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Association between the perspective of adult inpatients with digestive cancer regarding the nursing service and their quality of recovery on postoperative day 3

Kumiko Sasaki and Koji Tamakoshi

Department of Nursing, Nagoya University Graduate School of Medicine, Nagoya, Japan

ABSTRACT

Although qualitative research that focuses on inpatients' experience immediately after surgery has continued to elucidate the efficacy of the nursing service for postoperative recovery, there has been little quantitative research. Our aim was to quantitatively clarify the association between inpatients' perception of the nursing service and the quality of postoperative recovery. Seventy-one digestive cancer patients who underwent surgery were recruited. Participants completed two self-administered questionnaires, including the Japanese version of the 40-item postoperative Quality of Recovery scale (QoR-40J) and the Nursing Service Quality Scale for Japan (NURSERV-J) which has 22 items and five dimensions (tangibles, reliability, responsiveness, assurance, and empathy) on postoperative day 3. There were significant positive associations between the global scores of the NURSERV-J and the QoR-40J. The global score of the QoR-40J was compared between patients who gave full marks for each dimension of the NURSERV-J (the entirely satisfied group) and those who did not (the not entirely satisfied group). The entirely satisfied groups regarding tangibles, reliability and responsiveness had a significantly higher global score for the OoR-40J than the respective not entirely satisfied groups. Adjusted for age, gender, operative procedure, and duration of surgery, the entirely satisfied groups regarding tangibles and responsiveness had a significant higher global score for the QoR-40J than the respective not entirely satisfied groups. Patients who perceived that they had received a nursing service of high quality were likely to attain a high quality of postoperative recovery. Nursing services related to tangibles, reliability, and responsiveness especially contributed to postoperative recovery.

Keywords: postoperative recovery, nursing services, digestive cancer

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INTRODUCTION

One important purpose of the perioperative nursing service is to promote the postoperative recovery of patients undergoing surgery. Until now, when evaluating postoperative recovery, the presence or absence of complications, data from blood tests, or the rate of recovery of physical function have been used as indexes.¹⁻³⁾ In the clinical field, some patients who have undergone surgery, and are judged objectively to have recovered smoothly based on their vital signs and

Received: June 27, 2017; accepted: September 12, 2017 Corresponding author: Kumiko Sasaki, MSN, RN, PHN

1-1-20 Daiko-Minami-Cho, Higashi-Ku, Nagoya 461-8673, Japan

Phone: +81-52-719-1564, E-mail: takemura.kumiko@c.mbox.nagoya-u.ac.jp

the results of clinical examinations, leave hospital without recognizing their own recovery and with a feeling of anxiety. In recent years, there has been a compelling need to evaluate patients' postoperative recovery in a multifaceted way; that is, not only physically but also psychologically and socially.⁴⁻⁶⁾ Under these circumstances, the patient-reported outcome has been a concern when evaluating quality of life and the degree of satisfaction.

Several recovery-specific quality-of-life instruments have been developed.⁶⁻⁸⁾ Of them, a 40-item Quality of Recovery scale (QoR-40) developed by Myles et al.⁸⁾ has been translated in many countries,⁹⁾ and there is already a Japanese version of the 40-item Quality of Recovery scale (QoR-40J) validated by Tanaka et al.¹⁰⁾

In the nursing field, most research studies of the postoperative quality of life of inpatients who underwent surgery are qualitative, whose most common methods of data collection are interviews and focus groups. Although qualitative research that focused on inpatients' experience immediately after surgery has continued to clarify the postoperative quality of life of the inpatients who underwent surgery, there has been little quantitative research. The important role of nurses during the postoperative period is to provide support for patients to regain control and to facilitate their adaptation to postoperative physical, psychological, and social change.

To our knowledge, there has been no quantitative research investigating the association between the quality of the postoperative nursing service and the quality of postoperative recovery. We examined this issue by using the QoR-40J and the Nursing Service Quality Scale for Japan (NURSERV-J),¹³⁾ which was developed from a 22-item instrument (called SERVQUAL) for assessing customer perceptions of service quality in service and retail organizations.¹⁴⁻¹⁶⁾

The aim of this study was to quantitatively clarify the association between inpatients' perception of the nursing service and the quality of postoperative recovery.

