Factors Related to Satisfaction of Patients Receiving CT Scan*

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Abstract

Purpose: To explore the relationships between waiting time, anxiety, communication, environmental factors, and satisfaction of patients receiving CT scan.

Design: Descriptive correlational design.

Methods: Sample was 126 patients receiving CT scan at Bach Mai Hospital, Hanoi, Vietnam. Data were collected using 4 questionnaires: 1) the Hamilton Anxiety Rating Scale (HAM-A), 2) the communication questionnaire, 3) the environmental questionnaire, and 4) the satisfaction questionnaire. Spearman's rho was employed to test the relationships among studied variables.

Main findings: The result illustrated that anxiety was negatively related to satisfaction (r_s = - .48, p < .05). Communication and environment were positively related to satisfaction (r_s = .46, .34, p < .05, respectively). Nevertheless, waiting time was not significantly related to satisfaction (p > .05).

Conclusion and recommendations: Nurses should assess anxiety level of patients while they were waiting for CT scan and provide nursing care to reduce anxiety appropriately. In addition, communication skills should be concerned for heath care team as well as improved environment to ensure satisfaction of patients using services in the radiology department.

Keywords: CT scan, anxiety, communication, environment, satisfaction, waiting time

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ปัจจัยที่มีความสัมพันธ์กับความพึงพอใจของผู้ป่วยที่ได้รับการตรวจด้วยคอมพิวเตอร์สแกน*

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บทคัดย่อ

วัตถุประสงค์: เพื่อศึกษาความสัมพันธ์ระหว่างปัจจัยด้านเวลารอคอย ความวิตกกังวล การสื่อสาร และสภาพแวดล้อมของหน่วยตรวจ กับความพึงพอใจของผู้ป่วยที่ได้รับการตรวจด้วยคอมพิวเตอร์สแกน (CT scan)

รูปแบบการวิจัย: วิจัยเชิงสหสัมพันธ์

วิธีดำเนินการวิจัย: กลุ่มตัวอย่างเป็นผู้ป่วย จำนวน 126 คน ที่มารับการตรวจด้วยคอมพิวเตอร์สแกน โรงพยาบาลแบคมาย ประเทศเวียดนาม เก็บรวบรวมข้อมูล โดยใช้แบบสอบถามความวิตกกังวลของ Hamilton Anxiety Rating Scale (HAM-A) แบบสอบถามการสื่อสาร สิ่งแวดล้อมของหน่วยตรวจ และความพึงพอใจของผู้ป่วยที่ผู้วิจัยพัฒนาขึ้น วิเคราะห์หาค่าความสัมพันธ์ด้วยสถิติ Spearman's rho

ผลการวิจัย: ปัจจัยด้านความวิตกกังวลมีความสัมพันธ์เชิงลบกับความพึงพอใจ (r_s = - .48, p < .05) การสื่อสารและสภาพแวดล้อมมีความสัมพันธ์เชิงบวกกับความพึงพอใจอย่างมีนัยสำคัญทางสถิติ (r_s = .46, .34, p < .05, ตามลำดับ) ขณะที่เวลารอคอยไม่มีความสัมพันธ์กับความพึงพอใจ (p > .05)

สรุปและข้อเสนอแนะ: พยาบาลควรประเมินความวิตกกังวลของผู้ป่วยขณะรอรับการตรวจด้วยคอมพิวเตอร์สแกน และให้การพยาบาลเพื่อลดความวิตกกังวล รวมทั้งควรตระหนักถึงการสื่อสารที่เหมาะสมระหว่างบุคลากรและผู้ป่วย และปรับปรุงสภาพแวดล้อม เพื่อเพิ่มความพึงพอใจแก่ผู้ป่วยที่มารับบริการที่หน่วยรังสีวิทยา

คำสำคัญ: การตรวจด้วยคอมพิวเตอร์สแกน ความพึงพอใจ ความวิตกกังวล การสื่อสาร เวลารอคอย สภาพแวดล้อม

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Background and Significance

The concept of patient satisfaction was widely used to assess quality in which patients reflected their pleasure level. Assessment of patient satisfaction was critical to implement continuous improvements in medical settings. Patient satisfaction was a complex and multi-factorial healthcare outcome, and it was a part of life satisfaction. Patient satisfaction reflected the patient's perception through many dimensions such as quality of treatment, communication between physician and patient, waiting time, infrastructure, environment, and cost of medical service[1]. The satisfaction was improved when a patient felt trust and secure in health service.

