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The Journal of Breast Health (J Breast Health) is an international, open access, online-only periodical published in accordance with the principles of independent, unbiased, and double-blinded peer-review.

The journal is owned by Turkish Federation of Breast Diseases Societies and it is published quarterly on January, April, July, and October. The publication language of the journal is English. The target audience of the journal includes specialists and medical professionals in general surgery and breast diseases.

The editorial and publication processes of the journal are shaped in accordance with the guidelines of the International Committee of Medical Journal Editors (ICMJE), World Association of Medical Editors (WAME), Council of Science Editors (CSE), Committee on Publication Ethics (COPE), European Association of Science Editors (EASE), and National Information Standards Organization (NISO). The journal is in conformity with the Principles of Transparency and Best Practice in Scholarly Publishing (doaj.org/bestpractice).

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Processing and publication are free of charge with the journal. No fees are requested from the authors at any point throughout the evaluation and publication process. All manuscripts must be submitted via the online submission system, which is available at www.thejournalofbreasthealth.com. The journal guidelines, technical information, and the required forms are available on the journal's web page.

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- Grant information and detailed information on the other sources of support,
- Name, address, telephone (including the mobile phone number) and fax numbers, and email address of the corresponding author,
- Acknowledgment of the individuals who contributed to the preparation of the manuscript but who do not fulfill the authorship criteria.

Abstract: An English abstract should be submitted with all submissions except for Letters to the Editor. Submitting a Turkish abstract is not compulsory for international authors. The abstract of Original Articles should be structured with subheadings (Objective, Materials and Methods, Results, and Conclusion). Please check Table 1 below for word count specifications.

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Statistical analysis to support conclusions is usually necessary. Statistical analyses must be conducted in accordance with international statistical reporting standards (Altman DG, Gore SM, Gardner MJ, Pocock SJ. Statistical guidelines for contributors to medical journals. *Br Med J* 1983; 7; 1489-93). Information on statistical analyses should be provided with a separate subheading under the Materials and Methods section and the statistical software that was used during the process must be specified.

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Review Articles: Reviews prepared by authors who have extensive knowledge on a particular field and whose scientific background has been translated into a high volume of publications with a high citation potential are welcomed. These authors may even be invited by the journal. Reviews should describe, discuss, and evaluate the current level of knowledge of a topic in clinical practice and should guide future studies. The main text should contain Introduction, Clinical and Research Consequences, and Conclusion sections. Please check Table 1 for the limitations for Review Articles.

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Tables

Tables should be included in the main document, presented after the reference list, and they should be numbered consecutively in the order they are

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Original Article	3500	250 (Structured)	30	6	7 or total of 15 images
Review Article	5000	250	50	6	10 or total of 20 images
Case Report	1000	200	15	No tables	10 or total of 20 images
Letter to the Editor	500	No abstract	5	No tables	No media

BI-RADS: Breast imaging, report and data systems

referred to within the main text. A descriptive title must be placed above the tables. Abbreviations used in the tables should be defined below the tables by footnotes (even if they are defined within the main text). Tables should be created using the "insert table" command of the word processing software and they should be arranged clearly to provide easy reading. Data presented in the tables should not be a repetition of the data presented within the main text but should be supporting the main text.

Figures and Figure Legends

Figures, graphics, and photographs should be submitted as separate files (in TIFF or JPEG format) through the submission system. The files should not be embedded in a Word document or the main document. When there are figure subunits, the subunits should not be merged to form a single image. Each subunit should be submitted separately through the submission system. Images should not be labeled (a, b, c, etc.) to indicate figure subunits. Thick and thin arrows, arrowheads, stars, asterisks, and similar marks can be used on the images to support figure legends. Like the rest of the submission, the figures too should be blind. Any information within the images that may indicate an individual or institution should be blinded. The minimum resolution of each submitted figure should be 300 DPI. To prevent delays in the evaluation process, all submitted figures should be clear in resolution and large in size (minimum dimensions: 100 × 100 mm). Figure legends should be listed at the end of the main document.

All acronyms and abbreviations used in the manuscript should be defined at first use, both in the abstract and in the main text. The abbreviation should be provided in parentheses following the definition.

