Development of Nurse-led Navigation Program for Gastric Cancer Patients with Gastrectomy: Exploring the Effectiveness

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Abstract

Background: This study aimed to evaluate the effects of a nurse-led navigation program for gastric cancer patients with gastrectomy.

Method: The experimental group consisted of 23 patients and the control group consisted of 22 patientswith gastric cancer after gastrectomy in K university hospital in Korea.A quasi-experimental study with a nonequivalent control group was used. This study consists of two phases: a methodological study to develop a navigation program for gastric cancer patients and a quasi-experimental study to verify the effects of the navigation program. The navigation program was administered to the experimental group over 3 months with a total of 8 sessions.

Result: The experimental group had lower distress than the control group ($F = 5.298$, $p = 0.004$). Theexperimental group had less weight changes than the control group ($F = 4.390$, $p = 0.019$), and the healthcare service satisfaction with regard to nurses was high ($Z = 2.932$, $p = 0.003$). However, the quality of life was not significantly different($F = 5.905$, $p = 0.707$).

Conclusion: The nurse-led navigation program for gastric cancer patients was effective at reducing distress, improving nutritional status, and increasing satisfaction with healthcare services. It is suggested to conduct long-term follow-up research to measure quality of life changes from the navigation program.

Keywords: *gastric cancer; navigation program; distress; nutritional status; healthcare service; satisfaction*

Introduction

According to the annual report of cancer statistics, the most common cancer in Korea was gastric cancer[1]. This is expected to increase the number of gastric cancer patients, as the incidence rate is the highest compared to other countries such as the United States and Europe. The survival rate after treatment is increased due to early screening, diagnosis and treatment technology development[2]. The improvement of cancer patients' survival rate led them to recognize cancer as a concept of chronic disease requiring long-term management[3,4].

Recently, due to the change of medical environment, the overall number of days of hospitalization for cancer patients has been shortened and the responsibility for health care has been added to clients and their families[5,6]. Patients with gastrectomy experience physiological changes such as malnutrition, dumping syndrome, intestinal obstruction, and psychological changes such as fear, anxiety, depression, and distress due to uncertain prognosis of disease[7-9].

In Korea, nursing intervention for gastric cancer patients was applied to fragmentary interventioni.e., diet

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education and exercise education[10,11]. Since systematic, integrated and continuous approach is very important for gastric cancer patients and their families,it is necessary to integrate nutrition education and emotional support for gastric cancer patients.

For the first times, in the 1990s, Dr. Harold Freeman conducted patient navigation program at the Harlem Hospital in United States, lowering barriers to cancer diagnosis and management for the poor[12]. According to a 2001 report from the National Cancer Institute, the barriers to cancer treatment were not confined to the poor so that they could be applied to many Americans over all socio-economic levels[13]. In 2005, President George W. Bush approved federally funded legislation for patient navigation projects under the Patient Navigator Activity and Chronic Disease Act(H. R. 1812, 2005).In 2012, a new standard was contributed by the American College Board of Cancer Professionals that should be put into practice for cancer programs requiring certification by 2015[14].

Patient navigation is an intervention to overcome the obstacles that appear in the process of health care needs and treatment[15].The navigation program is designed to enhance the accessibility of treatment by supporting cancer patients. It focuses on meeting the needs of patients, not uniform and unilateral education by healthcare professionals. Navigators provide timely and qualitative nursing to affect treatment outcomes[16,17].

The navigation program has been applied to patients with various cancer types such as breast cancer, thyroid cancer, and prostate cancer[18-20].Nurse-led navigation programs reported to affect the emotional aspects of the subjects such as uncertainty, pain, fatigue and depression, ultimately enhancing the quality of life[21-23]. Nursing services by professional nurses had positive effects on patient satisfaction, compliance with treatment plans, reduction of length of hospital stay andre-hospitalization[24].

The gastric cancer patients were experienced physical and psychological problems and these symptoms have a significant impact on the quality of life[25]. Hong and colleagues[26] developed navigation program for newly diagnosed gastric cancer. This program composed of 3 sessions, each of 30 minutes. This navigator focused on nursing interventions that would be provided to patients at pre-treatment period. There was no navigation program for gastric cancer patients who complained of various physical and psychological symptoms after gastric cancer surgery.Therefore, it is necessary to provide integrated nursing interventions for patients diagnosed with gastric cancer appropriate at each time point throughout the treatment process, which will affect physical and psychological adaptation and recovery.