The problem of overcrowded and long waiting time occurred in every department of tertiary care hospitals. In the radiology department, there were several investigations and intervention modalities. One of the most frequent procedures that were taken place was CT scan. Unavoidably, patients who came for this procedure were very crowded and the waiting time was relatively long. It could lead to the anxiety of patients, which has significantly negative impacted the outcomes of service such as the reduction of CT image quality and the responses of patients to the CT. Additionally, anxiety could also result in the discomfort of patients and eventually decreased their satisfaction[2]. There were several reasons that caused anxiety of patients such as complicated procedure, insufficient space, and result of images. Therefore, it was essential to make patient feel comfortable and relax during using service.

Environmental factors could also influence patient satisfaction. There were studies found that physical environment of healthcare setting; such as light, noise, music, color; could influence the experience of patients either feel better or worse[3,4].

Satisfaction was also associated with the effective communication between physicians and patients[1]. Those activities could lead to increase considerably satisfaction and compliance of patients, which resulted in the positive outcomes of service[5]. Nijkamp, et al. showed that insufficient communication was negatively related to the satisfaction[6], while good communication resulted in better health outcomes[5]. Therefore, it is important to practice how to communicate effectively between health staffs and patients to improve the satisfaction of patients.

In this study, the concept of comfort[7] was applied, which indicated the role of health staffs and the importance of improving physical and psychological health of patients during treatment8. The findings from this study would provide some evidences that could be used to promote the satisfaction of patients in the Bach Mai hospital, Vietnam.

Objective

To study the relationships between waiting time, anxiety, communication, and environmental factors and satisfaction of patients receiving CT scan.

Hypotheses

1. Waiting time was negatively related to satisfaction of patients receiving CT scan.
2. Anxiety was negatively related to satisfaction of patients receiving CT scan.
3. Communication was positively related to satisfaction of patients receiving CT scan.
4. Environmental factor was positively related to satisfaction of patients receiving CT scan.

Methodology

Population and Sample

The population was patients at the age of 18 and older, both males and females, who received CT scan with injection of contrast agents at the Radiology Department in Bach Mai Hospital, Hanoi, Vietnam.

The sample was patients who were able to verbally communicate with the researcher in Vietnamese language; which were selected from the population.

Sample size was calculated using G*power program to determine the minimum number of participants needed for linear regression design with four independent variables[9]; the level of significance $\alpha = .05$, and the power of the statistical test (Power 1- $\beta = .8$). Since there was limited study about these variables, the researcher will select medium correlation coefficient ($R = .3$)[10], square multiple correlation ($R^2 = .09$), and calculated the effect size for this study ($f^2 = .099$). Based on G*power, sample size was at least 126 patients receiving CT scan.

Research Instruments

Research instruments used for data collection included 5 parts as follows:

1. Demographic data, health information, and waiting time were recorded from the patients' hospital records.

2. The Hamilton Anxiety Rating Scale (HAM-A)[11] was designed to assess the severity of a patient's anxiety. Each of the 14 items contained a number of symptoms, and each group of symptoms was rated on a scale of 0 (not present) to 4 (severe). The total scores were 56; the higher scores were more severity of anxiety.

3. The Communication Questionnaire was developed by the researcher based on the literature reviews. There were 10 self-reported items that assessed patient's perception about communication of health care staffs on service delivery. The 5-point rating scale was assigned as; 1 = poor, 2 = fair, 3 = quite good, 4 = good, and 5 = excellent. The total scores were 50; the higher scores reflected the better communication of health care staffs.

4. The Environment Questionnaire was developed by the researcher based on the literature reviews which composed of 11 self-reported items. It was used to assess environment and infrastructure conditions of hospital. Each item ranged from 1-5 score: 1 = not really convenience, 2 = not convenience, 3 = quite convenience, 4 = convenience, and 5 = very convenience. The total scores were 55; the higher score reflected the more convenience about environment and infrastructure conditions.

5. The Satisfaction Questionnaire was developed by the researcher based on the literature reviews which composed of 23 items with 5-point rating scale; the total score was 115; the higher score reflected the more satisfaction.