When a drug, product, hardware, or software program is mentioned within the main text, product information, including the name of the product, the producer of the product, and city and the country of the company (including the state if in USA), should be provided in parentheses in the following format: "Discovery St PET/CT scanner (General Electric, Milwaukee, WI, USA)"

All references, tables, and figures should be referred to within the main text, and they should be numbered consecutively in the order they are referred to within the main text.

Limitations, drawbacks, and the shortcomings of original articles should be mentioned in the Discussion section before the conclusion paragraph.

References

While citing publications, preference should be given to the latest, most up-to-date publications. If an ahead-of-print publication is cited, the DOI number should be provided. Authors are responsible for the accuracy of references. Journal titles should be abbreviated in accordance with the journal abbreviations in Index Medicus/ MEDLINE/PubMed. When there are six or fewer authors, all authors should be listed. If there are seven or more authors, the first six authors should be listed followed by "et al." In the main text of the manuscript, references should be cited using Arabic numbers in parentheses. References published in PubMed should have a PMID: xxxxxx at the end of it, which should be stated in parenthesis. The reference styles for different types of publications are presented in the following examples.

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Book Section: Suh KN, Keystone JS. Malaria and babesiosis. Gorbach SL, Barlett JG, Blacklow NR, editors. *Infectious Diseases*. Philadelphia: Lippincott Williams; 2004.p.2290-308.

Books with a Single Author: Sweetman SC. Martindale the Complete Drug Reference. 34th ed. London: Pharmaceutical Press; 2005.

Editor(s) as Author: Huizing EH, de Groot JAM, editors. *Functional reconstructive nasal surgery*. Stuttgart-New York: Thieme; 2003.

Conference Proceedings: Bengissson S. Sothemin BG. Enforcement of data protection, privacy and security in medical informatics. In: Lun KC, Degoulet P, Piemme TE, Rienhoff O, editors. *MEDINFO 92. Proceedings of the 7th World Congress on Medical Informatics*; 1992 Sept 6-10; Geneva, Switzerland. Amsterdam: North-Holland; 1992. pp.1561-5.

Scientific or Technical Report: Cusick M, Chew EY, Hoogwerf B, Agrón E, Wu L, Lindley A, et al. Early Treatment Diabetic Retinopathy Study Research Group. Risk factors for renal replacement therapy in the Early Treatment Diabetic Retinopathy Study (ETDRS), Early Treatment Diabetic Retinopathy Study Kidney Int: 2004. Report No: 26.

Thesis: Yılmaz B. Ankara Üniversitesi'ndeki Öğrencilerin Beslenme Durumları, Fiziksel Aktiviteleri ve Beden Kitle İndeksleri Kan Lipidleri Arasındaki İlişkiler. H.Ü. Sağlık Bilimleri Enstitüsü, Doktora Tezi. 2007.

Manuscripts Accepted for Publication, Not Published Yet: Slots J. The microflora of black stain on human primary teeth. *Scand J Dent Res*. 1974.

Epub Ahead of Print Articles: Cai L, Yeh BM, Westphalen AC, Roberts JP, Wang ZJ. Adult living donor liver imaging. *Diagn Interv Radiol*. 2016 Feb 24. doi: 10.5152/dir.2016.15323. [Epub ahead of print].

Manuscripts Published in Electronic Format: Morse SS. Factors in the emergence of infectious diseases. *Emerg Infect Dis* (serial online) 1995 Jan-Mar (cited 1996 June 5): 1(1): (24 screens). Available from: URL: [http:// www.cdc.gov/ncidod/EID/cid.htm](http://www.cdc.gov/ncidod/EID/cid.htm).

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Dear Colleagues,

I would like to share some good and important news with you.

The Journal of Breast Health has been accepted for inclusion in PubMed Central this year. The journal's archive is now available in PubMed Central, starting with the April 2014 issue.

This success, which we have achieved as a result of a very long endeavour, has been made possible by our continuous, regular and disciplined work. This result will ensure that your articles featured in our journal will be widely read and cited throughout the world. I would like to thank our colleagues in the editorial board, our reviewers, authors and AVES, our publishing organization, for concerting their efforts to bring our goals to fruition.