The purpose of this study was to develop and apply a nurse-led navigation program to patients diagnosed with gastric cancer and were admitted to surgery. The hypothesis of this study is that the experimental group that applied the navigation program will have lower distress, better nutrition status, higher quality of life, and higher satisfaction with medical services than the control group.

Methods

Sample and Setting

This study consists of two phases: a methodological study to develop a navigation program for gastric cancer patients and a quasi-experimental study with a nonequivalent control group to verify the effects of the navigation program. Convenience samples were confirmed and recruited at K University Hospitals in Korea.

The study was approved (accreditation no.:KYUH 2015-09-004-002) by the Institutional Review Board (IRB) of the K university hospital. Patients signed a written consent form before participating in the study. Each twenty-five patients were assigned to the experimental group and control group. The inclusion criteria as follows; (a)patients who had a performance level of 0 or 1 in the Eastern Cooperative Oncology Group performance status (ECOG); (b)patients with an American Society of Anesthesiology (ASA) score of class I to III; (c)no cognitive impairment and able to communicate; (d)patients who are known to have been diagnosed with gastric cancer. The control group data were collected from Oct 2015 to April 2016, and the experimental group were from February to August 2016.

Patients with distant metastasis, significant complications after gastric cancer surgery, active concurrent multiple cancer were excluded.In the experimental group, 2 subjects were withdrawn due to reoperation and complications, while 3 subjects were dropped from complications in the control group. Finally, a total of 45 subjects participated in this study (Experimental group=22, Control group= 23) (Fig. 1).

After the pre-test, the experimental group received a navigation program for 3 months. The intervention was performed by a researcher with 8 years of experience as a nurse practitioner specializing in gastric cancer. The intervention program effectiveness evaluation was examined at the ward and outpatient counseling room at 7 days after surgery, 1 month after surgery, and 3 months after surgery.

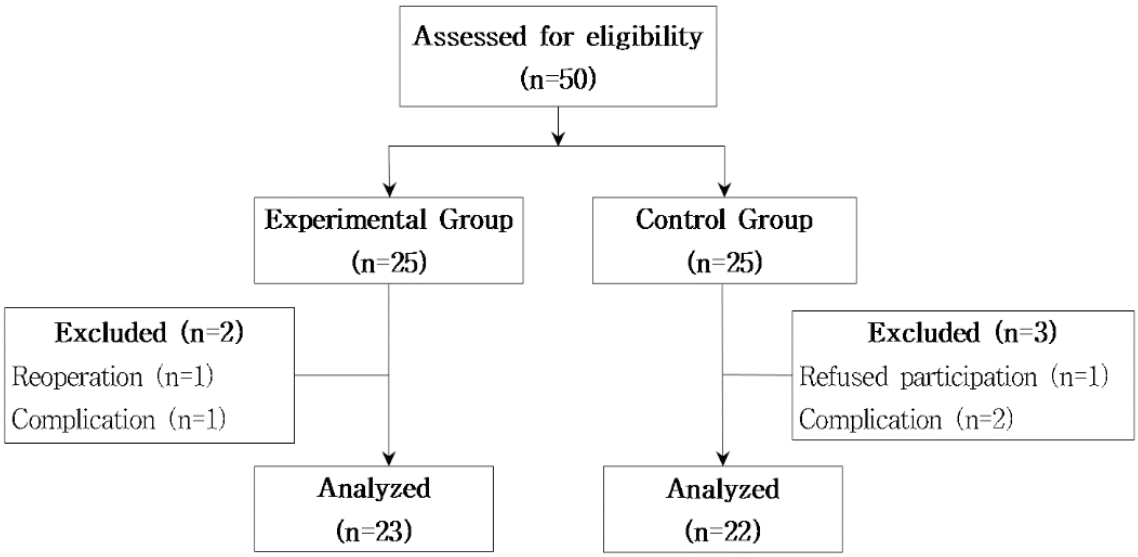

Figure 1. Study participants

Conceptual framework

The conceptual framework of this study was based ontransition theory proposed by of Meleis and colleagues[27]. Transition theory consists of the essence of transition i.e., types, patterns and properties, transition condition, response patterns and nursing therapeutics. The transition care refers to nursing activities that help clients or their families who faced with new environment and situation. Through transition, they accept new changes and adjust the condition[27].

