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The effectiveness of a telehealth program on the anxiety levels among women with core needle biopsy for suspected breast cancer

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The effectiveness of a telehealth program on the anxiety levels among women with core needle biopsy for suspected breast cancer

Abstract

Aim

This study aimed to investigate the effectiveness of a telehealth program on anxiety levels among women undergoing core needle biopsy for suspected breast cancer.

Samples and setting

A quasi-experimental research study was conducted at a university hospital in Bangkok, Thailand. Seventy women with breast lumps scheduled for a core needle biopsy were enrolled.

Methods

Thirty-five women with breast lumps were assigned to participate in the telehealth program plus routine care, while another group of thirty-five women received only routine care. Data was collected using a demographic data questionnaire and visual analogue scale (VAS). These tools assessed the patients' anxiety levels once before participating in the program (on admission to hospital) and twice after participating in the program (before the biopsy and on the day of follow-up). The telehealth program consisted of educating, consulting and monitoring patients via the LINE messaging application and handbooks for women receiving a core needle biopsy with routine care.

Results

The study group had statistically lower anxiety levels than that of the control group both before biopsy ($p = 0.003$) and on the day of follow-up ($p = 0.001$). In addition, the study group had statistically lower anxiety levels after participating in the program, both before biopsy ($p = 0.045$) and on the day of follow-up ($p = 0.002$).

Conclusions

The telehealth program can be used to care for patients that have been scheduled for core needle biopsy in order to reduce their anxiety.

Keywords: anxiety, core needle biopsy, telehealth program

Introduction

Breast cancer is frequently found in women worldwide and is the second leading cause of death¹, with trends showing an expected rise to 3.1 per cent by 2025². In Thailand, breast cancer incidence is found in 28.5 out of 100 000 women³. Breast cancer is considered the most common cancer in women. The diagnosis of a breast lump as cancer occurs at a rate of 27–34 per cent^{4,5}. Diagnoses currently occurs using the triple assessment guideline, consisting of clinical follow-up, a breast imaging study (such as ultrasound or mammograms) and pathology follow-up (such as fine needle biopsy, core needle biopsy or excisional biopsy⁶). Breast cancer is the second most frequently encountered diagnosis among patients visiting the hospital taking part in this study, Mahidol University hospital. According to hospital statistics, during the years 2016 to 2018, almost 6000 suspected breast cancer patients were diagnosed using a core needle biopsy⁷.

A core needle biopsy is an outpatient procedure for breast cancer diagnosis⁸. This procedure can take 30 minutes to two hours. Typically, a diagnosis will occur within ten days. Those patients with core needle biopsy receive short-term care in the hospital such as health counselling, advice and support. However, the transitional care between hospital and home has not been explicitly established for core needle biopsy patients. In addition, the transitional care for the outpatient surgery group still does not provide complete care. This may result in patients' experiencing complications or dissatisfaction with their service⁹.

Forty-two to 50 per cent of women that have suspected breast cancer and require core needle biopsy were found to have anxiety¹⁰. This anxiety continues to occur until the patients receive the biopsy results¹¹.

The factors influencing anxiety include the waiting time before receiving the core needle biopsy¹², the experience of having suspected breast cancer or a biopsy, a family history of breast cancer and lack of knowledge about the disease, biopsy methods, the time required to receive the results, the risk of developing breast cancer and information about follow-up and diagnostic tests¹³. Increased anxiety may affect a woman's ability to decide whether to use health care or lead to them refusing treatment, searching for other treatment methods or refusing follow-up care. These decisions could possibly cause the disease to become more severe. Additionally, the women's anxiety can interfere with the function of their perception, memory and decision-making regarding treatment which may cause them to receive incorrect information and feel unable to make informed treatment decisions or perform self-care after treatment¹⁴.

Literature reviewed for the study showed that care composed of health information and psychological support can reduce patients' anxiety during the breast cancer diagnostic period¹⁵. Telehealth programs have become increasingly popular using devices such as computers, tablets or smartphones to communicate with patients for preoperative or long-term follow-up care¹⁶. Telehealth programs can also be used for surgical patients or as part of perioperative preparation¹⁷. Moreover, telehealth programs can be used for patients with psychological conditions by providing educational material about their treatment or consultation via online media¹⁸. In Thailand, telehealth programs have not been consistently used in the care of patients, meaning that patient care ends on leaving the hospital. According to a study on the effects of discharge planning for women that received breast mass

excision, patients were not monitored until receiving the diagnosis¹⁹ and the program ended only one day after the surgery. Additionally, a study on the effects of providing preoperative information to women with breast cancer based on nursing practice guidelines for anxiety ended the program on the date of the surgery. Furthermore, patients were not monitored at home after the surgery²⁰, which may have led to inconsistencies in their care.