I am convinced that we will attain even more significant achievements with your continued support.

Sincerely,

Vahit Özmen
Editor in Chief



Paradigm Shift From Halstedian Radical Mastectomy to Personalized Medicine

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ABSTRACT

Breast cancer management changed from radical mastectomy to precision medicine in a period longer than a century. The aims of these changes were to refrain from overdiagnoses and overtreatments as well as their harmful side effects and extra costs. Breast cancer is a heterogeneous disease and characterized by many morphological, clinical and molecular features. We now increasingly realise that a one-size-fits-all strategy does not apply to all breast cancer patients. Personalized medicine may be used for breast cancer screening, diagnosis and treatment. Individualized screening can decrease the number of unnecessary mammograms, additional radiologic studies, breast biopsies and false positivity rates. However, additional 15 to 20 years are necessary to reach the results of prospective randomized trials comparing low-risk and normal-risk women. We also should wait for outcomes of risk-based screening trials. The rates of overtreatment in patients with early-stage breast cancer have reached 40% in many studies. Personalized treatment has succeeded in reducing it substantially by using tumour genetic profiling and tumour receptors in early breast cancer patients. However, it has its limits and it is impossible to generalize it to all patients. New biomarkers and molecular classifications have also led to the development of novel therapies and treatment strategies. And, they can contribute to a more personalized management of breast cancer patients.

Keywords: Breast cancer, individualized medicine, over diagnosis, over treatment, molecular subtype, genetic profiling

Introduction

The paradigm shift in breast cancer biology has changed the management of breast cancer from radical mastectomy to precision medicine. In the late 19th century, William Steward Halsted thought that breast cancer was a local-regional disease, and he proposed radical mastectomy, which became the standard surgical treatment of breast cancer for nearly 100 years (1). Halsted succeeded in decreasing the loco-regional recurrence rate to 6% at 5 years in contrast to his European counterparts, whose local recurrence rates ranged from 50 to 80% (2). Despite the decrease in local recurrence rate, radical mastectomy did not improve survival rate in comparison to lesser surgical procedures.

Bernard Fisher's alternative paradigm championed an emergence of breast cancer as a systemic disease in 1970s (3-4). He considered that breast cancer was a systemic disease at the outset as a consequence of cells entering lymphatics, but also into the blood via communications. According to this hypothesis, systemic treatment became a substantial part of breast cancer management, and multidisciplinary approaches were required for a more effective treatment. Prospective randomized clinical studies of the 1970s and 1980s (NSABP B04, NSABP B06, MILAN I study, etc.) supported Fisher's hypothesis - variations in the extent of local therapy such as simple mastectomy, quadrantectomy or wide tumour excision plus whole-breast radiation therapy yielded no significant differences in survival outcomes (5-7). Both Halstedian and Fisherian Hypotheses recommended one treatment protocol (radical mastectomy or systemic treatment±radiation therapy) to all patients with breast cancer (one size fits all). Since these two old hypotheses did not separate low-risk patients from high-risk patients, overtreatment was a major problem for patients with low-risk breast cancer. Today, we accept the intermediate paradigm that is combination of Halstedian and Fisherian hypotheses. Rising breast cancer awareness and mammographic screening have increased early-stage breast cancer and ductal carcinoma in situ rates. Almost half of these patients have good prognostic factors and do not require systemic treatment and/or radiation therapy. Patients diagnosed via screening mammography have better prognostic factors than symptomatic breast cancer patients. Systemic treatment and radiation therapy have very harmful side effects despite of their life saving benefits (8). They are also expensive and impose an economic burden on the health care system (9).

Personalized Screening

Randomized controlled trials (RCTs) have shown that mammographic screening can reduce breast cancer mortality by 25-30% after 7-12 years from entry into the trials (10). Nevertheless, since 2000, concerns have been raised about the validity of these trials because of harms of mammography screening and supposed 'flaws' in randomization and ascertainment of cause of death(11). Implementation of the same mammography screening guidelines to all women with low-risk breast cancer have caused overdiagnosis (1%-10%), false negativity (0.9% to 6.5%), false positivity, unnecessary biopsies, and additional diagnostic tests (12-13).