METHODS AND MATERIALS

Participants and Data collection

Adult inpatients were consecutively recruited who underwent surgery for digestive cancer under general anesthesia in a university hospital between July 2015 and March 2016. Patients were excluded if they could not communicate in Japanese, were treated in the intensive care unit after surgery, had a serious psychiatric disorder or a previous history, or had a medical history of drug addiction or alcohol dependence. Furthermore, patients were excluded if they had severe postoperative complications for which they could not assess their own condition objectively.

During the preoperative period, the researcher visited the participants and explained the outline of the research in the documentation. Written informed consent was obtained from all participants. The researcher revisited the participants on postoperative day 3 and asked them to complete two self-administered questionnaires. This study was conducted with the approval of the Institutional Review Board of Nagoya University Hospital (Approval number 2014-0286).

Measurement

The QoR-40J was used to measure a patient's quality of recovery after anesthesia and surgery. The QoR-40J consists of 40 items and has a possible score of 40 (extremely poor quality of recovery) to 200 (excellent quality of recovery). Participants are asked how they have felt in the last 24 hours. Each item is rated on a five-point Likert scale. The QoR-40J has five dimensions: physical comfort (12 items; maximum possible score = 60), emotional state (9 items; 45), physical independence (5 items; 25), psychological support (7 items; 35), and pain (7 items; 35).

The NURSERV-J was used to measure the quality of the nursing service for patients. 13) The

NURSERV-J includes the following five dimensions related to the patient's feeling about the nursing service: tangibles (five statements about hospital facilities, equipment, and the appearance of the nurses); reliability (four statements regarding the ability to perform the promised nursing care services dependably and accurately); responsiveness (four statements about willingness to help patients and provide prompt nursing care services); assurance (four statements regarding the knowledge and courtesy of nurses and their ability to inspire trust and confidence); and empathy (five statements about caring and the individualized attention that the nurses provide to patients). Each statement is rated on a four-point Likert scale and a total score ranging from 22 points to 88 points (each dimension maximum possible score; tangibles = 16, reliability = 20, responsiveness = 16, assurance = 16, empathy = 20).

Statistical analysis

The characteristics of study participants were presented descriptively using frequencies, median values, and inter-quartile ranges (IQR). Spearman's rank correlation coefficients were calculated to evaluate the association between the NURSERV-J score and QoR-40J score. Next, the participants were divided into tertiles of the NURSERV-J score. The global QoR-40J score and each dimensional score were compared among the tertiles using the Kruskal-Wallis test. Moreover, the Quade test, which is a rank analysis of covariance test, was conducted adjusting for age, gender, operative procedure, and duration of surgery. Finally, the participants were divided into two groups according to each dimensional score of the NURSERV-J (i.e., the participants who gave full marks and those who did not), because each distribution of the five subscale scores showed a great ceiling effect. The former patients were considered to be entirely satisfied with the provided nursing service (entirely satisfied group: ES group) and the latter were considered to not be entirely satisfied with it (not entirely satisfied group: NES group). The difference in the QoR-40J score between the two groups was evaluated using the Mann-Whitney test. All analyses were performed using the IBM SPSS Statistics software version 23.0 (IBM Corp., Armonk, NY, USA). The level of p < 0.05 was considered statistically significant.

RESULTS

Study participants

Initially, 110 patients met criteria. Of these, 80 consented, 25 refused and 5 were excluded because of postponed surgery, complications, and dropout. Nine patients did not complete the questionnaires because of a physical condition such as pain and nausea. A total of 71 patients participated in this study. As shown in Table 1, they consisted of 47 men (66.2%) and 24 women (33.8%) with a median age of 63 years (IQR: 52–70). Forty-one patients (57.7%) underwent surgery for colorectal cancer and 20 (28.2%) had surgery for stomach cancer.

Distribution of the QoR-40J and NURSERV-J scores

The median (IQR) of the global QoR-40J score was 183 (166–188). The medians (IQR) of the five dimensions including physical comfort, emotional state, physical independence, psychological support, and pain were 53 (50–56), 41 (37–43), 22 (18–25), 34 (33–35), and 31 (29–34), respectively. On the other hand, the median (IQR) of the global NURSERV-J score was 86 (83–88). The medians (IQR) of the five dimensions including tangibles, reliability, responsiveness, assurance, and empathy were 16 (15–16), 20 (19–20), 16 (15–16), 16 (16–16), and 20 (18–20), respectively. The distribution of each of the five NURSERV-J dimensions' scores showed an extreme ceiling effect.