The present study applied a transitional care model (TCM) providing consistent pre- and post-hospital care for patients who were treated at the hospital²¹. This model is dependent on the cooperation of the health care teams in meeting the patients' needs. The TCM can be used as a conceptual framework in caring for women receiving core needle biopsy for suspected breast cancer. It can also help nurses in providing physical and psychological care for patients, assessing problems, evaluating needs and solving potential problems when patients are staying at home. In Thailand, this approach to care and monitoring for women in this population has been rare. Therefore, this study examines a telehealth program for reducing anxiety in women undergoing core needle biopsy for suspected breast cancer.

Aim

The aim of the study was to investigate the effectiveness of a telehealth program on the anxiety levels among women undergoing core needle biopsy for suspected breast cancer.

Samples and setting

The population in this study consisted of female patients aged 18 years and older with breast lumps who had a planned core needle biopsy with local anaesthetic. Inclusion criteria consisted of

patients receiving a core needle biopsy for the first time. All of the participants had a waiting time of no more than four weeks to receive the core needle biopsy. They had the ability to perceive, understand and communicate in the Thai language and use a smartphone. Exclusion criteria consisted of patients already diagnosed with psychiatric disorders, such as anxiety disorder and depression, and cognitive disorders or patients diagnosed with other types of cancer.

The sample size was calculated using power analysis with the G*Power program. The power of the test was 0.80, $\alpha = 0.05$. A review of similar studies²² indicated an effect size of 0.67. Hence, the sample size was calculated at 29 samples per group. In order to prevent sample loss, the researcher added an attrition rate of 20 per cent. Therefore, the number of participants was 35 in each group. This prospective research was conducted from January to June in 2019 at Mahidol University hospital in Bangkok.

Methods

This quasi-experimental research had a two-group, pretest–posttest design. The research intervention consisted of the telehealth program for patients receiving a core needle biopsy. The researcher and advisory professors developed this program. It was conceptualised using the TCM. The health care team consisted of the physician and nurses who were promoting health outcomes throughout the period from arriving at hospital to returning home²¹. The program consisted of education about the core needle biopsy, consulting with patients, and monitoring their symptoms after receiving the core needle biopsy by sending messages via the LINE application. In addition, the participants were provided with a handbook with

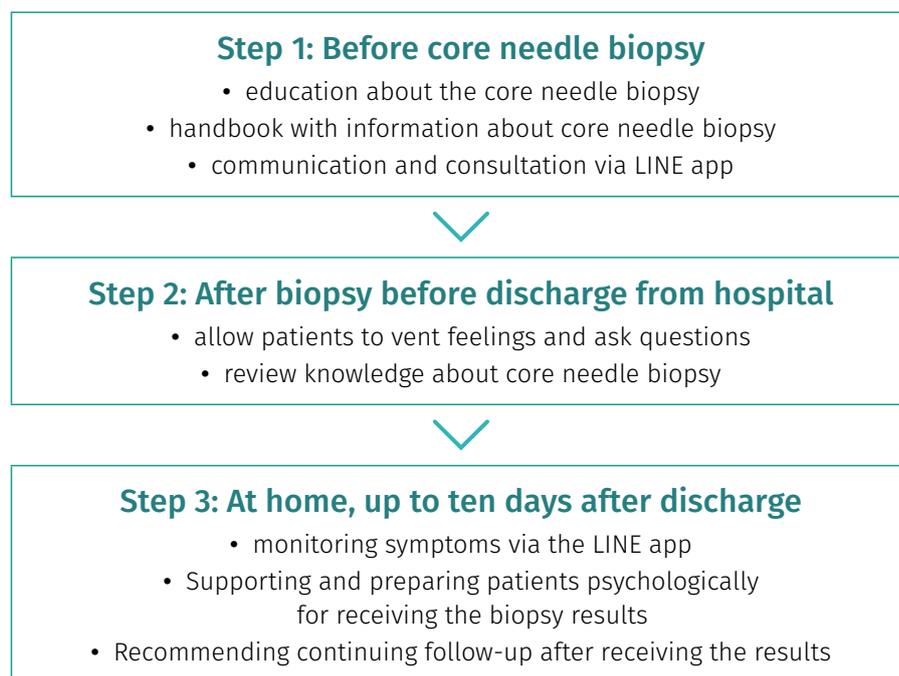


Figure 1: Flowchart of telehealth program for women receiving the core needle biopsy

