

Exploring factors associated with quality of life in women undergoing mammography

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Research

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Abstract

Purpose: Mammography is broadly used in early detection of breast cancer. However, women undergoing mammography had experienced physical, psychological, and social disturbance; this could affect their Quality of Life (QoL). Only few studies in QoL have been done on cancer screening populations. The purpose of this study was to explore factors associated with QoL among women undergoing mammography.

Methods: This research used a cross-sectional questionnaire survey and conducted with 158 women who were undergoing mammography. Data were collected from an outpatient department in a medical center located in central Taiwan from December 2014 to October 2015. The Functional Assessment of Cancer Therapy Scale – General, Chinese version was used to assess the QoL. Emotional distress was measured by using the Hospital Anxiety and Depression Scale and Mishel's Uncertainty in Illness Scale. Descriptive statistic and multiple liner regression were used to analyze the data.

Results: The multiple liner regression results revealed that women with benign breast tumors had better functional well-being ($\beta = 1.276$, $p = 0.021$). Women who had higher uncertainty ($\beta = -0.216$, $p < 0.01$) and emotional distress ($\beta = -1.229$, $p < 0.01$) experienced lower QoL.

Conclusion: In this study, the uncertainty, emotional distress significantly predicted the QoL in women undergoing mammography screening. Clinical staff should pay attention to the emotional problems of women undergoing mammography. When women receive the mammography, this is an opportune time to educate them regarding the examination process and inform them of how reductions in uncertainty and emotional problems may help improve their QoL.

Introduction

Mammography is a screening tool that using low energy x-rays imaging modality for early detection of breast cancer. This early detection tool of breast cancer is conducive early treatment and increases survival rates [1]. The US Preventive Services Taskforce (USPSTF) recommended women receive mammography screening every 1 to 2 years who aged over 40 years. Due to the success of the implementation of mammography screening to detect early stage breast cancers, the breast cancer mortality rate has been decreasing every year [2]. In Taiwan, a mammography screening policy started in 2004 that offered mammography every 2 years to all women aged 45 years and over. Based on this policy, the screening rate keeps increasing per year. In 2015–2016, women who received mammography between 40 to 69 years reached 1,561,477 people, that the screening rate was 38.1%; and the five-year overall survival rate of breast cancer regardless the disease stage was as high as 90% [3].

Psychological aspects of benign breast disease have also been studied since 1990s, most health providers think women who were undergoing mammography might be healthy people, few study focus on this population[4]. However, when women undergo mammography, most women feel painful from breast compressions, 50% of women reported experiencing severe pain. Additionally, the pain was

reported by some patients up to four days after the mammogram, which might deter women who had non-symptoms of breast cancer from breast cancer screening attendance [5]. Nevertheless, some of this population might have some history of breast diseases, such as extremely dense breasts, fibroglandular densities. Also, those who age 45 years and over might be experiencing menopause; in this situation, hormone replacement therapy for menopause might affect the propensity for high breast density, which increases the likelihood of false-positive results [6]. When non-cancer patients undergoing the radiological examination or waiting for the results, they may experience anxiety, uncertainty, and this may be aggravated in those who also received cancer examination [7]. Evidence supports that women who were waiting for the results of cancer screening from mammography or sonography are stressed and fearful. The anticipation of potential cancer diagnosis creates emotional distress. Other studies have reported that it is even more bothersome for women with benign diseases that require additional, regular follow-ups; cancer-related worries and distress are common and may increase over time, even in those with healthy screening results [8, 9]. When women undergoing breast cancer screening, they may present some responses such as worry about the results, fear of pain, suspicion, uncertainty, anxiety and depression; all of these responses may affect their Quality of Life (QoL) [10–11].

QoL is a life perception in the context of the culture and value systems that include subjective and multi-oriented, involving physiology, role, psychology, spirit and feeling of good health and it's an important indicator of health care outcome [12]. Many factors could have affected QoL. Currently, most studies focus on cancer treatment, palliative stage and survival of cancer patients [13]. Only few studies have been performed on cancer screening populations [10, 14]. Previous studies most concentrated on obtaining QoL cost-effectiveness analyses for use of mammography [15]. However, these papers didn't cover intangible costs and benefits, such as the anxiety, depression and discomfort associated with screening and diagnostic examinations [16].

