

# Supply of goods from hospitals to outpatients practicing intermittent self-catheterization in Japan

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## **ORIGINAL CLINICAL RESEARCH**

Supply of goods from hospitals to outpatients practicing intermittent self-catheterization in Japan

### **Short running title**

Supply of ISC goods from the hospital

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### **Abstract**

Hospitals supply goods to patients practicing intermittent self-catheterization (ISC), yet procedures for distribution have yet to be standardized, making it difficult to track the types of goods that are shipped and their amounts. The aim of this study was to standardize the types and amounts of goods provided by medical facilities on the basis of the survey results.

We conducted a survey of medical facilities and patients regarding the status of goods

supplied for intermittent self-catheterization (ISC). Data were collected from January to May 2010 from 5 outpatient urology clinics and 26 patients practicing ISC. The first finding of this research is that the amount of supplied goods was insufficient and part of the supply method was incorrect. The second is that the status of goods supplied changed not only with ISC, but with hospital characteristics. The third is that hospital costs averaged \$63.10; the supplied catheter number affected hospital costs. Patient costs per month averaged \$26.50, clearly showing that patients experience an economic burden. Patient costs were high in cases in which the percentage of types of goods supplied was low. A researcher analyzed survey data to determine issues and procedures relevant to the supply of goods. The study showed a need to develop an optimal supply system for ISC patients and identified issues in the current system in Japan that require resolution.

**Key words:** home care therapy, intermittent self-catheterization, outpatients, supply of goods

## **BACKGROUND**

Since Lapidès et al. reported the usefulness of clean ISC in 1972 (Lapidès et al., 1972), urethral catheterization has been recommended as a method of urination control. It not only alleviates urinary incontinence and residual urine, but also reduces urinary tract infections and physical constraints (Charbonneau-Smith 1993) and improves patient quality of life (Kessler et al. 2009) compared with indwelling bladder catheterization. Controlled laboratory and clinical trials have shown the benefits of ISC, and the procedure is widely used for in-home care and at rehabilitation centres (Lapidès et al. 1976; Ouslander et al. 1987). ISC is often used for long periods of time as a means of urinary tract control (Pilloni et al. 2005; Van Loo Ma et al. 2010). In Japan and other countries, the number of outpatients practicing ISC has been increasing (Cameron et al. 2010). Moreover, the purpose of the service provided by

professionals is reportedly to reduce patient anxiety, teach the ISC technique, and impact the rehabilitation process (Logan et al. 2008, 2011).

When ISC is practiced at home, physicians and nurses involved in patient management play a key role in ensuring the delivery of a sufficient supply of necessary medical supplies (Maeda. 2009). Under the health insurance system in Japan, the goods needed for management of patients living at home are expected to be shipped in adequate quantities from the medical facilities billing of individual patients. Medical institutions that have advised patients and supplied sufficient goods to those practicing ISC at home can bill the ISC administration fee of \$220 once a month (\$294 for ISC with a single-use catheter). However, there are no standards regarding the supply of goods for ISC, and the amount of reimbursement from the insurer is fixed at a certain level. As a result, the types and amounts of goods supplied to patients practicing ISC at home are determined at the discretion of individual medical facilities.

Reports indicate that under these circumstances, the supply of required goods for ISC and other home care healthcare needs is insufficient (Maeda et al. 2004). Both patients and home visit nursing stations face shortages (Kawamura 2008). Patients unable to perform healthcare procedures (Yuzawa 2001), and both patients and home visit nursing stations may have difficulty coping with emergencies (Kawamura 2008).

Prior studies have had several limitations. First, they have failed to investigate patients unable to acquire the types and amounts of goods needed and have been unable to determine whether the supply was sufficient. Furthermore, while economic burdens on patients arising from insufficient supply of goods have been noted by some investigators (Kawamura 2008), details have remained unclear about goods purchased by patients and the costs they incurred.

Second, prior studies did not investigate medical facilities. As a result, economic burdens on medical facilities from maintaining a sufficient supply of goods were discussed (Maeda 2005),

but details of the costs of supplying goods remained unclear. Third, these reports did not focus on any particular healthcare procedure or manipulation. For this reason, they failed to yield information about the status of goods supplied, the ability to perform required home care procedures, and the associated risks of infection.