Table 1	Chara	cteristics	of the	study	participants

Characteristics	N	%				
Gender						
Male	47	66.2				
Female	24	33.8				
ASA classification						
I	19	26.8				
II	50	70.4				
III	2	2.8				
Stage (UICC 7th edition)						
I	27	38.0				
II	19	26.8				
III	17	23.9				
IV	5	7.0				
Other	3	4.2				
Surgical site						
Stomach	20	28.2				
Intestine	41	57.7				
Stomach and intesitne	3	4.2				
Liver and pancreas	7	9.9				
Operative procedure						
Laparotomy	23	32.4				
Laparoscopy	48	67.6				
Characteristics	Median	IQR				
Age, years	63.0	52-70				
Duration of surgery, hours	4.28	3.18-5.05				
Length of hospital stay, days	18.0	15–25				
Length of postoperative hospital stay, days	14.0	10–19				
Note: $N = 71$ IOP interquartile range: ASA American Society of						

Note: N = 71. IQR, inter-quartile range; ASA, American Society of Anesthesiologists.

Correlations between the NURSERV-J and QoR-40J scores

A significant positive association was observed between the global scores of the NURSERV-J and QoR-40J (r = 0.34: p = 0.003). The global NURSERV-J score was significantly and positively associated with the dimension scores of emotional state (r = 0.34: p = 0.004), psychological support (r = 0.47: p = 0.00004), and pain (r = 0.26: p = 0.031).

Comparison of the QoR-40J score for the tertiles of the global NURSERV-J score

Table 2 presents the medians (IQR) of the QoR-40J by tertiles of the NURSERV-J score. The median of the global QoR-40J score increased with the tertiles of the NURSERV-J score. The increasing trends were likely to also be observed for physical comfort, emotional state, psychological support, and pain. The Kruskal-Wallis test showed a significant difference in the

	T1 (score 55–84)		T2 (score 85–87)		T3 (score 88)			
	N = 28		N = 22		N = 21		p	adjusted-p
	Median	IQR	Median	IQR	Median	IQR		
Global	174	156.5-187	184	174.3-186	186	174.5-193.5	0.03	0.03
Comfort	52	47–55	54	50.8-56	55	51-56.5	0.16	0.17
Emotion	39	31.25-43	41	39-42	43	38.5-45	0.03	0.03
Physical	22.5	16.3-25	22.5	15.8-25	22	20.5-25	0.59	0.76
Support	34	29-35	34	34–35	35	34–35	< 0.01	0.01
Pain	30	27-33	31.5	29-33	33	30.5-34	0.08	0.03

Table 2 Comparison of the QoR-40J score for the tertiles of the global NURSERV-J score

Note: Global, QoR-40J global; Comfort, physical comfort; Emotion, emotion state; Physical, physical independence; Support, psychological support; IQR, inter-quartile range. *P* values are calculated by Kruskal-Wallis test and adjusted-*p* values are done by Quade test to adjust for age, gender, operative procedure, and duration of surgery.

global QoR-40J, emotional state, and psychological support scores. Moreover, after adjusting for age, gender, operative procedure, and duration of surgery, there was a significant difference not only in the global QoR-40J score but also in the pain score in addition to two subscales including emotional state and psychological support.

Comparison of the QoR-40J score between the ES group and NES group

Table 3 shows the medians (IQR) of the QoR-40J by the five dimensions of the NURSERV-J. The medians of the global QoR-40J score and its dimensions were compared between the ES group and NES group. After adjusting for age, gender, operative procedure, and duration of surgery, the ES group for tangibles had significantly higher dimensional scores for emotional state and psychological support than the NES group. The ES group for reliability had a significantly higher score for psychological support than the NES group. As for responsiveness, the ES group had significantly higher scores for emotional state and psychological support and a borderline significantly higher score for pain than the NES group. Regarding assurance, all of the five dimensions' median scores were higher in the ES group, but a statistically significant difference was observed only in the dimension of psychological support. The ES group for empathy had borderline significantly higher scores for psychological support and pain than the NES group after adjustment.