content related to core needle biopsy methods, the necessary steps to be taken, instructions for before and after the core needle biopsy, and communication channels for asking questions (Figure 1). Three qualified experts tested the material for content validity. The telehealth program was tested with ten participants who were representative of the sample group in order to assess the understanding of the content before the program was used with the participants.

The data collection instruments consisted of a demographic data recording form consisting of age, religion, marital status, level of education, occupation, income, treatment rights and medical history data. The visual analogue scale (VAS) was used to assess the patients' anxiety levels with one question for the participants to assess their current anxiety²³. The VAS is widely used and assesses anxiety in clinical practice settings. The scale was linear and horizontal with a length of 100 mm, beginning from the left side

at 'no anxiety' and rising toward the right to 'highest anxiety.'

Data collection method

After ethical approval from the Institutional Review Board at Mahidol University, the researcher selected the participants at the breast clinic based on the inclusion criteria. The researcher inquired about the subjects' willingness to participate in the research project along with an explanation of the research objectives and informed consent. The subjects then signed the forms consenting to participation.

The researcher collected data in two stages, firstly from the thirty-five participants in the control group and then the thirty-five participants in the study group, in order to prevent contamination between the two groups. The control group received routine care without access to the telehealth program. The study group received the same routine care plus access to the telehealth program consisting of education and

Table 1: Comparison of study group and control group anxiety level mean scores with independent t-test statistics

Anxiety level	Study group (n = 35)				Control group (n = 35)				T	p-value
	min	max	mean	S.D.	min	max	mean	S.D.		
At admission (T0)	0.8	10	5.61	2.86	1.2	9.6	5.66	2.20	0.084	0.930
Before biopsy (T1)	0.4	8.6	4.83	2.17	2.6	9.3	6.29	1.86	2.634	0.003*
Day of follow-up (T2)	0	9	3.83	2.43	1.6	10	5.79	2.44	3.158	0.001*

*p < .05 S.D. = standard deviation

a handbook about the core needle biopsy, consultation and monitoring of symptoms after receiving the core needle biopsy and when they had returned home via the LINE app.

The participants completed their own demographic and medical history data, while the researcher completed the data from the patient's medical records. The VAS was completed by the participants at three time points: on the day of admission, on the day of receiving the core needle biopsy and on the day of follow-up before receiving the biopsy result.

Data analysis

SPSS version 20 was used for data analysis. Differences in demographic data and treatment background data were compared using a chi-squared test, Fisher's exact test and an independent t-test. The mean scores for patient anxiety were compared between the study group and the control group by using independent t-test and mean levels of anxiety before and after the telehealth program, and were then compared with repeated measure ANOVA statistics.

Results

Demographic and medical history data

Concerning the participants' demographic data, the study group was found to have a mean age of 50.63 years (SD = 7.85) and the control group was found to have a

mean age of 52.60 years (SD = 10.22). Most participants had completed a bachelor degree or higher as their highest degree of education (57.2% in the study group and 60.0% in the control group). Most participants worked as a government official or university officer (40% in the study group and 42.9% in the control group) and had mean family, monthly incomes amounting to 30 000 baht or greater (60% in the study group and 42.8% in the control group). The health care costs of about half the participants were provided by the government (51.5% in both groups) and less than half the participants heard about this treatment from physicians and nurses (40% in the study group and 48.6% in the control group).

Regarding the medical history in both groups, most participants were found to have no chronic diseases, no history of using birth control, no history of breast symptoms, no family history of cancer and had previously conducted breast self-examination. When the demographic and medical history data were compared between both groups, no differences were found, with statistical significance of 0.05.

Anxiety levels

Table 1 shows the mean scores for anxiety between the group who participated in the telehealth program and the group who received routine care only. The study group was found to have a lower anxiety

level (4.83 ± 2.17) than the control group (6.29 ± 1.86) before the core needle biopsy (p = 0.003), in addition to having a lower anxiety level than the control group on the day of follow-up (study group: 3.83 ± 2.43, control group: 5.79 ± 2.44). This was statistically significant (p = 0.001).