The present study focused on ISC, which is covered by the home care administration fee reimbursement system and is usually practiced by patients for long periods of time. We conducted a survey of medical facilities and patients regarding the status of goods supplied for ISC, and an attempt was made to standardize the types and amounts of goods provided by medical facilities on the basis of the survey results.

## **AIMS**

The aims of this study were to (1) clarify the status of the supply of goods by medical facilities for at-home ISC, (2) analyse the influence of patient background variables on the status of goods supplied, and (3) analyse influences of the status of goods supplied on patients and medical facilities. Based on the results, we created a list of supplies sent by medical facilities (including types and amounts) to enable standardization of the process. Our findings will provide insight that can help establish a standardized goods supply system, allowing for safe home care ISC as well as other healthcare procedures and manipulations.

## **METHODS**

### **Participants**

Inclusion criteria for clinics were (1) care of ISC-practicing outpatients who periodically visited the clinic (approximately once per month) and for whom the administration fee was billed and (2) willingness to cooperate with the investigation on the status of goods supplied to patients. Inclusion criteria for patients included (1) practice of home care ISC, (2) periodic

visits to a clinic (approximately once per month), (3) billing of the administration fee, and (4) the ability to answer interview questions. Patients were referred from participating clinics.

## **Design**

A trained researcher used a questionnaire to interview participants. It covered patient attributes, the status of ISC implementation, and variables related to medical facilities.

## **Data collection**

Data were collected from January to May 2010 from 5 outpatient urology clinics and 26 patients. We interviewed patients twice using a paper questionnaire. The second interview occurred approximately 1 month after the first. Data obtained from the patient included patient characteristics, status of goods supplied, Hospital Anxiety and Depression Scale (HADS) results, patient costs, degree of satisfaction with goods supplied, etc. Data obtained from outpatient urology clinics included goods supplied, the presence/absence of urinary tract infections, hospital costs, etc.

## **DATA ANALYSIS**

### **Status of goods supplied (Table 1)**

#### ***Influence of patient background variables on the status of goods supplied***

We performed univariate analysis with patient background variables as the independent variable and supply status as the dependent variable. Next, we performed multiple regression analysis (by forced entry) with patient background variables (the statistically significant difference in univariate analysis) as the independent variable and supply status as the dependent variable.

#### ***Influences of the status of goods supplied on patients and medical facilities***

We performed univariate analysis with supply status as the independent variable and effects on patients and medical facilities (Table 1) as the dependent variable. Next, we performed multiple regression analysis (by forced entry) with supply status (the statistically significant difference in univariate analysis) as the independent variable and effects on patients and medical facilities as the dependent variable.

All analyses were performed using SPSS 19.0J (SPSS Inc., Chicago, IL, USA).

### ***List of goods supplied***

We gathered data on goods supplied on July 10, 2010 from 5 physicians, 1 hospital clerical work administrator and 3 nursing teachers. On the basis of the results, we prepared a draft list of goods supplied. The validity and feasibility of the list were determined by discussions with participants.

### **Institutional review board approval**

Prior ethical approval was obtained from the Kanazawa Medical University Clinical Study Ethics Committee (No. 109, December 2009). Written informed consent was obtained from all participants after each was informed both orally and in writing of the purpose and design of the study, the privacy and confidentiality of individual information and answers to questions, and the respondent's right to refuse to participate in the study at any time with no effect on treatment.

## **RESULTS**

Table 2 shows the baseline characteristics of the patients. Table 3 shows the supply status for every type of goods. Everything with the exception of wipes was supplied by the hospitals; 57.9% of wipes were supplied by the hospitals. The amount of single-use catheters and wipes supplied from the hospital were deficient for 1 month of use. Therefore, patients obtained

insufficient amounts of these goods from the hospital or pharmacy. However, gel and disinfectant were supplied not by the home care fees, but by prescription in many cases.

### **Influence of patient background variables on the status of goods supplied**

Table 4 shows the status of goods supplied and the results of the univariate and multiple regression analyses. For each type of goods, there was a patient supplied at the time of consultation and a patient who was not supplied. The univariate analysis showed that the status of goods supplied changed with total number of types of goods used by patients for ISC, type of catheter, determinant of goods supplied, and type of medical facility. The multiple regression analysis showed that percentage of types of goods supplied, number of single-use catheters supplied, and number of reusable catheters supplied were affected by patient characteristics.