The instruments of this study were translated into Vietnamese using back translation technique and verified by 5 experts. CVI of these experts equaled to 1. The Cronbach's Alphas reliability of the scales in pilot test with 30 patients and with the studied sample (126 subjects) was as follows: the HAM-A = .92, .92; the Communication questionnaire = .82, .82; the Environment questionnaire = .87, .87; the Satisfaction questionnaire = .86, .85.

Protection of Human Subjects

The research proposal was ethical approved from the Institutional Review Board (IRB) of Faculty of Nursing, Mahidol University (COA No.IRB-NS2016/340.0205), and the IRB of Vietnam National University, Vietnam. Data were collected following the standard process set by the IRB. Ethical issues concerning voluntary participation with informed consent, safety, anonymity, and confidentiality of the subjects were warranted.

Data Collection

Data were collected as follows:

1. After received permission to collect data, the researcher met with the head of the Radiology department in Bach Mai hospital to introduce herself and explain the research objectives, details of data collection procedures, request cooperation in collecting data from patients receiving CT scan and hospital records.

2. The researcher assistant recruited subjects according to inclusion and exclusion criteria; explained objectives of the project and data collection process, then invited them to participate in the study. If the patients agreed to participate voluntarily, they were asked to sign the consent form, and then the research

assistant introduced the subjects to the researcher.

3. The researcher met the subject at his/her bed, introduced herself, and established a relationship with the subject. The researcher organized a private room/place to interview the subjects with 5 questionnaires or let them do by themselves. The total time of collecting data for each subject was about 30-40 minutes.

Data Analysis

Data were analyzed using a computer statistical program with the significant level of .05 as follows:

1. Descriptive statistics were used to describe demographic data and illness information including frequency, percentage, range, mean, and standard deviation.

2. The studied variables were tested for normal distribution to meet assumption of Pearson's Product Moment Correlation. None of them was normal distributed; therefore, Spearman's rho correlation was used to test the relationships of studied variables.

Findings

The findings showed that 58.73% of the subjects were males; the mean age was 52.83 years (SD = 14.7) with a range from 18 to 83 years old; 53.14% came from countryside; 34.13% finished high school; 27.78% were professional; 35.71% had monthly income 151-250 USD.

Regarding CT scan information, 30.95% were diagnosed with digestive diseases; 72.22% received first-time CT scan; more than half of the subjects (55.56%) received CT scan abdomen.

Waiting time, anxiety, communication, and environment

Total time of CT scan was calculated when patients came to the appointment room until received result of CT scan. The mean of waiting time was 21.81 hours (SD = 12.41) with the range of 3.08-61.67 hours; most of patients (65.87%) waited more than 12 hours.

Anxiety as measured by the HAM-A, it was found that almost all patients (96.83) had score > 30 which indicated severe anxiety.

Communication was assessed interaction between nurses and patients receiving CT scan at the Radiology Department, the findings indicated that majority of patients (86.51%) understand about receiving CT scan.

Environment was assessed in terms of convenience about environment at the Radiology Department; the findings found that almost all patients (95.24%) felt that it was not convenience about environment while receiving CT scan.

Satisfaction was assessed the feeling of comfort while receiving CT scan in the Radiology Department. The findings revealed that 60.32% of the subjects felt comfort, while 38.09% felt not comfort, and 1.59% felt very comfort.

The relationship between waiting time, anxiety, communication, environment and satisfaction

The result illustrated that anxiety was negatively related to satisfaction (r_s = - .48, p < .05). Communication and environment were positively related to satisfaction (r_s = .46, .34, p < .05, respectively). Nevertheless, waiting time was not significantly related to satisfaction (p > .05).

Table 1: The relationship between waiting time, anxiety, communication, environment and satisfaction

	1	2	3	4	5
1. Waiting time	1.00				
2. Anxiety	.08	1.00			
3. Communication	- .13	- .23*	1.00		
4. Environment	.15	- .34*	.12	1.00	
5. Satisfaction	- .11	- .48*	.46*	.34*	1.00

* p < .05

Discussion

The results partially supported the proposed hypotheses that anxiety was negatively related to satisfaction (r_s = - .48, p < .05). Communication and environment were positively related to satisfaction (r_s = .46, .34, p < .05, respectively). However, waiting time was not significantly related to satisfaction (p > .05).