According to a systematic review by U.S. Preventive Services Task Force, 556 mammography, 55 additional radiologic studies, and 5 biopsies are necessary to diagnose 1 case of invasive breast cancer in women aged between 40 and 49 (14, 15). The new American College of Radiology and American College of Surgeons guidelines recommend that all women begin annual mammography screening at no later than 40 years old and supplementary screening with breast MRI be considered for women with a lifetime breast cancer risk of 15-20% or higher (14-16). Various risk prediction models have been developed to inform patients about their individual risk (17). The Gail, BRCAPro, Claus, and Jonker models underestimate risk, whereas the Tyrer-Cuzick (IBIS) and BOADICEA models produce higher, more accurate estimates. Personalized screening is difficult today due to the lack of long-term (15 to 20 years), prospective, randomized clinical trials comparing screening of low-risk women to women participating in the present screening guidelines. On the other hand, a new ongoing randomized controlled trial of annual vs. personalized screening [WISDOM (The Women Informed to Screen Depending On Measures of risk)] will study the efficacy, safety, and acceptability of risk-based screening (18). As WISDOM is one of the first trials on risk-based personalized screening, these data will be crucial in evaluating whether precision screening will improve the effectiveness of breast cancer screening, particularly whether it leads to screening algorithms that identify cancers for which treatment extends a woman's life.

Personalized Surgery

Breast-conserving surgery rate has increased in recent decades due to the early detection of small sized breast tumours. And, most breast surgeons do not perform axillary lymph node dissection even in the presence of 1 or two positive sentinel lymph node(s) due to the results of ACOSOG Z0011 trial (19). New consensus conferences on surgical margins in patients with invasive and ductal carcinoma in situ (DCIS) recommend no-ink on tumour for invasive, and 2 mm for DCIS as clear surgical margin (20-21). This new margin status has been increasing the breast conserving surgery rate and decreasing re-excision(s), thereby resulting in poor cosmetic results. New systemic treatment drugs and whole breast radiation with a boost also help decrease local recurrence rates and increase overall survival rates.

The term 'oncoplastic surgery' has been used very frequently in last decade (22). Increasing disease free survival rates drew attention to the cosmetic results of breast conserving surgery. Compared with standard quadrantectomy or lumpectomy, oncoplastic surgery (ONC) achieves more accurate tumour resection and free resection margins with better cosmesis (23). Oncoplastic surgery may be personalized for patients with breast cancer by allowing partial mastectomy with good cosmesis, and can decrease total mastectomy or subcutaneous mastectomy with prosthetic reconstruction in many patients without increasing local recurrence, and has fewer complications than mastectomies.

Personalized Systemic Treatment

New developments on molecular biology techniques such as microarrays, next-generation sequencing, and whole exome sequencing, etc. allow scientists to better understand tumour biology and identify biomarkers involved in multiple signalling pathways that can improve general clinical practice contributing to a personalized prognostic and predictive approach to management (24). A precision medicine consists of effective treatment by targeting genomic abnormalities that drive tumour biology. Molecular profiling of tumours has also helped individualize the diagnosis and treatment of breast cancer (25). According to these studies, breast cancer is a complex, and heterogeneous disease. Intra-tumoural heterogeneity shows individualized features. There are several assays studying tumour genetic profiling, such as Oncotype DX® (Genomic Health, Inc., Redwood City, CA), MammaPrint® (Agendia, Amsterdam, The Netherlands), Prosigna® (PAM50; NanoString Technologies Inc, Seattle WA), EndoPredict® (Myriad Genetics Inc, Salt Lake City, UT) and the Genomic Grade Index (GGI), which identify gene signatures to predict response to therapy by using RT-PCR or microarray technology (26). The Oncotype DX Breast Recurrence Score Assay was analytically and subsequently clinically validated as a prognosticator and a predictor of chemotherapy benefit in ER+ early breast cancer according to the biomarker validation guidelines (27-28). MammaPrint uses a microarray technology to assess the expression of 70 genes, The MINDACT [The Microarray In Node-negative and 1 to 3 positive lymph node Disease may Avoid ChemoTherapy is a prospective trial using MammaPrint, and its results constitute level 1A evidence for the prognostic role of MammaPrint (data derived from fresh frozen tissue samples)](29). In the MINDACT trial, approximately 46% of women with breast cancer who are at high clinical risk might not require chemotherapy. The Prediction Analysis of Microarrays (Prosigna®, PAM50) is a 50-gene set that was originally developed for the classification of intrinsic breast cancer subtypes based on the initial work by Perou, Sorlie and colleagues (30). EndoPredict is a gene expression signature that predicts the likelihood of distant recurrence in ER+ and HER2-negative early breast cancer patients treated with adjuvant endocrine therapy. The results demonstrated a concordance rate of 100% in risk group classification (high/low) for the 10 tumours assessed, and the EP scores did not differ by a score unit of more than 1.0 from a pre-defined reference (31). The Genomic Grade Index (GGI) was previously developed, evaluated on frozen tissue, and shown to be prognostic in early breast cancer (32).