This study was designed to enhance the continuity of nursing care and to promote the empowerment of patients with gastric cancer. The 'Professional Navigation Framework' proposed by Fillion et al[28] guidedan interventional component.This framework was used to enhance continuity of cancer care and the empowerment of patients.Fillion et al[28] suggested the three concept of continuity care; informational, management and relational. In addition, active coping, cancer related self-management and support care were proposed for the patients and caregiver empowerment. Thus, this navigator program provided the information about the gastric cancer and coping strategies.

Navigation program for gastric cancers with gastrectomy

The first step of designing navigation program was reviewing relevant literatureson gastric cancer interventional studies and nurse-led navigation program for cancer patients. As a result, 16 articles were selected for program development.

Second, focus group interview(FGI) was conducted for gastric cancer patients and healthcare professionals to understand surgical experience and to organize intervention strategies. The 7 gastric cancer surgery clients and 6 healthcare professionals participated. From

an analysis of FGI interviews with clients who underwent surgery for gastric cancer, 7 themes were derived: post-surgery adjustment period during admission, gastric cancer surgery, discharge, and post discharge; dumping syndrome; satisfying curiosity; diet management; psychological disorder; needs for timely education; and support from healthcare professionals.

An analysis of the FGI with healthcare professionals revealed the following 7 themes: difficulties of gastrectomy patient experiences; nutritional status improvement; patient curiosity after surgery, post-operative care; continuity of care; educational methodsand contents.Based on the reviews and interview results, the intervention contents were composed of 38 items.

Third, a preliminary draft of the navigation program was verified by 6 experts. The content validity index was over 0.80 in each of the 38 items. All items were satisfied the content validity index.

The intervention program was conducted 8 times for 3 months. The 6 times were face-to-face interventions and 2 were telephone consultations (Table 1). Patients were provided with tablet PC containing educational contents and booklets.

Table 1. Composition of the navigation program

Dimension	Themes	Contents		Length (min)	Outcome
Facilitating continuity of care	Informational continuity	Providing educational information package (booklets and tablet PC)		3	Satisfaction of Medical Services
		patient education	Pre-surgery patient education	10	
			post-surgery patient education	10	
			Discharge education	10	
	Management continuity	Review of test results		2	
		Coordination with the involved departments and confirmation of the outpatient schedule		5	
	Relational continuity	Program orientation with the nurse in charge (provide contact information)		3	
		Answering the phone (if necessary)		3	
Promoting patient empowerment	Cancer self-management	Educating on gastrointestinal symptoms and how to manage them		10	Nutrition Status
		Diet education		15	
		Education on chemotherapy side effects and how to manage them (if necessary)		15	
	Active coping	Providing a self-management journal		1	Quality of Life
		Need evaluation and symptom management		3	
		Discussion of cancer		15	
		Coping with stress		20	
		Coping with changes in family and other interpersonal relationships		10	
		Coping with potential fear		15	
		Maintaining changes		15	
	Supportive care	Introducing a support group		2	Distress
		Listening, concern, contact, and encouragement		2	

Instruments

The distress screening instrument developed by the NCCN(2007)was translated into Korean[29] was used. The instrument comprises of a distress thermometer and distress problem items. Cronbach's α was .80 in the present study. The nutritional status was measured by the Patient-Generated Subjective Global Assessment (PG-SGA) [30]. In this study, Cronbach's α was .78. Nutrition status, hemoglobin, albumin, and total protein used to verify the biochemical testing. Additionally, weight was measured as an anthropometric index. To evaluate the quality of life of patients with gastric cancer, the general quality of life of patients with cancer (QLQ-30) and the gastric cancer module, the site-specific quality of life for patients with gastric cancer (QLQ-STO22), which were originally developed by European Organization for Research and Treatment of Cancer (EORTC) were used[31]. Cronbach's α was .85 in this study. The cancer inpatient satisfaction (IN-PATSAT32) developed by EORTC was used[32]as well. In this study, Cronbach's α values ranged from .79 to .93.

Data Analysis

The general characteristics of the experimental and control groups were examined by computing frequencies, percentages, means, and standard deviations. Homogeneity between the groups was tested with descriptive statistics, chi-square test, Fisher's exact test, and Mann-Whitney U test.To examine differences in distress, nutritional status, and quality of life across time, Mauchly's sphericity test was performed, and, then, repeated measures ANOVA was used.The Bonferroni test was used for post-hoc testing. In case ofMauchly's sphericity test showed the homoscedasticity assumption violation, the findings were interpreted using the results of Wilk's lambda of multivariate ANOVA. Difference in satisfaction with healthcare services after the navigation program was completed using a Mann-Whitney U test.The data were analyzed according to per protocol analysis(PPA) principle except for five dropouts.