Percentage of types of goods supplied averaged 53.0%. That is, among all types of goods supplied to ISC-practicing outpatients for ISC, 53.0% were supplied from medical facilities. We performed univariate analysis (correlation analysis or Mann–Whitney U-test) with patient background variables as the independent variable and percentage of types of goods supplied as the dependent variable. A statistically significant difference was seen in total number of types of goods used by patients for ISC and type of catheter between Hospital A and Hospital B ( $p < 0.05$ ). Next, we performed multiple regression analysis (by forced entry) with 4 patient background variables (the statistically significant difference in univariate analysis) as the independent variable and percentage of types of goods supplied as the dependent variable. The total number of types of goods used by patients for ISC showed a significant negative relation. That is, a large total number of types of goods used by patients for ISC was associated with a small percentage of types of goods supplied.

Number of single-use catheters supplied averaged  $127.3 \pm 84.7$ . We performed univariate



analysis (correlation analysis or Mann–Whitney U-test) with patient background variables as the independent variable and number of single-use catheters supplied as the dependent variable. A statistically significant difference was seen in the number of ISC/day and total number of types of goods used by patients for ISC ( $p < 0.05$ ). Next, we performed multiple regression analysis (by forced entry) with 2 patient background variables as the independent variable and number of single-use catheters supplied as the dependent variable. The number of ISC/day and total number of types of goods used by patients for ISC showed a significant positive relation. That is, a large number of ISC/day or large total number of types of goods used by patients for ISC was associated with a large number of single-use catheters supplied. Number of reusable catheters supplied averaged  $1.0 \pm 0.7$ . We performed univariate analysis (correlation analysis or Mann–Whitney U-test) with patient background variables as the independent variable and number of reusable catheters supplied as the dependent variable. Statistically significant differences were seen in the total number of types of goods used by patients for ISC, gender, and determinant of goods supplied between Hospital B and Hospital C ( $p < 0.05$ ). Next, we performed multiple regression analysis (by forced entry) with 5 patient background variables as the independent variable and number of reusable catheters supplied as the dependent variable. Hospital C showed a significant negative relation. That is, a small number of catheters was supplied by Hospital C for patient use.

Amount of wipes supplied averaged  $48.5 \pm 74.2$  packs. We performed univariate analysis (correlation analysis or Mann–Whitney U-test) with patient background variables as the independent variable and amount of wipes supplied as the dependent variable. A statistically significant difference was seen by Hospital B ( $p < 0.05$ ). Next, we performed multiple regression analysis (by forced entry) with Hospital B as the independent variable and amount of wipes supplied as the dependent variable. Hospital B showed a significant negative relation. That is, a small number of wipes was supplied by Hospital B for patient use.

Amount of gel supplied averaged  $170.0 \pm 165.8$  mL. We performed univariate analysis (correlation analysis or Mann–Whitney U-test) with patient background variables as the independent variable and amount of gel supplied as the dependent variable. A statistically significant difference was seen in the determinant of goods supplied ( $p < 0.05$ ). Next, we performed multiple regression analysis (by forced entry) with determinant of goods supplied as the independent variable and amount of gel supplied as the dependent variable. No significant relationships were revealed.

Amount of disinfectant supplied averaged  $552.6 \pm 666.4$  mL. We performed univariate analysis (correlation analysis or Mann–Whitney U-test) with patient background variables as the independent variable and amount of disinfectant supplied as the dependent variable. Statistically significant differences were seen in the total number of types of goods used by patients for ISC and determinant of goods supplied between Hospital B and Hospital C ( $p < 0.05$ ). Next, we performed multiple regression analysis (by forced entry) with 4 patient background variables as the independent variable and amount of disinfectant supplied as the dependent variable. No significant relationships were revealed.

### **Influences of the status of goods supplied on patients and medical facilities**

Table 5 shows the influences on patients and medical facilities according to the results of univariate and multiple regression analyses.