Personalized Radiation Therapy

Adjuvant radiotherapy is a standard treatment for patients with breast conserving surgery, and it is also recommended for many patients with mastectomy regardless of their molecular subtypes. However, locoregional recurrence rate differs by molecular subtypes, and triple negative and HER2-enriched subtypes have a higher risk of loco-regional recurrence despite radiotherapy (33). While there is an absolute need for greater precision in prescribing radiotherapy in patients with breast cancer, Speers and his colleagues formulated a molecular signature of radiation response from in vitro studies, and they found that there was no relationship between radiosensitivity and molecular subtype (34). Radiotherapy needs to be tailorable to tumour biology ranging from no treatment to partial breast irradiation and loco-regional irradiation, even including the internal mammary chain (35). However, there is still a long road ahead before we can truly tailor the post-operative management for patients with early breast cancer. Nonetheless, it looks feasible in the coming decades.

Conclusion

In order to avoid overdiagnosis and overtreatment of patients with early breast cancer, screening, diagnosis, surgery, and other treatments should be individualized. The concept of individualized medicine is very promising. On the other hand, intra-tumour heterogeneity, lack of large coordinated research programs and clinical trials, cost of molecular diagnostic assays, toxicities and partial inhibition of the signaling pathways of molecular targeting agents are limitations on personalized medicine. Nevertheless, it is promising for the future.

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Experience With A Support Group Intervention Offered to Breast Cancer Women

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ABSTRACT

Breast cancer is the most frequent cancer in Turkey and other countries. It is not sufficient for women with breast cancer to receive medical treatment protocols (i.e. surgery, chemotherapy, radiotherapy and hormone therapy) to overcome their disease. Breast cancer has biopsychosocial effects on the patients. Provision and maintenance of biopsychosocial wellbeing of the patients during and after the medical treatment process should be one of the primary treatment criteria. It is important for women with breast cancer to develop new strategies to adapt to the disease and treatment processes and to cope with their disease. Support groups and education are quite frequently utilized to achieve this adaptation and coping. Support group interventions allow the women to discuss, receive education and share their experiences. These opportunities guide the patients about how to manage their disease and help them fulfill their social support needs. Support groups are very important to promote physical and psychological health, expand social network and increase social support for breast cancer women. The aim of this review is to reveal experiences in the preparatory and implementation stages of a support group intervention designed for women diagnosed with breast cancer in the framework of a PhD dissertation.

Keywords: Experience, support group intervention, education, breast cancer

Introduction

Breast cancer is the type of cancer with the highest incidence rate in developing and developed countries globally as well as in Turkey (1, 2). According to the GLOBOCAN 2012 data, breast cancer constitutes 25% of all cancer cases globally and the incidence rates vary per country. While the incidence rate of breast cancer is 27 out of one hundred thousand in East Asia and Central Africa, this rate is reported to be 92 out of one hundred thousand in North America. The global five-year prevalence of breast cancer is reported to be 6.232.000 cases in total (1). While an increase is observed in global breast cancer incidence, it has been determined that breast cancer incidence started to decrease in developed countries such as France, Spain, USA, Canada, Australia and New Zealand (1). According to the 2016 data of the Ministry of Health in Turkey, breast cancer ranks the first with a rate of 45.9 out of one hundred thousand among age-standardized rates of the 10 cancers seen most frequently among women (2).