Results

General characteristics

The general characteristics of participantsare represented as Table 2. The homogeneity test showed no significant differences ingeneral characteristics and dependent variables between two groups.

Table 2. Test of between-group homogeneity (general characteristics) (n=45)

Variable		Experimental (n=23)	Control (n=22)	χ2 or Z	p
		n(%)	n(%)		
Age(yr)	≤64	13(56.6)	7(31.8)	2.883	0.279
	65-74	6(26.1)	8(36.4)		
	≥75	4(17.4)	7(31.8)		
		63.00±10.78	66.95±9.82	1.284	0.206
Gender	Male	16(69.6)	16(72.7)	0.055	1.000
	Female	7(30.4)	6(27.3)		
Marital status	Unmarried	2(8.7)	1(4.5)	1.350[a]	1.000
	Married	20(87.0)	21(95.5)		
	Bereaved	1(4.3)	0(0.0)		

Cont... **Table 2. Test of between-group homogeneity (general characteristics) (n=45)**

Religion	Yes	11(47.8)	14(63.8)	1.138	0.373
	No	12(52.2)	8(36.4)		
Education	Uneducated	5(31.7)	1(4.5)	2.767[a]	0.297
	Elementary - middle school	10(43.5)	11(50.0)		
	≥ High school	8(34.8)	10(45.5)		
Employment	Yes	8(34.8)	5(22.7)	0.795	0.514
	No	15(65.2)	17(77.3)		
Economic status	High	5(21.7)	5(22.6)	0.491[a]	0.920
	Middle	12(52.2)	13(59.1)		
	Low	6(26.1)	4(18.1)		
Stage	Early	16(69.3)	11(50.0)	1.793	0.231
	Advanced	7(30.4)	15(6)		
Surgery method	Laparoscopic assisted distal gastrectomy	15(65.2)	13(59.1)	0.370[a]	0.914
	Subtotal gastrectomy	5(21.7)	5(22.7)		
	Total gastrectomy	3(13.0)	4(18.2)		
Length of hospital stay(days)	8.08±1.83.	9.04±2.49	-1.236	0.221	0.297

[a] Fisher's exact test

Distress

The degree of stress was correlated between two groups according to the measurement time (F=5.298, p=0.004). In the follow-up analysis, there was a statistically significant difference at 1 month after surgery (Z=-3.050, p=0.002) and 3 months after surgery (Z=-3.196, p=0.001)(Table 3).

Nutrition Status

The change of weight was significantly correlated with the experimental group and the control group according to the measurement time (F=4.390, p=0.019). The follow-up analysis showed a statistically significant difference in the postoperative 1 month (Z=-2.158, p=0.031) and the postoperative 3 months (Z=-2.193, p=0.028). The PG-SGA score and biochemical values were not identified by the interaction between the groups at the time interval for measurement (Table 3).

Quality of Life: The overall quality of life (F=5.905, p=0.707) score of functional area (F=0.613, p=0.547) was not significantly correlated with the experimental group and the control group according to time interval for measurement(Table 3).

Table 3. The effect of navigation program for gastric cancer patients with gastrectomy on distress, nutritional status, quality of life (n=45)