QoL is an important health issue in breast cancer screening population. Studies have reported that anxiety and depression were significant predictors of QoL. Research on women who have abnormal report of Pap smear indicated that they experienced higher anxiety and lower QoL [17]. In addition, some studies have reported 37% of women who with benign breast tumor had anxiety and depression, while anxiety and depression could affect QoL when they were examined by breast ultrasound [18]. In another study showed women who had benign breast tumors experienced significantly more anxiety ($\beta = -0.354$, $p < .001$) and depression ($\beta = -0.331$, $p < .001$), this situation significantly influenced their QoL [19]. Lee, Hardesty, Kunzler, and Rosenkrantz indicated that women who were undergoing mammography might have fear of pain from examination and experience some psychological impacts including being worried about the examination results, uncertainty, anxiety and depression which may reduce QoL [11].

According to the literature review, some cancer related studies had explored the factors associated with QoL, but few studies were done in the cancer screening populations. Therefore, the purpose of this study was to examine the distribution of emotional distress, uncertainty, and the QoL, also to explore the factors associated with QoL among women undergoing mammography.

Method

Study design

The study used a cross-sectional questionnaire survey.

Setting and sample

In this cross-sectional survey, we recruited women who were undergoing mammography at one medical center in central Taiwan. Inclusion criteria for participants were women age 45 years and older, undergoing breast cancer screening, who could communicate in Mandarin Chinese or Taiwanese. Patients who had a history of cancer were excluded. The study had 170 women who older than 45 years were selected to participate, after explained the purpose of this study, 18 women reject to participate in this study. Finally, the study was conducted with 158 individuals who were undergoing mammography (response rate: 92.9%). This study used G power 3.1.7 to calculate sample size. Based on the results of a study by Lou et al. [19], we hypothesized that the effect size of anxiety symptoms associated with physical QoL and mental QoL was 0.233, two-sided alpha was 0.05, and power was 0.8, the sample size was 89.

Ethical consideration

This study was approved by the Institutional Review Board of the CMU Hospital (Approval no. CMUH103-REC3-086)

Measurements

The study instruments were designed to include questions based on the following: (1) A structured questionnaire comprised of demographic and medical information; (2) The Functional Assessment of Cancer Therapy Scale –General, Chinese version (FACT-G); (3) The Hospital Anxiety and Depression Scale (HADS); and (4) Mishel's Uncertainty in Illness Scale (MUIS).

The demographic information includes age, marital status, living status, education level, and work status. The medical information includes menopause status, whether or not the subject has a benign breast tumor, family history of breast cancer, and whether or not the subject conducts regular breast self-exams.

The Functional Assessment of Cancer Therapy Scale –General, Chinese version (FACT-G) consists of 21 items, Physical well-being (PWB) 6 items, social/family well-being (SWB) 5 item, emotional well-being (EWB) 4 item and functional well-being (FWB) 6 item. Each item uses five point Likert scale ranging from 0 to 4. The sum of four component scores ranges from 0 to 84, with higher scores indicating a better QoL. The Cronbach's alpha for the Chinese FACT-G was 0.89[20].

The Hospital Anxiety and Depression Scale (HADS) was developed to detect anxiety and depression in a nonpsychiatric hospital setting [21]. The scale is a 14-item scale with seven items measuring anxiety and seven items measuring depression. Each item is measured on a four point Likert scale ranging from 0

(not present) to 3 (maximally present) with a higher score indicating higher levels of anxiety or depression. The scale for detecting emotional distress was over 14 [22]. The Cronbach's alpha was .83 and .82 for the HADS-anxiety and HADS-depression [23].

Mishel's Uncertainty in Illness Scale (MUIS) was a 25-item scale. Each item is measured on a five-point Likert scale ranging from 1 to 5 with the higher score indicating higher level uncertainty. The Cronbach's alpha was .87 for the Uncertainty in Illness Scale.

Data collection

The study gathered participant's information from December 2014 to October 2015. The corresponding author explained the detail of this study to primary physician of breast surgery department, such as study purpose, collected procedures, and inclusion criteria. The first author kept in the clinic of breast surgery department to collect participants. The investigators used one by one interview about 10–15 minutes self-reported to complete questionnaires after obtained written informed consent.

Data analysis

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) for Windows version 21.0 (SPSS Inc, Chicago, Illinois). Descriptive analyses were performed by calculating frequencies, percentages, means, and standard deviations (SD). Multiple liner regression analysis was used to identify factors associated with QoL. The final liner regression model included all significant variables (two-sided, P-value < .05).

Results

Description of Participants and Distribution of Study Variables

The mean age of participants in this study was 53.94 ± 6.39 years. Most of the participants were married (75.9%), lived with family (89.9%). About 36.7% of subjects had an educational level of college and above, current with full time job (53.8%). Among them, 74.7% women without chronic disease. A total of 53.8% of women were pre-menopausal, 80% had benign breast tumors, 77.8% were not feeling breast discomfort, 50.6% were not regularly conducting self-examinations, 89.2% were without breast tumors in their family history, 85.4% were without breast cancer in their family history and 65.8% were without other cancer in their family history (See Table 1). In the present study, the mean and standard deviation of the FACT-G, HADS, and MUIS scores were 67.66 (11.94), 6.84 (6.64), and 58.94 (13.08), respectively.