Breast cancer is a disease that influences people in biopsychosocial aspects. It is also recommended that patients are offered interventions that involve education and consulting in addition to medical treatment protocols as part of the therapeutic process. It is important for women with breast cancer to develop new coping methods to be able to adjust to the disease. Social support and education are interventions that are rather frequently used for this purpose (3-5). It has been identified that women diagnosed with breast cancer need support groups and education in order to cope with the crisis they experience (6, 7). Studies performed have determined that support group interventions help women cope with emotional problems such as anxiety, depression and despair, meets the need for information and support related to the disease, enhances emotional well-being and positively influences life satisfaction (8-11).

Support group intervention consists of educating people experiencing similar problems in a safe and comfortable environment about the disease and disease management and having them listen to one another and have discussions for ensuring emotional support (8). Support group intervention involves mutual discussion, education and sharing similar problems. The content of education consists of interventions about the way in which the disease and side effects of therapy will be managed. The goals of cancer support groups is to provide mutual discussion, education, direct help, make suggestions on the basis of personal experience, provide emotional support and develop

the emotion of belonging to a group. The support group and patients receive education and emotional support from the group members (peers) and group leader. Furthermore, support group intervention provides contribution for people to control their emotions, enhances their problem-solving skills and coping methods and facilitates compliance with the disease and treatment process (8, 12).

Cancer support groups provide a significant means that meets the social support requirements of cancer patients. The scope of social support for cancer patients is composed of family members (mother, father, sibling and children), close circle (relatives, friends) and healthcare team (doctor, nurse, social service worker, psychologist). There are multiple social support elements in a cancer support group. While the group is composed of other cancer patients, who may be seen as friends as part of a close circle, a professional from the healthcare team assumes the role of the leader (12). It is recommended that support sessions last 60 min. to 90 min, are held with 6 to 20 participants, that 6 to 12 sessions are held and the frequency of meeting of support groups is determined on the basis of patient requirements and wishes (8, 12). The studies held show that sessions are held at different frequencies: every week, three days a week and once a month (4, 8, 13-15).

There are studies in the literature where the support intervention was applied for women with breast cancer and results were evaluated (4, 8, 11, 13). Similarly, a study was conducted where the influence of a support group intervention based on the Roy Adaptation Model (RAM) on sexual adaptation, body image and perceived support was examined at the Daytime Treatment Center of a University Hospital in Turkey in 2016. In a review, the experience gained in the study process was shared towards the aim of providing guidance for researchers who would conduct studies on "Support Group Intervention" in the future.

Support Group Intervention Preparatory Phase

The researchers developed an educational book aligned with the support group intervention program to meet the requirements of patients on the basis of RAM by benefiting from the literature. Regarding the research into and care by nurses, it is specified that a model should be used in order to ensure that nurses can focus on the nursing role and practice and to be able to provide systematic and effective care (16, 17). RAM was developed by Sister Callistra Roy in late 1960s and it was originally used in a license program in 1970. According to RAM, a highly developed model that is frequently used in defining the concepts of nursing, the purpose of nursing is to promote compliance and prolong the life expectancy (16). According to RAM, compliance in four adaptation model needs to be achieved. These adaptation systems are the following: physiologic mode, self-concept mode, role function mode and mutual interdependence mode. The content of the educational book was created on the basis of the adaptation modes of RAM.

The essential requirement in the physiologic mode is physiological integrity. The physiologic adaptation mode is composed of nine elements. The five essential elements are: oxygenation, diet, elimination, movement-resting and defense. Additionally, the four complex elements of liquid electrolyte, acid-base balance, neurological function and endocrine function are also in the scope of the physiological adaptation area (16-18). In the educational book to be used with the support group intervention, educational content for the areas of diet, elimination, movement-resting and defense has been formed.