Variables	Group	Preop.	Postop. 7-day	Postop. 1-month	Postop. 3-month		F	p
		M±SD	M±SD	M±SD	M±SD			
Distress	Experimental	3.70±1.14	4.22±1.44	4.70±0.82	2.96±0.97	group time group*time	3.351 62.852 5.298	0.74 <0.001 0.004
	Control	4.00±1.41	4.09±1.57	5.59±0.95	4.00±9.26			
PG-SGA	Experimental	3.35±0.48	4.96±1.02	7.04±1.18	4.35±1.22	group time group*time	1.756 244.877 2.778	0.192 <0.001 0.053
	Control	3.32±0.47	5.05±1.21	7.86±1.28	4.95±1.64			
Body weight (kg)	Experimental	66.84±11.19		64.23±11.02	62.20±8.49	group time group*time	4.461 39.026 4.390	0.041 <0.001 0.019
	Control	62.44±9.03		57.35±7.05	56.44±8.18			
Hemoglobin (g/dL)	Experimental	13.19±1.68	11.63±1.17	12.63±1.11	12.64±1.34	group time group*time	0.901 38.218 1.681	0.348 <0.001 0.186
	Control	12.94±1.64	10.84±1.43	12.30±1.34	12.67±1.35			
Albumin (g/dL)	Experimental	4.13±0.27	3.36±0.29	3.97±0.31	4.11±0.25	group time group*time	<0.001 42.036 1.406	0.997 <0.001 0.255
	Control	4.22±0.36	3.26±0.78	3.89±0.47	4.20±1.05			
Protein (g/dL)	Experimental	7.03±0.52	6.12±0.59	7.15±0.62	7.04±0.50	group time group*time	2.003 64.961 0.813	0.164 <0.001 0.494
	Control	6.94±0.33	5.84±0.66	6.94±0.47	6.88±0.48			
Global health status/QoL	Experimental	62.68±6.08		55.40±6.01	52.17±9.13	group time group*time	0.098 43.258 5.905	0.490 <0.001 0.707
	Control	62.12±6.15		55.12±6.15	49.62±9.78			

Satisfaction of Medical Services

There was no difference in the medical service satisfaction for doctors between groups (Z=-1.064, p=0.293), while there was a significant difference in the satisfaction of medical service for nurses between groups (Z=-2.932, p=0.003).Satisfaction in service area showed statistically significant difference(Z=-2.651, p=0.007), and there was also significant difference in overall satisfaction with hospital between the experimental group and the control group(Z=-1.775, p=0.043) (Table 4).

Table 4. The effect of navigation program for gastric cancer patients with gastrectomy on satisfaction of medical service (n=45)

Variables	Experimental (n=23)	Control (n=22)	Z	*p*
	M±SD	M±SD		
Doctors	71.05±3.51	70.21±3.54	-1.064	0.293
Interpersonal skills	78.76±4.77	79.39±4.58	-0.475	0.736
Technical skill	73.26±8.96	71.13±10.38	-0.864	0.395
Information provisions	70.00±8.90	70.360±8.51	-0.073	0.955
Availability	61.84±6.08	60.34±8.56	-0.481	0.620
Nurses	84.34±6.05	78.86±5.04	-2.932	0.003
Interpersonal skills	85.94±11.32	78.18±8.48	-2.462	0.013
Technical skill	79.78±9.28	79.46±9.01	-0.238	0.823
Information provisions	90.57±10.86	79.84±10.80	-3.227	0.001
Availability	81.08±10.54	77.95±8.22	-0.956	0.374
Service	77.72±5.47	72.90±4.97	-2.651	0.007
Other personnel	83.40±9.96	80.98±7.87	-1.075	0.283
Waiting time	75.76±14.01	70.00±12.19	-1.322	0.196
Access	74.34±13.90	67.72±11.97	-1.671	0.098
Other items				
Exchange of information	73.69±9.79	70.00±10.91	-1.152	0.274
Comfort/cleanness	71.08±5.21	72.27±7.35	-0.630	0.608
General satisfaction	86.30±12.17	75.68±18.79	-1.975	0.043

Discussion

The navigation program for gastric cancer patients developed in this study was based on the theory of transition[27]. This study was conducted in two stages. First, methodological study to develop a navigation program for gastric cancer patients by literature review and focus interview. Second, a quasi-experimental study was conducted to verify the effects of the navigation program.As a result of study, the nurse-led navigation program for gastric cancer patients was effective at reducing distress, improving nutritional status, and increasing satisfaction with healthcare services.

The distress significantly decreasedto the experimental group than the control group.It was consistent with previous studies[33,34]. These results represented that the intervention of various information, telephone counseling and support in this navigation program helped to reduce patient's distress. The distress of cancer patients might have a negative effect on the systemic condition, pain, medical service costs, treatment effects, satisfaction with medical care, quality of life, and even survival rates associated with cancer treatment. The stress intervention strategy might be contributed to improving patient satisfaction.