The hospital costs per month were USD  $\$63.10 \pm \$56.60$  ( $\$0$ – $\$168.30$ ). In the analysis of type of catheter, the hospital costs were  $\$56.40 \pm \$47.20$  ( $\$0$ – $\$168.30$ ) for a single-use catheter and  $\$68.10 \pm \$47.20$  ( $\$0$ – $\$150.40$ ) for a reusable catheter. We performed univariate analysis (correlation analysis) with status of goods supplied variables as the independent variable and hospital costs as the dependent variable. Statistically significant differences were seen in percentage of types of goods supplied, number of single-use catheters supplied, and

number of reusable catheters supplied ( $p < 0.05$ ). Next, we performed multiple regression analysis (by forced entry) with 3 “status of goods supplied” variables (the statistically significant difference in univariate analysis) as the independent variable and hospital costs as the dependent variable. Percentage of types of goods supplied showed a significant negative relation. The number of single-use catheters supplied and number of reusable catheters supplied also showed a significant relation. That is, a large percentage of types of goods supplied was associated with low hospital costs, and a large number of single-use catheters supplied or large number of reusable catheters supplied was associated with high hospital costs.

The patient costs averaged  $\$21.7 \pm \$26.3$ . We performed univariate analysis (correlation analysis) with status of goods supplied variables as the independent variable and patient costs as the dependent variable. A statistically significant difference was seen in the percentage of types of goods supplied ( $p < 0.05$ ). Next, we performed multiple regression analysis (by forced entry) with percentage of types of goods supplied variables as the independent variable and patient costs as the dependent variable. Percentage of types of goods supplied showed a significant negative relation. That is, a low percentage of types of goods supplied was associated with high patient costs.

HADS results were  $8.82 \pm 8.16$  (0–22). Within 1 year, urinary tract infections developed in 4 patients (15.4%). The association between urinary tract infection and degree of satisfaction with goods supplied was excluded from analysis because of bias in the number of subjects for whom data were available. A total of 27 patients (88.8%) were satisfied with the status of goods supplied.

### **Preparation of a list of goods supplied**

We prepared a draft list of goods supplied. Its validity and feasibility were evaluated by 9 participants. As a result, the following methods were incorporated into the list: (1) The goods used for ISC are supplied once a month; (2) goods to be supplied are determined by the physician or nurse on the basis of information from individual patients; (3) sufficient goods needed for ISC are supplied under the administration fee billing system; (4) the types of goods used by individual patients are checked; (5) at the start of ISC, standard goods (e.g., catheters, wipes, gel, disinfectants) and optional goods (e.g., gloves, urine bottles, intermittent balloon catheters) are presented to the patient so that he/she can select the goods that will be used, followed by supply of the selected goods; and (6) the quantity supplied is calculated on the basis of the quantity needed for a given frequency of ISC (Table 6).

## **DISCUSSION**

The first result of this research is that the quality and quantity of goods supplied was not enough and that a part of the supply method was incorrect. Specifically, the percentage of types of goods supplied was 53.0%, the quantity of goods supplied was not enough, and gels and disinfectants had to be supplied by prescription. This may be attributed to the following factors: (1) lack of the healthcare provider's assessment of the goods used by patients and (2) the possibility that the healthcare provider did not adequately understand the goods supply system. To avoid this, it is essential that healthcare providers understand the goods supply system for ISC patients and have an opportunity to check the goods used by individual patients.

The second result is that the status of goods supplied changed not only with ISC, but with hospital characteristics. This suggests a possibility that unfairness will arise in terms of goods supply to patients by the type of consulting medical facility. The percentage of types of goods, number of reusable catheters, amount of wipes, and amount of disinfectant supplied

changed according to hospital characteristics. Hospital A supplied wipes to all patients. Therefore, it is considered that the percentage of types of goods supplied by Hospital A was high. There were many wheelchair users in Hospital B because of cord injury, etc. among patients, and they were workers. Therefore, there was a high total number of types of goods used by patients for ISC to address impairment and ISC outside the home. However, because the goods supplied by Hospital B were restricted, it is considered that the percentage of types of goods supplied was low. Moreover, patients in Hospital B received a supply of catheters or disinfectants every month, and some received 2 reusable catheters. Therefore, the number of reusable catheters supplied was high. Both doctors and patients determined the goods supplied by Hospital C. However, some patients did not receive supplies at the time of consultation. Therefore, the number of reusable catheters and amount of disinfectant supplied were low. From this result, irregular supply in relation to patients' requests was predicted. Furthermore, it is necessary to investigate differences in hospital backgrounds in terms of decisions on the type and frequency of goods to supply. The number of reusable catheters was especially affected by the medical facility caring for individual patients.