Waiting time for health care services was one of important determinants for hospital management. In this study, the mean of waiting time was 21.81 hours (SD = 12.41) with the range of 3.08-61.67 hours; most of patients (65.87%) waited more than 12 hours. This was different from previous studies that found shorter waiting time[12,13]. Specifically, several previous studies have shown the negative effect of waiting time on patient service satisfaction, which was also different from the result of this study. Reducing waiting time could improve the satisfaction among patients receiving CT scan[12,13]. Another study in National Hospital Abuja, Nigeria indicated that there was a strong association between shortening waiting time, meeting patients' expectations about clinic visit encounters and patient satisfaction (p < .001)[14]. Another explanation for the findings of no relationship between waiting time and satisfaction might be that the studied hospital was the big and very crowded hospital in Vietnam, patients who came to this hospital already known that they had to wait for a long time to get treatment, therefore waiting time did not affect their satisfaction.

Anxiety, it was found that almost all patients in this study (96.83) had score > 30 which indicated severe anxiety. Anxiety was also negatively related to satisfaction of patients receiving CT scan (r_s = - .48, p < .05). Normally, patients undergoing imaging procedures felt anxiety because of various reasons, such as their health/disease condition, feeling of fear, unknown procedure, comfort during CT scan, and uncertainty of the results[15]. Previous studies showed that patients who were not familiar with CT scan might have higher level of anxiety than those having experience with CT scan. Patients with CT scan of the extremities showed significantly lower anxiety than those undergoing scan of the torso, spine, blood vessels or head. Traumatic patients also showed significantly lower anxiety than those of the patients who received CT scans for primarily non-traumatic indications. Of all subgroups, tumor patients showed the highest level of anxiety[15-17]. Hence, it is necessary for medical staffs or healthcare professionals to provide the information related to the procedure. This was a critical component for reducing anxiety, and it was essential to use this solution in the first stage, especially for those suffering more anxiety[2,15,17]. Furthermore, enhancing communication between patients and technical staffs should also be considered[18].

Communication played an important role to promote patients satisfaction regarding the quality of hospital medical services as well as improving the anxiety level of patients. Most of the patients in this study (86.51%) understood nurse's communication in providing procedures of CT imaging. There was also a positive relationship between medical staff's communication and patients satisfaction (r_s = .46, p < .05). A previous systematic review showed that knowledge-attitude and communication skill of staffs were strongly correlated to the patient satisfaction[19]. Good communication reduced patient's pressure and increased their comforts, especially older patients[20-23]. Therefore, improving communication capacities of staffs should be considered when planning the strategies to increase the patients' satisfaction.

The results demonstrated that almost all patients (95.24%) felt that it was not convenience about environment while receiving CT scan. Additionally, it was found that environment was significantly positive related to satisfaction (r_s = .34, p < .05). Many variables that affect patients' satisfaction were part of the physical healthcare environment, such as light, noise, music, color; which could influence the experience of patient satisfaction[3,4]; which was a substantial indicator of healthcare quality. Therefore, hospital staffs

should optimize the hospital's resources and improve the infrastructure as well as physical and professional environment of the hospital to enhance patient satisfaction.

Satisfaction was assessed the feeling of comfort while receiving CT scan. The findings revealed that 60.32% of the subjects felt comfort, while 38.09% felt not comfort. This result was similar to the study in Saudi-Arabia which assessed the level of patient satisfaction and its association with different socio-demographic and healthcare characteristics in an emergency care center; which found that 70.4% of patients had moderate satisfaction[24]. In comparison with other studies, the percentage (60.32%) was lower than result of study published previously[25,26].

Conclusion and Implication for Practice and Further Study

The findings from this study supported the concept as proposed by Comfort theory[7], when patients had psychological problem such as anxiety and feeling frustrate with an inadequate communication, being in the very undesirable environment; they would demonstrate dissatisfaction and this reflects un-comfort.

Implications for nursing practice

In order to enhance satisfaction of patients receiving CT scan, the following managements should be performed by nurses or health care team: providing knowledge about CT scan for patients; improving infrastructures and equipment; promoting communication capacities of health care staffs such as doctors, nurses, technicians to communicate efficiently with the patients; setting the systems for reduce waiting time such as improving administrative procedure and using smart phone application to inform the result; improving the environments for comfort the patients.

Implications for further study

The training program for effective communication should be developed and test for its effectiveness by research. Anxiety management program for patients waiting for CT scan should also be developed and tested through research.

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