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THE INVESTIGATION OF THE APPLICATION OF MULTIMEDIA HEALTH EDUCATION ON THE KNOWLEDGE OF ACTIVITY: THE CASE OF KNEE REPLACEMENT OPERATION AND POSTOPERATIVE WOUND

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ABSTRACT

Since Taiwan's society structure has come to an aged society, knee arthroplasty surgery has become one of the most common operations in this society. Under the National Health Insurance and its case payment system, the patients are asked to leave the hospital earlier which the hospitalization period and the relevant education for recovery after the operation are both shortened that has impacted patients' body movements after the operation. The cooperation between the patient and his/her family members and the provision of health care information from the medical personnel become Ministry of Health and Welfare's first priority to pursue in order to maintain patient's health and wellbeing (Ministry of Health and Welfare, 2014). The objects of the research are patients in the National Cheng Kung University Hospital Dou-Liou Branch- the fifth room that contained the most Osteoarthritis patients and had experienced the total knee arthroplasty surgery. The characteristics of such patients including: the low educational level of the patient him/herself or the caregiver, less family company, unqualified home care environment that result from the insufficient health care education and the different level of after-operation health care understanding which lead to the negative effect on patients' recovery from time to time. The research is based on the characteristics of such patients in Yun Lin and it is expected the analysis on such characteristics and the application of diversify health care tutorial to increase the effect after the knee replacement operation. Furthermore, it could effectively and practically prevent from the time consuming situation occurs between the communication of patients and medical personal which the health care satisfaction and quality could be effectively increase. And academically, it is expected to provide scholar in relevant research field a reference for the positive effects on diversify health care.

Contribution/ Originality: This study contributes in the existing literature, which the prevent from the time consuming situation occurs between the communication of patients and medical personal which the health care satisfaction and quality could be effectively increase.

1. INTRODUCTION

Degenerative arthritis (osteoarthritis) refers to the degeneration of the senior's bone and joint system, pain, swelling, stiffness and deformation in joints, so the patients' activities are limited, with keen arthritis being most common. Taiwan has become an aging society (the elderly people have accounted for 9.2% of its total population), and the aging population in Yunlin County ranks second across the country. Degenerative arthritis is prevalent in the elderly and women, and the increase in the elderly people also contributes to its rising prevalence each year. With the advances in medical technology, artificial knee replacement surgery has become one of the most common orthopedic surgeries so that many patients with severe degenerative joint diseases no longer have to bear the pain and suffering of limited mobility. In addition to pain, clinically, the patients' self-care ability is reduced due to difficulties in walking Christian *et al.* (2003). Since health care needs to effectively control medical costs, the "Case Payment System" forces the patients receiving joint replacement surgery to shorten the days of hospitalization. Under the time limit, the time when patients receive related preoperative and postoperative education gradually reduces. As a result, medical staff cannot effectively communicate with the main caregivers. Besides, families differ in receiving the information about nursing guidance. Consequently, the postoperative limb motor functions are impaired, which clearly demonstrates the importance of preoperative and postoperative nursing guidance for patients. Preoperative nursing guidance can effectively alleviate anxiety, and the contents are as follows: 1. Process information: preoperative preparation, surgical procedure, ways of anesthesia, postoperative precautions and other matters; 2. Sensory information: provide the feelings which the body may experience during and after the surgery to reduce anxiety; 3. Adaptation techniques: provide relaxation techniques, comfortable positioning of affected limb and distraction to ease physical discomfort. For instance, postoperative nursing guidance can effectively enhance the patients' care awareness of related diseases and the quality of nursing patients, and can minimize their postoperative physical, psychological and emotional anxiety. The Ministry of Health and Welfare encourage patients and their families to establish partnership and to take the initiative to offer relevant information. During hospitalization, the patients may anticipate that nursing staff can take the initiative to provide relevant preoperative and postoperative information. However, most of the current postoperative nursing guidance starts to be implemented after the surgery. But the pain and anxiety tend to affect patients' concentration on study and response ability. Even their physiological and psychological conditions are affected by anxiety, thereby reducing learning ability. In recent years, the common tools for postoperative nursing guidance of knee replacement surgery include leaflets, manuals and video tapes of health education, computer 3C multimedia, and can develop patients' awareness of diseases and improve the quality of care. At present, due to severe shortage of nursing staff, when nursing staff offer nursing guidance, they often offer references to patients orally or via leaflets for health education. However, during the process, the patients are often found to understand limited information. It is learned from literature that in implementing nursing guidance, tools suitable for the patients' age and education background should be chosen. Apart from traditional leaflets for health education, study can be more life-based and the learning effects can be boosted in case of combining diverse multi-media guidance ways like audio-visual materials and offering varied health education according to differences in age and education background. In terms of older patients, their cognition and understanding will be influenced by their age and education background, and it is expected to enhance their learning concentration and understanding through sound and videos. In the organization I work for, artificial knee replacement surgery is often performed due to osteoarthritis, and the average days of hospitalization is approximately seven. In the course of clinical care, it is found that many seniors undergoing knee replacement surgery tend to feel anxious due to concern about postoperative wound pain and recovery of motor function. Therefore, the rehabilitation exercise program should start from correct postoperative limb positioning. Apart from easing pain, recovering the motor function of keen joints and preventive measures, daily activities should gradually increase to enhance the physical motor function and promote self-care ability. However, clinically, owning to postoperative pain and indwelling of various tubes in the body, patients can get out of bed about 3 to 4 days after