The third result of this study is that hospital costs averaged \$63.10. The percentages of these hospital costs within the administration fee for single-use and reusable catheters were 26.4% (0%–57.3%) and 28.7% (0%–68.3%), respectively. The administration fee is a medical examination expense that is included in goods supply and covers all additional costs, such as a medical examination and nursing instruction. Therefore, when hospital costs are high, there is almost no benefit to the hospital. We can say that the administration fee is not high enough for a hospital that supplies sufficient goods. The administration fee in Japan does not reflect the source of all supplies. Therefore, hospital costs are likely to be high.

Furthermore, the supplied catheter number affected hospital costs according to the multiple regression analysis. These findings indicate the necessity of reviewing the current system,

under which reimbursement for extra fees is permitted only for single-use catheters. Thus, when designing a supply system for outpatients using ISC, the method for tracking reimbursed administration fees must reflect the number of catheters supplied. The number of single-use catheters supplied is calculated from the number of ISCs per day. The number of reusable catheters supplied is calculated from the use standard of goods. The number of catheters that a patient needs is calculated by the doctor or nurse. In Japan, the doctor or nurse chooses the catheter type in most cases (Maeda 2012). The doctor and nurse must stock the necessary number of catheters in the hospital. The Japanese government must examine the administration fee to obtain the necessary amount of catheters. All reusable catheters used in this study were made by Fuji Systems, Inc., which recommends exchanging the catheter every month. However, reusable catheters were not supplied to all patients at the time of consultation. In a recent study, the authors stated that there are few reliable sources that advocate a reusable catheter protocol (Getliffe et al. 2007). In the United States, no recommendations have been made by Medicare or any other insurer for cleaning catheters between uses or reusing the same catheter for multiple catheterizations (Newman DK et al. 2011). In 2007, the Veterans Administration issued the following recommendations: “Patients should be provided with an adequate number of catheters to allow the use of a sterile catheter for each catheterization.” However, in Japan, patients are not provided with an adequate number of catheters. A system with a sufficient catheter supply is immediately necessary. Patient costs per month averaged \$26.50 in the present study, clearly showing that patients experience an economic burden. The patient costs in the present study were lower than the amount estimated by Kawamura et al. (2008), who estimated patient costs based on the quantity of goods purchased. In the present study, we based costs on the dollar amount spent. Patient costs were high in cases in which the percentage of types of goods supplied was low. That is, the status of goods supplied will affect a patient’s economic burden.

The percentage of patients who developed urinary tract infections within 1 year was low (15.4%); therefore, we were not able to determine the relationship between urinary tract infections and the status of goods supplied. In a prior report that surveyed patients using ISC, the infection rate was 0.84% (Pilloni 2005), and there was no relationship between the use of wipes and infection (Dedeić-Ljubović A 2009). A difference in the infection rate according to the difference in the type of catheter is beginning to be reported (Cardenas DD et al. 2011).

The percentage of patients who were not satisfied with the status of goods supplied was 12.2%; therefore, we were not able to determine the relationship between satisfaction and the status of goods supplied (no data available) (Moore KN et al. 2007).

The fourth result of this study is that physicians and nurses had no opportunity to learn about the goods supply system and had to deal with patients practicing ISC without adequate knowledge by preparation of a list of goods supplied. To facilitate safe and appropriate care of patients at home, there must be opportunities for physicians and nurses to learn the health insurance reimbursement system related to goods supplied because they must take responsibility for supplying necessary goods to their outpatients practicing ISC.

## **LIMITATIONS**

This study's limitations include a small sample size. However, the detailed investigation of the condition of each patient and the status of goods supplied in each case yielded findings that can help establish better systems for supplying goods to patients. The methodology and results of this study are potentially applicable to other healthcare procedures and manipulations.

A goods supply system based on reimbursement of home care administration fees is unique to Japan. However, the need to ensure efficient supply of goods for the care of outpatients is common to many countries, as is the need to create a supply system based on linkages

between multiple healthcare professionals. The authors believe that the list of goods supplied, as proposed in this study, will be valid in Japan as well as other countries.