Table 3 Comparison of the QoR-40J score between the entirely satisfied group and not entirely satisfied group

Tangibles		ES group $N = 41$		S group = 30	р	adjusted-p
	Median	IQR	Median	IQR		
Global	184	174.5–191	176.5	158.5–187	0.05	0.03
Comfort	54	51–56	52	47–56	0.15	0.16
Emotion	42	39–44	40	31.8-42	< 0.01	< 0.01
Physical	21	19–25	23.5	15.8-25	0.99	0.79
Support	35	34–35	34	29-35	< 0.01	< 0.01
Pain	32	29.5-34	31	27.8-33.3	0.34	0.24

	ES group			S group		
Reliability	Median	= 47 IQR	$\frac{N = 24}{\text{Median}}$ IQR		p	adjusted-p
Global	185	171–190	178.5	153–185	0.03	0.06
Comfort	54	50–56	52.5	46.3–55.8	0.03	0.43
Emotion	42	38–43	39.5	32.3–43	0.43	0.45
Physical	24	20–25	21	15–24	0.03	0.13
Support	35	34–35	33.5	29–34	< 0.03	<0.13
Pain	31	29–34			0.38	0.21
				31.5 29–33		0.21
Responsiveness	ES group $N = 42$			NES group $N = 29$		adjusted-p
Responsiveness	Median	IQR	Median			aujusicu-p
Global	185	174.8–191	175	157–185	< 0.01	0.02
Comfort	54	51–56	52	47–55	0.09	0.11
Emotion	42	38.8-43.3	39	32.5-42.5	0.03	0.04
Physical	24	20.8–25	21	16-24.5	0.04	0.24
Support	35	34–35	34	29–35	< 0.01	< 0.01
Pain	32.5	30-34	30	29–33	0.04	0.06
	ES group		NES	NES group		
Assurance	N = 63		N	N = 8		adjusted-p
	Median	IQR	Median	IQR		
Global	183	171–189	158.5	144.5–187.8	0.18	0.27
Comfort	54	51–56	49	43-58.3	0.37	0.46
Emotion	41	38-43	36	29.8-42.8	0.15	0.28
Physical	23	18-25	20.5	15.5-24.3	0.29	0.43
Support	35	34–35	31	27.3-34	< 0.01	< 0.01
Pain	32	29-34	29.5	27.3-32.8	0.15	0.17
	ES group		NES group			
Empathy	N = 36		N = 35		p	adjusted-p
	Median	IQR	Median	IQR		
Global	183.5	171.3-190.8	180	159–187	0.21	0.19
Comfort	54	51–56	53	47–56	0.50	0.44
Emotion	42	38.3–43	40	32–43	0.13	0.12
Physical	21.5	20–25	23	17–25	0.74	0.93
Support	35	34–35	34	30–35	0.08	0.08
Pain	32	29.3-34	31	29–33	0.28	0.09

Note: Global, QoR-40J global; Comfort, physical comfort; Emotion, emotion state; Physical, physical independence; Support, psychological support; ES group refers to patients who gave full marks and hence were considered to be entirely satisfied with nursing services; NES group refers to patients who did not give full marks and hence were considered to be not entirely satisfied with nursing services; IQR, inter-quartile range. *P* values are calculated by Mann-Whitney test and adjusted-*p* values are done by Quade test to adjust for age, gender, operative procedure, and duration of surgery.

DISCUSSION

This is the first study to quantitatively examine the association between patients' perception of the nursing service and their quality of recovery during the postoperative period. The patients who perceived their received nursing service to be of high quality attained a high quality of postoperative recovery. We used the NURSERV-J consisting of the five dimensions of tangibles, reliability, responsiveness, assurance, and empathy to evaluate patients' perception of the nursing service received. Of these, satisfaction with tangibles, reliability, and responsiveness were significantly and positively associated with the quality of postoperative recovery.