Table 1
Demographic and Medical Characteristics of Participants and Factors
Associated with Quality of Life (n = 158).

Variable	n (%) or M ± SD	t or F (p)
Age (yrs)	53.94 ± 6.39	
Marital Status		0.76 (.446)
Married	120(75.9)	
Unmarried	11(7.0)	
Divorced/ Widowed	26(16.5)	
Live Status		1.06(.293)
With family	142(89.9)	
Alone/ other	12(8.9)	
Education		1.63(.200)
Elementary	43(27.2)	
High School	57(36.1)	
College & above	58(36.7)	
Menopause		0.28(.758)
Pre	85(53.8)	
Post	58(36.7)	
Unknown	11(7.0)	
Benign breast tumor		3.51(.001)**
With	80(59.6)	
Without	77(48.7)	
Family history of breast cancer		1.09(.283)
With	23(14.6)	
Without	135(85.4)	
Family history of benign breast tumor		-0.14(.887)

Note. M = mean; SD = standard deviation.

* $p < .05$ ** $p < .01$

Variable	n (%) or M ± SD	t or F (p)
With	16(10.2)	
Without	141(89.2)	
Breast self-exam		2.56(.011)*
Yes	78(49.4)	
No	80(50.6)	
Breast uncomfortable		-0.52(.602)
Yes	78(49.4)	
No	80(50.6)	
Receive report		-1.07(.286)
Before survey	135(85.4)	
After survey	23(14.6)	
Note. M = mean; SD = standard deviation.		
*p < .05 ** p < .01		

The associated of medical information on women's QoL

Using the Pearson's correlation coefficient test (see Table 2), the variables includes HADS, and MUIS that significantly correlated with QoL. The correlation between QoL and uncertainty, between QoL and HADS were significantly negative ($r = -0.76$, $r = -0.41$; $p < .01$); the correlation between HADS and uncertainty were significantly positive ($r = 0.23$, $p < .01$) (See Table 2). Using the t-test analysis found that women with benign breast tumor ($t = -0.14$, $p < .01$), doing breast self-exam ($t = 2.56$, $p = .01$) had significant association with QoL (See Table 1). Of all the variables included benign breast tumor, breast self-exam, MUIS and HADS were significantly associated with QoL. All other variables were not significantly associated with QoL and thus were not included in multiple liner regression analysis.

Table 2
Correlation between Main Variables (n = 158).

Variables	HADS r (p)	Uncertainty r (p)
HADS		
Uncertainty	0.23(< .01)**	
QoL	-0.76(< .01)**	-0.41(< .01)**
Note. HADS = hospital anxiety and depression scale; QoL = quality of life.		
** p < .01		

The results of the multiple liner regression (see Table 3) revealed that women with benign breast tumors had better functional well-being ($\beta = 1.28, p = .021$), women with higher uncertainty had lower physical well-being ($\beta = -0.06, p < .001$), social/family well-being ($\beta = -0.05, p = .032$), emotional well-being ($\beta = -0.06, p = .030$) and functional well-being ($\beta = -0.05, p = .027$). Furthermore, women who were higher in emotional distress had lower physical well-being ($\beta = -0.21, p < .001$), social/family well-being ($\beta = -0.33, p < .001$), emotional well-being ($\beta = -0.23, p < .001$) and functional well-being ($\beta = -0.46, p < .001$).

Table 3
Multiple Liner Regression Analyses of QoL (n = 158).

	Physical well-being		Social/family well-being		Emotional well-being		Functional well-being		Overall QoL	
	β	p	β	p	β	p	β	p	β	p
Benign breast tumor										
Yes	-0.24	.543	1.24	.055	-0.58	.270	1.28	.021	1.70	.166
No(ref)										
Breast self-exam										
Yes	0.49	.208	0.70	.291	0.10	.846	0.54	.329	1.81	.140
No(ref)										
Uncertainty	-0.06	< .001	-0.05	.032	-0.06	.030	-0.05	.027	-0.22	< .001
Emotional distress	-0.21	< .001	-0.33	< .001	-0.23	< .001	-0.46	< .001	-1.23	< .001
R ²	.37		.33		.27		.53		.64	
Adjusted R ²	.35		.32		.25		.51		.63	
Note. ref = reference group; R ² = R square; Adjusted R ² = Adjusted R square.										

