Furukawa, Shinchi, Fukuyama et al., 2007; Fukuyama, Koichi Shinchi, Toyoka Shinchi et al., 2007). Specifically, our results suggest that there is a need for surgical nursing practice to fulfill general nursing duties in IDR.

Items for which recognition of need was low in both the GO and NGO groups included “health management by team members” and “procurement of medical equipment.” It is likely that these tasks are performed by medical coordinators in the teams and are not undertaken within Surgical Nurse.

In the future, surgical functions will be expected to play an important role in IDR, and the specialized skills involved in surgical nursing practice will be required to administer treatment efficiently. In addition, roles that are learned in normal surgical nursing practice in Japan were also required for the provision of IDR. This result could be an important source of experience for nurses who support surgical nursing practice in future international emergency relief activities.

Many surgical nurses have the potential for active participation in IDR. We are acutely aware that the surgical nursing practice specialty is required in activities to support disaster victims, and we hope that it will be utilized as a new human resource in international emergency medical assistance.

## V. Study Limitations and Future Research Topics

It was difficult to recruit the subjects for the study, and the study sample was small. It is therefore possible that bias occurred in the dispatching organizations and related medical field, and the results should be interpreted with caution. In addition, few subjects had experience of surgical functions in IDR, and our assessment was performed with this in mind. Future research should include larger samples, and the role of Surgical Nurse should be based on experience.

## VI. Conclusion

The results showed the following regarding individuals experienced in IDR: (1) 72.5% of experienced subjects recognized the need for “surgical nursing practice” in IDR; (2) “organization at the time of dispatch;” was the main factor related to recognition of the need for “surgical nursing practice;” and (3) GO group recognized that the role of Surgical Nurse in IDR was not only nursing care through the perioperative period but also disaster nursing care to perform a wide variety of activities will be required in the provision of medical support following international disasters. NGO group recognized the importance of nursing care during operations as the role of Surgical Nurse in IDR.

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