The dimension of tangibles includes questions about the hospital facilities, equipment, materials associated with the nursing service such as pamphlets or statements, and nurses' appearance. Doering et al. conducted a qualitative study to examine patients' perceptions of the quality of the nursing and medical care they received during their hospital stay after cardiac surgery. One of the findings was that patients were not satisfied with the physical environment in the hospital, such as being too hot in the room, the room not being clean, and a lack of privacy. These findings were consistent with our finding. Nurses should work to locate medical apparatus, instruments and articles so as to not disturb the activity of the patient, and check medical equipment so that its alarm does not sound needlessly, leading to an increase in the quality of postoperative recovery. Furthermore, many previous studies reported that providing preoperative education had a positive effect on the physical and psychological well-being of patients before and after surgery. Nurses should also prepare adequate pamphlets or statements for surgical patients.

Reliability is defined as the ability to perform the promised care dependably and accurately.^{13,15)} According to the phenomenological research with early postoperative patients undergoing colorectal surgery by Jonsson et al., adequate interventions, such as giving ice water and a warm blanket when patients asked for help, were described as good qualities among the health-care staff.¹⁹⁾ The participants in our study were patients on postoperative day 3; as such, they are in pain and have not regained control yet. Interventions and support that are absolutely necessary, such as safe care, pain management, bed baths, and change of body position, should be provided to the patients adequately and in a faithful manner.

Responsiveness is recognized as the willingness to help patients and provide prompt care.^{13,15)} In our study, responsiveness was also significantly and positively associated with the quality of postoperative recovery. As for pain management, the phenomenological study by Worster and Homes demonstrated that some patients undergoing colorectal surgery had not been satisfied with the analgesic efficacy of the pain medication provided.¹¹⁾ The quantitative research by Zalon showed a significant and negative association between pain and the patients' self-perception of recovery among older adults after major abdominal surgery.²⁰⁾ Early after surgery, the patients feel some psychological and physiological discomfort in addition to pain. Providing a rapid nursing service for these complications and difficulties contributes to the increased quality of postoperative recovery, indicating that nurses need to have the ability to assess a patient's physiological, psychological, sociological, and spiritual status accurately.

Assurance is defined as the knowledge and courtesy of the nurses and their ability to inspire trust and confidence. [3,15] Empathy is regarded as the individual attention that nurses provide to the patients. [4,15] According to a previous descriptive phenomenological study targeting the patients who participated in a fast-track program after colonic surgery, professional support provided by medical staff enabled the patients to carry out the program. [21] Moreover, the medical staff's knowledge and their empathy for the patient relieved the patients' fear and gave a sense of security. This finding is in agreement with our findings. Assurance and empathy provided by the nurses may promote the patients recognition of support and lead to the increased quality of

postoperative recovery.

One limitation of this study lies in that it used one medical institution. Both its inpatients and staff may be characteristically biased. In addition, we used a self-administered questionnaire, the NURSERV-J, to evaluate the quality of the nursing service. The participants may have overestimated the quality because of concern about the primary nurses, although we informed them that no person other than the researchers were able to check the questionnaire results. However, this overestimation could attenuate the true association with postoperative recovery. Moreover, our study participants consisted of only patients suffering from digestive cancer. Research targeted at patients undergoing surgery for other cancers is needed to highlight the importance of the nursing service for postoperative recovery. Additionally, in this study, we used data of their perception of the received nursing service on postoperative day 3. The possibility that their evaluation on postoperative day 3 may contain their impression before postoperative day 3 should be considered when interpreting our findings. Finally, further studies examining the association between the quality of postoperative recovery evaluated by QoR-40J and the long-term outcome of patients are needed to determine the clinical importance of our findings.

In conclusion, this quantitative study demonstrated that patients' perception of the nursing service was significantly and positively associated with their postoperative quality of recovery on postoperative day 3 among those who underwent surgery due to digestive cancer. Our findings also suggested that the nursing service should promote patients' postoperative recovery emotionally and psychologically, and alleviate patients' pain. Nursing services related to tangibles, reliability, and responsiveness especially contributed to postoperative recovery while other services, such as assurance and empathy, also made a contribution.

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CONFLICTS OF INTEREST

No conflict of interest has been declared by the authors.