Discussion

This study is a cross-sectional study examining QoL and the influence of important psychosocial factors (illness uncertainty and emotional distress) on QoL. The present study demonstrated that women who had benign breast tumors were more likely to have functional well-being QoL. In our study, women who had regular breast self-examinations had better QoL, the results were similar with study results of Cheng et al. [24], which showed that the breast and Pap smear screening rate was higher for women with better QoL. Although the association between women receiving cancer screening and QoL is still unclear, research suggests that women who have higher QoL may have better self-efficacy, optimistic personality and greater likelihood of having healthy behavior [25].

In addition, a previous study showed women with benign breast tumors were more likely to experience anxiety ($\beta = -0.35, p < .001$) and depression ($\beta = -0.33, p < .001$). This situation significantly influenced their QoL [19]. It's consistent with previous studies that women who have abnormal report of health screening indicated that they experienced higher anxiety and lower QoL [17]. Study results of Hafslund, Espehaug, and Nortvedt showed that women with false-positive results showed increased anxiety at

recall versus before screening ($P = .04$), had higher on depression ($P = .045$) and lower QoL in particular general health ($P = .02$) and mental health ($P = .03$) domains at 6 months after screening [18]. Keyzer-Dekker, de Vries, Mertens, Roukema and van der Steeg reported that women who had high anxiety were more likely to have lower QoL, regardless of whether they had malignant tumors ($\beta = -0.43$, $p < .001$) or benign tumors ($\beta = -0.40$, $p < .001$) [26]. Our present findings extend previous results by demonstrating that emotional distress is associated with decreased QoL.

In our study, uncertainty were affect QoL, women with higher uncertainty had lower Physical well-being ($\beta = -0.055$, $P < .001$), social/family well-being ($\beta = -0.053$, $P = .032$), emotional well-being ($\beta = -0.062$, $P = .03$) and functional well-being ($\beta = -0.047$, $P = .027$). Most researches of uncertainty were focus on chronic disease or cancer disease patients [27]. Few study focus on cancer screening participants [18]. According to some references that mild to moderate illness uncertainty has also been shown in patients before and after breast biopsy, diagnosed with benign breast disease, also negatively affecting the QoL among women who were during breast examination and diagnosed [28].

Moreover, this study explores the impact of benign breast tumors on functional well-being. There were no studies testing this association in the extant literature; however

It is worth mentioning our study result that women with benign breast tumors had better functional well-being ($\beta = 1.276$, $P = .021$). Currently, there were no study focus on association between functional status, well-being associated and benign diseases. However, most study focus on functional status and well-being associated with chronic disease and cancer disease that patients with few condition showed better functioning and well-being [29]. During the process of collecting, we found when women with benign breast disease, they had better knowledge of their disease and had higher self-efficacy. It's consistent with previous studies that women with high health literacy may be more motivated to engage in preventive health behaviors and tend to avoid risky habits. When women with better general health status were more likely to participate in health screening behavior and with better general QoL (psycho-social and physical domains) [24, 30].

Moreover, this study explores the impact of waiting for the results of medical expectation on QoL. There were few studies testing this association in the extant literature, only one longitudinal study reported the change of QoL before and after women waiting the mammography results. At 6 months after screening, when women with false-positive results had lower general health, mental health, role-physical and role-emotional than women with negative results [18]; however, in our study, there is no significant difference between the QoL scores for the group of subjects surveyed before versus after receiving their examination reports. One possible explanation for the lack of significant relationship may be that the women who received mammography in this study were not actually suspected of having cancer; therefore, the potential stress of waiting for the examination results or fear of the treatment itself would have less effect on their QoL.

Limitation

Several limitations should be acknowledged in the present study. First, the samples were from one medical center, and the results might not be representative of the breast cancer screening population in Taiwan. Second, this was a cross-sectional study, the reported results are only correlational not causal. Future research should consider applying longitudinal design and collecting data in multiple sites to explore causal determinants of QoL.

Conclusion

The present study demonstrated that poorer QoL was prevalent among women who had benign breast tumors, who had higher uncertainty, and who had higher emotional distress. The present findings suggested that health professionals should provide strategies to improve QoL and decrease uncertainty and emotional distress. Improved management of physical symptoms in women who receive mammography and dissemination of information about breast disease and examinations could be effective strategies.

Abbreviations

QoL: Quality of Life; IRB: The institutional review board; FACT-G: The Functional Assessment of Cancer Therapy Scale – General, Chinese version; HADS: The Hospital Anxiety and Depression Scale; MUIS: Mishel's Uncertainty in Illness Scale; PWB: Physical well-being; SWB: Social/family well-being; EWB: Emotional well-being; FWB: Functional well-being.

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Declarations

Ethics approval and consent to participate: The institutional review board (IRB) of China Medical University & Hospital (CMUH103-REC3-086) approved this study.

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