The change of the subjects' weight among the nutritional status was found to have significant interactions between two groups according to the measurement time. Similarly, Jung & Lee[35]'s study reported thatexperimental group who received nutritional education reported a lower weight loss than the control group.The experimental group gained confidence in food choice andshowedsignificant difference in weight loss with the increase in intake. Weight loss is the most commonly recognized indicator of malnutrition, especially weight loss after gastrectomy[36]. Thegastrectomy patients have various gastrointestinal symptoms.These symptoms eventually lead to weight loss[37].In addition, the weight of the subjects gradually decreased in experimental group until 3 months after surgery. Itrepresented the continuous nutrition management needs after discharge. The results ofprevious study supported that intensive nutrition supply would be needed within 3 months after surgery[38]. Considering this result, the postoperative changes in gastric cancer can be predicted and explained to patients. Clinicians should provide care more effectivelytoward coping with malnutrition.

Although the PG-SGA score, biochemical tests i.e., serum hemoglobin, albumin, and protein levels were recovered by the time of measurement, however, these were not statistically significant. This was consistent with the previous gastric cancer studies[39]. Considering that the weight was continuously decreased for 3 months after surgery, it is necessary to avoid serious weight loss immediately after surgery. In addition, gastric cancer patients should take enough calorie intake to maintain the nutritional status. In future studies, it is necessary to understand the degree of postoperative eating habits and intake.

There were no significant differences inquality of life between two groups which is similar to previous navigation program for first diagnose with cancer [18,22]. However, other nurse-led navigation program showed positive effect to quality of life[40]. The gastric cancer quality of life had the lowest within 3 months after surgery, and they recovered continuously within 1 year after surgery[6,36,41]. The gastric cancer navigation program performed last intervention at 3 months after operation therefore, there should be caution in interpreting this study results. Future studies are needed to provide sufficient evidence to examine the impact of quality of life in long-term period including appropriate nursing care.

The result of verifying the effect of the navigation program on the satisfaction of medical services, the experimental group showed a significant difference for nurses. The interpersonal skills and information provision of subdomain of medical service for nurses weresignificant. This navigation program was designed for nurse-led intervention. The advanced nurses for gastric cancer provided the individual education, interest and support to patients. It might be the affirmative effect to increase the satisfaction level. This resultwas consistent with many navigation programsin enhancing the satisfaction of cancer patients[20,31,38,42].

Limitation

The effect of navigation program was measuredafter

3 months, when gastrointestinal symptoms of gastric cancer patients improved. The long-term effect of the quality of life changes after surgery was not verified. Therefore, it is necessary to conduct a follow-up study to measure the effect of the long-term period in order to evaluate the objective effect of the intervention program.

Implications for Nursing

Previous gastric cancer studies focused specific characteristics such as risk factor, cancer stage or setting i.e., community care[43,44]. Gastric cancer patients suffered diverse symptoms from diagnosis to discharge. This study focused on improving the outcome the patients by organizing individual nursing interventions systematically according to the step of each transition. This study tried to promote the attributes and conditions of the transition and to improve the result such as stress, nutrition status, quality of life and satisfaction through nursing care. The interventional framework of nursing treatment was Professional Navigation Framework by Fillion et al[28], which allowed the elements of intervention to have theoretical basis. Through literature review and focus group interviews with patients and medical professionals, the program was induced to satisfy the needs of patients. A timely approach at each time of patient transition provided individual and ongoing integrated interventions to the clients.

Conclusion

Gastric cancer is the most common cancer in Korea.The improvement of cancer patients' survival rate led them to recognize a concept of chronic disease requiring long-term management. This study was to evaluate the effectiveness of navigation program for gastric cancer. The nurse-led navigation program for gastric cancer patients was positive effect to reduce the distress of the subjects, promoting the nutritional status, and enhance the satisfaction of medical services. This study contributed to gastric cancer patients' quality of life improvement. It is suggested to conduct long-term follow-up research to measure quality of life changes due to the navigation program. Furthermore, it is necessary to continuously pay attention to the quality of life of vulnerable population such as elderly gastric cancer patients.

Knowledge Translation

- This study focused on improving the outcome the patients by organizing individual nursing interventions systematically based on the theory of transition.
- The nurse-led navigation program for gastric cancer patients was effective at reducing distress, improving nutritional status, and increasing satisfaction with healthcare services.
- The nurse-led navigator program provided individual education, attention, and support to gastric cancer patients to increase satisfaction, which had a positive effect.

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Conflict of Interest : None

Ethical Clearance: This research has ethical clearance from the Institutional Review Board of Konyang University Hospital(KYUH 2015-09-004-002)

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