## **CONCLUSION**

- 1) The status of goods supplied was not enough, and a part of the supply method was incorrect.
- 2) The status of goods supplied changed not only with ISC, but with hospital characteristics.
- 3) The hospital costs averaged \$63.10. The percentages of these hospital costs within the administration fee for single-use and reusable catheters were 26.4% and 28.7%, respectively. The administration fee is a medical examination expense that is included in goods supply and covers all additional costs, such as medical examinations and nursing instruction. Therefore, hospital costs are likely to be high.
- 4) Patient costs per month averaged \$26.50 in the present study, clearly showing that patients experience an economic burden.
- 5) Physicians and nurses had no opportunity to learn about the goods supply system and had to deal with patients practicing ISC without adequate knowledge by preparation of a list of goods supplied.

## **DIRECTION FOR FUTURE RESEARCH**

Development of a list of goods supplied, enlargement of the sample size, and expansion of studies to include other home care healthcare situations are required.

## **IMPLICATION FOR NURSING PRACTICE**

This study revealed that of the goods used by patients for ISC at home, those supplied by medical facilities were insufficient in terms of both type and amount, thus indicating that



certain aspects of the current goods supply system require modifications. And, on the basis of the results of the survey on the status of goods supplied, the authors proposed a list of goods aimed at standardizing the types and amounts of items to be supplied by medical facilities to patients. When ISC is practiced at home, nurses involved in patient management play a key role in ensuring the delivery of a sufficient supply of necessary medical supplies. From this study, we understood that it was important the assessment of the goods used by patients , to understand the goods supply system for ISC patients , and to check the goods used by individual patients as a nurse's role.

The administration fee in Japan does not at reflect the source of all supplies. Therefore, hospital cost and patients cost are likely to be high according to patient background variables. The Japanese government must examine the administration fee. Otherwise, the safe and certain ISC will not be continued by the patients in home. That is, a patient may refrain from the purchase of wipes or catheters to reduce their economic burden. Furthermore, a hospital may refrain from supplying goods or high-quality goods to a patient to reduce its economic burden. Therefore, there is an increased risk that the number of ISCs per day will decrease or that a patient will experience complications such as urinary tract infection due to the use of inadequate equipoment.

## **ACKNOWLEDGEMENTS**

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#### WHAT IS KNOWN ABOUT THIS TOPIC

Prior studies indicate that the supply of required goods for ISC and other home care healthcare needs is insufficient in Japan. However, they failed to investigate patients unable to acquire the types and amounts of goods needed and have not determined whether the supply is sufficient.

#### WHAT THIS PAPER ADDS

This study provides insights that will be helpful for the establishment of a goods supply system that allows safe ISC to be practiced at home and will facilitate establishment of a goods supply systems for all healthcare procedures/manipulations performed in the patient's own home in addition to ISC.

1. It is essential that healthcare providers understand the goods supply system for ISC.
2. When designing a system for supply of goods to outpatients practicing ISC, it seems essential to adopt a method by which the reimbursed administration fees reflect the amount of catheters supplied.

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**Table 1. Details of the variables**

Variables		Details
Status of goods supplied	Percentage of types of goods supplied	Percentage of each type of good supplied by medical facilities among all types for ISC
	Number of single-use catheters supplied	Number of single-use catheters at clinic visit
	Number of reusable catheters supplied	Number of reusable catheters at clinic visit
	Amount of wipes supplied	Amount of wipes at clinic visit
	Amount of gel supplied	Amount of gel at clinic visit
	Amount of disinfectant supplied	Amount of disinfectant at clinic visit
Effects on patients and medical facilities	Hospital costs	Total amounts of goods supplied according to administration fee billing
	Patient costs	Total amounts of ISC supplies purchased during the 1-month period
	Urinary tract infection	Presence/absence of urinary tract infection during the past 1-year period
	Degree of satisfaction with supplied goods	4 steps for degree of satisfaction: "not satisfied" to "satisfied"
	Hospital Anxiety and Depression Scale (HADS)	7 items for each state of depression and anxiety

**Table 2.** Patient characteristics

			n = 26
Variable			n (%)
Characteristic	Sex	Male	19 (73.1)
		Female	7 (26.9)
	Age (years)	Mean $\pm$ SD	56.6 $\pm$ 20.0
	Wheelchair use	Yes	11 (42.3)
Status of ISC	Type of catheter	Reusable	15 (57.7)
		Single-use	11 (42.3)
	Period of ISC (months)	Mean $\pm$ SD	102.2 $\pm$ 88.0
	ISC outside home	Yes	20 (76.9)
	Number of ISC/day	Mean $\pm$ SD	5.7 $\pm$ 2.6
Medical facility involved	Determinant of goods supplied	Patient only	19 (73.1)
		Doctor and patient	5 (19.2)
		Doctor only	2 (7.7)
	Type of medical facility	A. Hospital	10 (38.5)
		B. Hospital	9 (34.6)
		C. Hospital	5 (19.2)
		D. Clinic	1 (3.8)
		E. Clinic	1 (3.8)