Table 2 compares the mean anxiety scores for the two groups at admission (T0), before the core needle biopsy (T1) and on the day of follow-up (T2). The scores for the study group were found to be different to those for the control group, with a statistical significance for at least one pair (F = 11.085, p = 0.000).

Table 3 compares the mean anxiety scores for the study group before and after participating in the telehealth program. The study group was found to have statistically significant lower mean anxiety scores after participating in the telehealth program, both during the period before the core needle biopsy (p = 0.045) and on the day of follow-up (p = 0.002), than at admission before participating in the telehealth program.

During the telehealth program, some of the participants shared thoughts via the LINE app about potential causes of anxiety, including being suspicious of breast cancer results, pain during and after the biopsy, and inability to take care of themselves after the biopsy. Two participants

Table 2: Comparison of study group and control group anxiety level mean scores using repeated measure ANOVA

Anxiety level	At admission (T0)		Before biopsy (T1)		Day of follow-up (T2)		F ^a	p –value
	mean	S.D.	mean	S.D.	mean	S.D.		
Control group	5.66	2.20	6.29	1.86	5.79	2.44	1.227	.294
Study group	5.61	2.86	4.83	2.17	3.83	2.43	11.085	.000*

^aGreenhouse-Geisser correction, *p < .05

sent images to ask questions about wound healing.

Discussion

The women who received a core needle biopsy and had access to the telehealth program had lower anxiety levels than the women receiving only routine care; the difference was statistically significant (p < 0.05). The participants in the study group had lower mean anxiety scores than those in the control group before the core needle biopsy (T1) and on the day of follow-up (T2) because the telehealth program allowed them to manage their emotional responses, fear and anxiety. In addition, the program supported and provided opportunities for the participants to ask questions and relieve anxieties. Moreover, the telehealth program provided a degree of physiological and psychological readiness for the patients preparing for core needle biopsy. The continuing care of patients based on the TCM was

conceptualised in this study. The gap in nursing care was covered by using the telehealth program, which decreased anxiety levels in participants as a result.

Regarding the anxiety characteristics among the participants that received the core needle biopsy in this study, the patients were noted to have anxiety at every stage. Upon admission, the patients in the control group were found to have no differences in their mean anxiety scores from the study group. Furthermore, the mean anxiety scores were found to have increased before the core needle biopsy and decreased on the day of follow-up. Additionally, the telehealth program included transitional care, which consisted of anxiety assessments, education, consultation and consistent monitoring of participants via the LINE application after they went home. The program helped the participants receive continuing care, which decreased their anxiety levels.

According to Dermia et al.⁹ who studied the experiences of patients who had undergone breast biopsy, most patients felt anxiety because of a lack of knowledge and information related to the disease and its procedure. The patients also expressed fear and concern which was related to spiritual needs. In addition, Brocken et al.²⁴ and Harding²⁵ studied the suffering and related factors during the diagnostic phase of suspected cancer. They found that the patients who had undergone breast biopsy were found to have anxiety due to pain, lack of knowledge, uncertainty regarding the biopsy results and fear of cancer. This caused anxiety levels among the participants in the control group to rise before the core needle biopsy and their anxiety remained high on the day of follow-up.

Similarly, Liao et al.¹⁵ found that informational and psychological supportive care post-operatively included educational pamphlets about breast cancer diagnosis and treatment, emotional support and follow-up telephone consultations. In Liao et al.¹⁵ the study group was found to have statistically significant lower mean anxiety scores than the control group before the core needle biopsy (p = 0.017) and when receiving the diagnosis results (p = 0.001). In addition, Tan et al.²⁶, who studied an educational program for women with newly diagnosed breast cancer, found the patients had higher knowledge and lower anxiety levels (p < 0.001). This program provided handbooks on treatment guidelines, breast care

Table 3: Comparison of anxiety level mean scores in the study group at admission (T0), before core needle biopsy (T1) and on the day of follow-up (T2) in matched pairs categorised by time period using multiple comparison statistics by the Bonferroni method (N = 35)

Pair comparison for anxiety level mean scores by time period	mean difference	p-value	95 % confidence interval	
			lower	upper
T0 and T1	0.777	0.045*	0.013	1.541
T0 and T2	1.774	0.002*	0.574	2.974
T1 and T2	0.997	0.014*	0.165	1.829

*p < 0.05

nurse counselling, and educational videos on breast cancer.