the surgery, so the rehabilitation exercise timing and evaluation of activity recovery are always delayed. Additionally, traditional models of health education and current non-proficiency in language of many nurses are responsible for many patients' failure to under the contents of health education. Besides, the pictures of health education are standardized and cannot be understood by the elderly. In Yulin County, tons of patients are illiterate or taken care of by foreign nurses, so their understanding of the contents about health education will be obviously affected, and then they misunderstand the contents of postoperative nursing guidance. Therefore, this paper intends to explore the effect of multimedia nursing intervention on wound and cognitive activities of patients undergoing knee replacement surgery. On this basis, it is hoped to develop a vast range of nursing guidance models. One-on-one nursing guidance is offered through self-made films about nursing guidance by health care teams which are presented in Chinese and Taiwanese and through tablet computers. Or complete preoperative and postoperative nursing guidance for patients undergoing knee replacement surgery is provided by means of group health education. These measures can improve home care after knee replacement surgery, not only can effectively improve the communication between patients and nurses, but can boost the quality and satisfaction of nursing care. In this way, sound nursing guidance can be developed and quality of care is more efficient (McNally *et al*., 2015). The purposes of this study: 1. Whether the cognition of patients having knee replacement surgery will be affected by effectiveness of leaflets and multimedia and whether there are significant differences in the cognition before and after surgery; 2. Whether the satisfaction of patients undergoing knee replacement surgery with nursing guidance will differ before and after the use of multimedia compact disc; 3. Home life background will affect the results of health education; 4.Health education results will differ due to company of family members.

2. DATA SOURCE

This study regarded patients undergoing knee replacement surgery in this hospital as subjects and also included the patients having kne replacement surgery. It used structured questionnaire as the tool to collect data and related statistical analysis. The Professor Pi-chu Lin from School of Nursing, Taipei Medical University questionnaire consented to the modification and use of the questionnaire (letter of authorization is presented in the appendix). After approved by the supervisor, this study was reviewed by the Institutional Review Board of National Cheng Kung University Hospital. Prior to the study, questionnaire survey was carried out after obtaining the consent of the participants. Before the inclusion, aside from obtaining the participants' consent, the purpose and steps of this study are clarified. In case of feeling tired or not wanting to continue the study, the participants may put forward their ideas and terminate the inclusion. After the "Questionnaire on Satisfaction of Patients Undergoing Knee Replacement Surgery with Nursing Guidance Offered by Nursing Staff" was collected, data was processed with SAS 9.3 and first coded. Statistical methods included descriptive statistics and chi-square distribution. This study included 34 clinical cases and all questionnaires were valid. The results are analyzed as follows:

3. EMPIRICAL FINDINGS

3.1. Descriptive Statistics

3.1.1. Distribution of Population Variables

During the study, it was found males and females accounted for % and %, respectively, of the total cases. The average age group was mainly 72 years old. The subjects were primarily engaged in freelance industry and agriculture, forestry, fishery and husbandry, which was in line with the occupational characteristics of Chianan. Additionally, their education level was mostly elementary school and junior high school and they were married. The subjects undergoing surgery represented () and they generally had chronic diseases. Most of them lived with spouse or children, and the main caregivers in this study were the spouse or children. Religious beliefs were mainly Buddhism, Taoism and Christianity. A list of related statistics is shown in Table 1.