**Table 3. Percentage of goods supplied**

n = 26

Type of goods (number of users)	Percentage of goods supplied n (%)	Method of supply		Goods supplied was adequate (for one month) n (%)	The buying method of a deficiency n (%)
		Covered by home care fees n (%)	By prescription n (%)		
Single-use catheter (n = 11)	11 (100)	11 (100)	0 (0.0)	8 (72.7)	buying from the pharmacy 3(100)
Reusable catheter (n = 15)	15 (100)	15 (100)	0 (0.0)	15 (100)	
Wipes (n = 20)	11 (57.9)	11 (100)	0 (0.0)	10 (90.9)	buying from the hospital 5(50.0) buying from the pharmacy 5(50.0)
Gel (n = 11)	11 (100)	3 (27.2)	8 (72.8)	11 (100)	
Disinfectant (n = 19)	19 (100)	5 (26.3)	14 (73.7)	19 (100)	



**Table 4. Influences of patient characteristics on status of goods supplied**

Status of goods supplied	Mean ± SD	Range	Patient characteristics	Univariate analysis	Multiple regression analysis <sup>3)</sup>		
				r or z	β	R	R2
Percentage of types of goods supplied (n = 26)	53.0%	10-100	Total number of types of goods used by patients for ISC <sup>1)</sup>	-0.786 ***	-2.912 **	0.799 ***	0.639
			Type of catheter <sup>2)*1</sup>	-2.280 *	-0.101		
			A. Hospital <sup>2)*2</sup>	-2.280 *	0.092		
			B. Hospital <sup>2)*3</sup>	-3.525 ***	-0.182		
Number of single-use catheters supplied (n = 11)	127.3 ± 84.7 catheters	0-250	Number of ISC/day <sup>1)</sup>	0.694 *	0.580 *	0.834 **	0.695
			Total number of types of goods used by patients for ISC <sup>1)</sup>	0.614 *	0.476 *		
Number of reusable catheters supplied (n = 15)	1.0 ± 0.7 catheters	0-2	Total number of types of goods used by patients for ISC <sup>1)</sup>	0.538 *	0.086	0.900 **	0.810
			Gender <sup>2)*4</sup>	-1.972 *	-0.343		
			Determinant of goods supplied <sup>2)*5</sup>	-2.676 **	-0.139		
			B. Hospital <sup>2)*3</sup>	-2.372 *	0.265		
Amount of wipes supplied (n = 20)	48.5 ± 74.2 packs	0-200	C. Hospital <sup>2)*6</sup>	-2.958 **	-0.651 *	0.492 *	0.242
			B. Hospital <sup>2)*3</sup>	-2.280 *	0.492		
Amount of gel supplied (n = 11)	170.0 ± 165.8 mL	0-490	Determinant of goods supplied <sup>2)</sup>	-2.414 *	0.542	0.542	0.294
Amount of disinfectant supplied (n = 19)	552.6 ± 666.4 mL	0-2000	Total number of types of goods used by patients for ISC <sup>1)</sup>	0.464 *	0.256	0.588	0.346
			Determinant of goods supplied <sup>2)*5</sup>	-2.414 *	-0.039		
			B. Hospital <sup>2)*3</sup>	-1.986 *	0.093		
			C. Hospital <sup>2)*6</sup>	-2.693 **	-0.392		

1) Correlation analysis

2) Mann-Whitney U-test

3) Multiple regression analysis (forced entry)

r: Spearman's product-moment correlation coefficient

z: z-value

\* p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001

β: standard partial regression coefficient

R: multiple correlation coefficient

R2: determination coefficient R2

\*1 single-use catheters (1) reusable catheters (0)

\*2 A Hospital (1) Others (0)

\*3 B Hospital (1) Others (0)

\*4 Male (1) Female (0)

\*5 Only the patient (1) Others (0)