The women that received the core needle biopsy after the telehealth program were seen to have statistically significant lower anxiety levels than before the telehealth program ($p < 0.05$). In this study, the participants in the study group were found to have the highest mean anxiety score before the telehealth program. These anxieties decreased after the program, both before the core needle biopsy and on the day of follow-up. The participants in the study group that were assigned to participate in the telehealth program received knowledge about the core needle biopsy via verbal teaching and handbooks. The patients were able to review the handbooks at home. Educating patients from the day of treatment at the hospital provided them with knowledge, understanding and the ability to prepare for events. This corresponded with the findings of Tantulawat and Patumwan²⁷, who found that giving recommendations to the patients before receiving the core needle biopsy reduced their lack of understanding by 93 per cent.

In this study, the telehealth program provided channels for patients to communicate and make inquiries via the LINE app on smartphones, while they stayed at home. This supported the provision of complete information and psychological support by enabling nurses to speak with the patients, ask about their feelings and provide encouragement. These findings were consistent with the findings of Miller et al.⁸, who studied the effects of good communication between patients and radiotherapists on the day of a core needle biopsy procedure. The information included types, time and steps of methods of the procedure. In addition, the researcher spoke with the patients in order to prepare them for follow-up results, causing them to have lower anxiety ($p < 0.001$).

Obadina et al.¹⁸, who studied the effects of educational online support, used online education related to breast care, and answers from breast specialists to patients' questions. According to the findings from Obadina et al.¹⁸, the group participating in the online program at the core needle biopsy stage was found to have lower anxiety levels ($p = 0.017$).

The participants in the present study were monitored for symptoms after the core needle biopsy and after discharge by the researcher sending messages to individual participants regarding potential symptoms after the procedure. Examples of these symptoms include abnormal bleeding, pain or discomfort. Most of the participants were found to have no abnormal symptoms while staying at home. Only 5.7 per cent of the participants (two participants) sent images to consult the researcher regarding wound characteristics and bruising of the breasts. The researcher consulted with the medical team regarding how to reply to the patients' inquiries. In contemporary studies, which used telehealth technology to monitor patients after breast cancer surgery, 75 per cent of the samples were found to have used the telehealth program. In those studies, many of the patients were concerned with the post-operative recovery time and other patients' experiences. One-third of the sample reported that the symptoms encountered while staying at home consisted of anxiety and pain. Fifteen per cent of the sample wanted to consult with a physician regarding the management of symptoms caused by anxiety and other side-effects²⁸. In the area of mobile app development for breast cancer treatments of patients treated with chemotherapy, the patients were found to better perceive self-efficacy, symptom management and quality of life ($p < 0.05$)²⁹.

Conclusion

The telehealth program in this study assessed only patients' anxiety levels. Current studies have reflected the effectiveness of the telehealth programs in assessing patients' quality of life and development to help them achieve better health outcomes. In this study, the participants that received the telehealth program were assessed for anxiety levels at each stage of the core needle biopsy and were monitored via long-range media continually until the day of follow-up to prepare them for every possible event, such as receiving bad biopsy results. Therefore, such a telehealth program can be used to care for patients receiving core needle biopsy so as to lower their anxiety levels.

Implications for perioperative nursing

The perioperative nurse should use the telehealth program to communicate with patients who have received a core needle biopsy. This telehealth program will be implemented in clinics by the multidisciplinary team including attending nurses and physicians. The nurse works as the efficiency coordinator who is aware of problems and the needs of the patient, in particular providing knowledge, health consultation and monitoring in the perioperative phase to educate patients about their upcoming surgery and recovery.

Recommendations

According to the findings, patients who participated in the telehealth program have lower anxiety. Therefore, the findings can be used to support the following recommendations for developing and implementing care of patients:

1. The telehealth program should be developed by using applications as another channel of

communication with patients and should be used to monitor and care for other groups of patients undergoing biopsy.

- Care policies should be developed that use technology to monitor patients' symptoms from when patients were at the hospital to when patients are home. In addition, the number of coordinators with special knowledge and expertise on the care of patients should be increased.
- More qualitative studies should be conducted into the aetiology of anxiety among patients involved in this study to determine corrective guidelines and create care models for this group of patients in the future.

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