Table-1. Distribution of Population Variables

Age:	63.38 歲								
Gender:	Male: 14	Female:20							
Occupation:	Unemployed:11	Military, civil servant, and teacher:1		Agriculture, forestry, fishery and husband□y:7			Industry:0	Freelan□e industry:3	Homemaker:10	Others:2
Education level:	Illiterate:10	E□ementary school:15		Junior high school:6		Senior high school:1	College:2		Graduate school or above:0	
Marital status：	Single:0	Married:34								
Past surgery:	Yes□25	No:9								
Chronic □iseases:	No:13	Yes:21								
Living condition:	Parents:3	spouses:22	chil□ren:7	brothers and sisters:0	relatives:0	friends:0	foreign domestic workers:0		living alone:2	
primary caregiver:	Parents:1	spouses:17	children:15	brothers and sisters:0	relatives:0	friends:0	foreign domestic workers:0		nurses:1	
Religious belief:	None:8	Taoism:18	Christianity:2	Catholicism:0	Buddhism:6	Others:0				

Source: The investigation by the authors

3.1.2. Relevant Needs for Operational Information before Knee Replacement Surgery

As the patients would harbor various doubts about the surgery before the surgery was performed, this study prepared a questionnaire to probe into their related needs for health education before the surgery and hoped to meet their reasonable needs for health education during hospitalization. The results showed that they had a heavy need for postoperative activity progress, off-bed time and related care for wounds. In respect of the ways of health education, the subjects mainly hoped to receive information about health education during hospitalization and in an individual manner. A list of related materials is shown in Table 2.

Table-2. Relevant Needs for Operational Information before Knee Replacement Surgery

	Mean	Median	Mode
1. Reasons for the replacement with artificial joints	4.41	4.50	5.00
2. Preoperative preparations	4.15	5.00	5.00
3. Post-operative activity progress	3.76	4.00	5.00
4. Whether chronic disease will increase the risk of surgery	4.09	4.□0	4.00
5. Postoperative off-bed time	4.21	4.00	4.00
6. Ways of caring wounds	4.21	4.00	4.00
7. Prohibited actions during posture changes (such as: standing, sitting and lying)	4.41	5.00	5.00
8. Time and methods of using crutches or walking aids	4.24	4.00	4.00
9. Postoperative dietary considerations	4.41	4.50	5.00
10. Notes on medication	4.38	4.00	4.00
11. Postoperative rehabilitation exercise methods	4.35	4.00	4.00
12. Do I need to be taken care of after discharge?	4.44	4.50	5.00
13. How long can I go back to work after surgery	4.44	4.50	5.00
14. What are the postoperative complications ?	3.06	2.00	2.00

Source: The investigation by the authors

3.1.3. Satisfaction with Health Education Needs For Knee Replacement Surgery after Receiving Nursing Guidance

According to the relevant scales of this paper, the subjects were satisfied with the contents of nursing guidance. Regarding need for hospitalization, its average was (median was). The contents of nursing guidance were clear and easy to understand with an average of (median was). The average of helping understand postoperative precautions by multimedia nursing guidance was (median was). With regard to access to information about nursing guidance, the subjects were very satisfied with rehabilitation knowledge and self-care of wound after discharge. Overall, patients were satisfied with this nursing guidance.