\*6 C Hospital (1) Others (0)

**Table 5. Influences of the status of goods supplied on patients and medical facilities**

Influences on patients and medical facilities	Mean ± SD	Range	Influence of patient variables (correlation analysis)		Multiple regression analysis <sup>1)</sup>		
			Status of goods supplied	r	β	R	R2
Hospital costs	\$63.10 ± \$56.60	\$0-\$168.30	Percentage of types of goods supplied	-0.557 **	-0.398 **	0.844 ***	0.712
			Number of single-use catheters supplied	0.818 **	0.617 ***		
			Number of reusable catheters supplied	0.713 **	0.706 ***		
Patient costs	\$21.7 ± \$26.3	\$0-\$75.5	Percentage of types of goods supplied	-0.654 **	-0.527 **	0.527 **	0.278
Hospital Anxiety and Depression Scale	8.82 ± 8.16	0-22	-	-	-	-	-

1) Multiple regression analysis (forced entry)

r: Spearman's product-moment correlation coefficient

\*\*p < 0.01, \*\*\*p < 0.001

β: standard partial regression coefficient

**Table 6.** Processes for preparing a list of goods to be supplied

Item	Survey results	Draft list	Discussion	Authorized list of goods supplied
1. Frequency of supply	(1) Supplied at visit during some months but not others.	Once monthly during visit to hospital	Draft approved. A comment given recommending dissemination of the goods supply system to patients and advice for periodic visits to the hospital to ensure periodic supply of the needed goods (once monthly).	1) Goods for ISC are supplied during the visit to the hospital once a month. 2) Each patient is informed of the fee charge system for the goods needed for ISC and the necessity of periodically visiting the hospital associated with this system.
2. Person in charge of supply	(1) Items to be supplied were determined by patients (92.3%) or physicians (26.9%) (multiple answers were permitted). (2) When only the patient determined which items were to be supplied, the quantities were high for reusable catheters, gel and disinfectant.	Types and amounts to be determined by both patient and physician	A clerical staff member desired that a decision is made by the physician rather than by the patient. Another view was that physicians are not always familiar with the goods supply system and tend to consult nurses whenever necessary. In view of these comments and the necessity of information from patients about the goods used and their stocks, the final adopted provision is: " <u>The types and amounts of goods are determined by the physician and nurse on the basis of information from patients.</u> "	What is supplied is determined by a physician or nurse, taking into account the information from the patient concerned.
3. Type of goods supplied	(1) The mean number of types of goods was $5.7 \pm 2.6$ . Some patients needed more diverse types of goods for ISC. (2) The status of goods supplied was not enough and that a part of the supply method was incorrect. (3) The status of goods supplied changed not only with ISC, but with hospital characteristics.	Goods needed for ISC are supplied in sufficient quantities.	(1) A clerical staff member pointed out the necessity of disseminating knowledge about the goods supply system to avoid supply of goods in the form of prescriptions. (2) "Supplying necessary goods in sufficient quantity" was accepted by participants. To deal with differences in goods needed among individual patients, it was approved to check the goods used by patients, to present standard and optional goods at the start of ISC to patients, and to supply the necessary goods selected by patients.	1) All goods used for ISC are supplied under the home ISC administration fee billing system. 2) Types of goods used by each patient are checked. 3) At the start of ISC, standard goods (e.g., catheter, wipes, gel, disinfection) and optional goods (e.g., gloves, urine bottle, intermittent balloon catheter) are presented to the patient, allowing the patient to select the goods needed and the facility to supply the goods selected.
4. Quantity of goods supplied	Amounts of catheters supplied affected the costs of goods supplied during visits to medical facilities.	Goods needed for ISC are supplied in sufficient quantities.	Because increases/decreases in the quantity supplied depending on the frequency of ISC are natural in cases practicing ISC with single-use catheter, it was permitted to calculate the quantity needed on the basis of the frequency of ISC with this type of catheter.	The quantity needed is calculated on the basis of the frequency of ISC.
5. Place of supply	Gel and disinfectants were supplied to all patients by medical facilities, although they were supplied as prescribed goods rather than as goods billed as ISC administration fees in 72.8% and 73.7% of all patients, respectively.	Supplied at all outpatient urology clinics.	Draft accepted.	All goods needed are supplied by the outpatient urology clinic.