REFERENCES

- 1) Niwa Y, Koike M, Hattori M, Iwata N, Takami H, Hayashi M, et al. Short-term outcomes after conventional transthoracic esophagectomy. *Nagoya J Med Sci*, 2016; 78: 69–78.
- Wang D, Kong Y, Zhong B, Zhou X, Zhou Y. Fast-track surgery improves postoperative recovery in patients with gastric cancer: a randomized comparison with conventional postoperative care. *J Gastrointest Surg*, 2010; 14: 620–627.
- Cohen MM, Young W, Theriault ME, Hernandez R. Has laparoscopic cholecystectomy changed patterns of practice and patient outcome in Ontario? CMAJ, 1996; 154: 491–500.
- Myles PS, Hunt JO, Nightingale CE, Fletcher H, Beh T, Tanil D, et al. Development and psychometric testing of a quality of recovery score after general anesthesia and surgery in adults. *Anesth Analg*, 1999; 88: 83–90.
- 5) Herrera FJ, Wong J, Chung F. A systematic review of postoperative recovery outcomes measurements after ambulatory surgery. *Anesth Analg*, 2007; 105: 63–69.
- Kluivers KB, Riphagen I, Vierhout ME, Brolmann HA, de Vet HC. Systematic review on recovery specific quality-of-life instruments. Surgery, 2008; 143: 206–215.

- Paddison JS, Sammour T, Kahokehr A, Zargar-Shoshtari K, Hill AG. Development and validation of the Surgical Recovery Scale (SRS). J Surg Res, 2011; 167: e85–e91.
- Myles PS, Weitkamp B, Jones K, Melick J, Hensen S. Validity and reliability of a postoperative quality of recovery score: the QoR-40. Br J Anaesth, 2000; 84: 11–15.
- Gornall BF, Myles PS, Smith CL, Burke JA, Leslie K, Pereira MJ, et al. Measurement of quality of recovery using the QoR-40: a quantitative systematic review. Br J Anaesth, 2013; 111: 161–169.
- 10) Tanaka Y, Wakita T, Fukuhara S, Nishiwada M, Inoue S, Kawaguchi M, et al. Validation of the Japanese version of the quality of recovery score OoR-40. J Anesth. 2011; 25: 509–515.
- Worster B, Holmes S. A phenomenological study of the postoperative experiences of patients undergoing surgery for colorectal cancer. Eur J Oncol Nurs, 2009; 13: 315–322.
- 12) Susleck D, Willocks A, Secrest J, Norwood BK, Holweger J, Davis M, et al. The perianesthesia experience from the patient's perspective. *J Perianesth Nurs*, 2007; 22: 10–20.
- 13) Igawa, Y. Examination of reliability and validity of the NURSERV-J for evaluation of the quality of the nursing service in an acute care hospital. *J Jpn Acad Nurs Sci*, 2013 (in Japanese); 33: 56–65.
- 14) Parasuraman A, Zeithaml VA, Berry LL. A conceptual-model of service quality and its implications for future-research. *Journal of Marketing*, 1985; 49: 41–50.
- 15) Parasuraman A, Zeithaml VA, Berry LL. SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing*, 1988; 64: 12–40.
- Parasuraman A, Berry LL, Zeithaml VA. Refinement and reassessment of the SERVQUAL Scale. *Journal of Retailing*, 1991; 67: 420–450.
- 17) Doering LV, McGuire AW, Rourke D. Recovering from cardiac surgery: what patients want you to know. Am J Crit Care, 2002; 11: 333–343.
- 18) Waller A, Forshaw K, Bryant J, Carey M, Boyes A, Sanson-Fisher R. Preparatory education for cancer patients undergoing surgery: A systematic review of volume and quality of research output over time. *Patient Educ Couns*, 2015; 98: 1540–1549.
- 19) Jonsson CA, Stenberg A, Frisman GH. The lived experience of the early postoperative period after colorectal cancer surgery. *Eur J Cancer Care (Engl)*, 2011; 20: 248–256.
- Zalon ML. Correlates of recovery among older adults after major abdominal surgery. Nurs Res, 2004; 53: 99–106.
- 21) Norlyk A, Harder I. After colonic surgery: The lived experience of participating in a fast-track programme. *Int J Qual Stud Health Well-being*, 2009; 4: 170–180.