Table-3. Satisfaction with Health Education Needs for Knee Replacement Surgery after Receiving Nursing Guidance

	Mean	Median	Mode
1. Contents of nursing guidance content meet your hospitalization needs	4.23	4.00	4.00
2. Contents of nursing guidance are clear and easy to understand	4.38	4.00	4.00
3. This nursing guide helps you understand the postoperative precautions	4.56	5.00	5.00
4. The information about nursing instruction is readily available	4.12	4.00	4.00
5. Nursing guidance helps you understand rehabilitation exercise and to get out of bed ahead of time	4.68	5.00	5.00
6. Nursing guidance helps you with self-care after discharge	4.59	5.00	5.00
7. You are satisfied with this hospitalization nursing guidance	4.62	5.00	5.00

Source: The investigation by the authors

3.2. Goodness-Of-Fit Test

3.2.1 The Relationship between Home Life Background and Patients' Needs for Health Education

This paper first explored whether there were significant differences in the needs for health education between different genders. It can be observed from chi-square test that there were no significant differences in different

needs in terms of gender, occupation and educational level. The principal reason may be that a short study period resulted in a small sample size.

Table-4. The relationship between home life background and patients' needs for health education

	Gender	Occupation	Education level	Marital status	Past surgery
1. Reasons for the replacement with artificial joints	X	X	X	X	X
2. Preoperative preparations	X	X	X	X	X
3. Post-operative activity progress	X	X	X	X	X
4. Whether chronic disease will increase the risk of surgery	X	X	X	X	X
5. Postoperative off-bed time	X	X	X	X	X
6. Ways of caring wounds	X	X	X	X	X
7. Prohibited actions during posture changes (such as: standing, sitting and lying)	X	X	X	X	X
8. Time and methods of using crutches or walking aids	*	X	*	X	X
9.Postoperative dietary considerations	X	X	X	X	X
10. Notes on medication	X	X	X	X	X
11. Postoperative rehabilitation exercise methods	X	X	X	X	X
12. Do I need to be taken care of after discharge?	X	X	X	X	X
13. How long can I go back to work after surgery	X	X	X	X	X
14. What are the postoperative complications ?	X	X	*	X	X

Footnote-1. H0:Row variable is independent with the column variable. vs.H1:Row variable is not independent with the column variable; 2.**:P-value<0.05;*:P-value 值<0.10;X:P-value>0.10

3.2.2. The Relationship between Health Education and Company of Families

In order to probe into whether the patients' satisfaction with relevant health education needs are affected by relevant home life background, relevant data were also discussed in chi-square distribution. The null hypothesis was that home life background did not affect satisfaction with health education needs, whereas the alternative hypothesis was that home life background was associated with satisfaction with health education needs. Due to the sample size and given the relevant power, contiguous data were combined. The empirical results show that relevant home life background is not related to the satisfaction of health education.

Table-5. The relationship between health education and company of families

	Gender	Occupation	Education level	Marital status	Past surgery	Chronic diseases	primary caregiver
1. Contents of nursing guidance content meet your hospitalization needs	X	X	X	X	X	X	X
2. Contents of nursing guidance are clear and easy to understand	X	X	X	X	X	X	X
3. This nursing guide helps you understand the postoperative precautions	X	X	X	X	X	X	X
4. The information about nursing instruction is readily available	X	X	X	X	X	X	X
5. Nursing guidance helps you understand rehabilitation exercise and to get out of bed ahead of time	X	X	X	X	X	X	X
6. Nursing guidance helps you with self-care after discharge	X	X	X	X	X	X	X
7. You are satisfied with this hospitalization nursing guidance	X	X	X	X	X	X	X

Footnote-1. H0: Row variable is independent with the column variable. vs.H1:Row variable is not independent with the column variable; 2.X:P-value>0.10

4. CONCLUSIONS AND DISCUSSIONS

It is found through the cases included during the study period that multimedia nursing guidance can significantly improve patients' awareness of disease and self-care. In this study, satisfaction with surgery showed an increasing trend. The following recommendations can be made through this study: It is hoped to enhance the training of special orthopedic nursing staff and to provide patients with customized nursing care and rehabilitation guidance. Also, the professional functions of care is improved by means of advanced multimedia technology which is further extended to the use and teaching of relevant aids in other organizations. Finally, as Taiwan's elderly population continues to increase, it is expected to ease the fear and anxiety of cases, enhance the adaptability to postoperative daily activities and improve the quality of life by playing multimedia CDs.

However, since the sample size of this study was small during the study period, the production of statistical results needs to be conserved. Due to the limited funding, it is hoped to conduct longer-term data trace and assessment of patients after surgery in order to document multifaceted effects, such as complication rate, re-hospitalization rate and self-care behaviors.

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