The mode of Self-Concept was tackled in two dimensions being the physical self and personal self. Physical self is divided into two parts:

body image and emotions about the body. Emotions about the body include the person's body attitude about his/her own body and emotions about his/her sexuality (16-18). The educational book contains interventions targeted at diminishing the influence of the side effects of treatment methods on the body image and sexuality in order to intervene on the adaptation mode of the self-concept.

The underlying basis for the mode of role function is the assurance of social integrity. It focuses on the roles of an individual in the society (16-18). The educational book lays out interventions towards the aim of coping with the influence of the side effects of treatment methods on the mode of role function.

The mode of mutual interdependence is focused on the interaction of individuals within the framework of love, respect, gaining and showing appreciation. The fundamental purpose of this mode is relational integrity. In the mutual interdependence mode, the interactions of individuals with the individuals they deem important in their lives and support systems (16-18). To ensure adaptation in this mode, efforts were made to develop social aspects such as mutual love, respect, gaining and showing appreciation by means of the support group intervention.

Regarding the content of the educational book, opinions were received from six specialists in total: three members of faculty in the fields of general surgery, radiation oncology and medical oncology with specialization in breast cancer, one physical therapy specialist and one psychologist. The necessary changes were made as per the opinions of specialists and the educational book was finalized. The educational book includes the subjects explained during the support group trainings and is composed of 86 pages and 15 chapters in color print. The chapters of the book are as follows: 1) Breast cancer team, 2) Breast texture and breast cancer, 3) Breast cancer risk factors, 4) Signs and diagnose of breast cancer, 5) Breast self-exam, 6) Surgical treatment methods for breast cancer, 7) Side effects that may emerge following surgical treatment, 8) Breast reconstruction, 9) Breast cancer chemotherapy, 10) Radiotherapy for breast cancer, 11) Hormone therapy for breast cancer, 12) Target-oriented treatment for breast cancer, 13) Diet in breast cancer, 14) Breast cancer and sexuality, 15) Safe sexual intercourse (19). The educational books were handed out to patients that would join the group before the start of support group meetings.

The place where the sessions would be held should offer the possibility to strengthen the interaction among group members. There should be a place known by group members which is easily accessible by everyone. It is necessary that the place selected be an area that is spacious enough and offer the possibility to sit on chairs and would not cause any communication issues among group members. Furthermore, it is necessary that people are seated in an arrangement to communicate comfortably with one another, have a table to be able to take notes and room temperature be adjusted well (20). In this context, support group sessions were held in a meeting hall in the chemotherapy unit known by everyone and easily accessible by everyone. In the meeting hall where the support group intervention was held, there was a large, round table and chairs around the table. The size, lighting and temperature of the room were convenient.

Making the Announcements and Determining the Participants for the Support Group Interventions

Registered women with breast cancer undergoing chemotherapy treatment at a daytime treatment center were called by phone and women

meeting the sample criteria were phoned and informed about the support group intervention and they were invited to participate in the support group meetings. Furthermore, information about the support group was also provided for women with breast cancer during the day by the nurse in charge and chemotherapy nurses and they were invited to the training. *Criteria for inclusion in the sample:* participants volunteering to take part in the study, being above the age of 18, being able to understand and speak Turkish, not having any hearing and speaking problems, being literate, having a sex partner, having been diagnosed with primary breast cancer, having undergone mastectomy or breast-conserving surgery.

Oncology nurses play an important role in meeting the education and support requirements of women diagnosed with breast cancer (7). The biggest concern following these meetings was related to ensuring the participation and continuing the attendance of patients. Regular participation in weekly meetings may be challenging as a function of the healthcare conditions of participants. Furthermore, patients participating in group meetings compare the progress of diseases with the other members of the group. Such factors may influence the participation of patients in meetings and their attendance (12). The sensitivity of nurses for the participation of women with breast cancer in support group meetings, their appreciation of support group meetings and encouragement they provided for women's participation have been facilitating factors in patient participation. Following the briefings and announcements made, the first session date was identified and patients were invited. The meetings were planned to be held on days when they would receive treatment. The patients had their blood analyses done in the mornings of these days and attended the meetings in the period of time they would wait for the results. This facilitated the assurance of attendance. Forty eight women agreed to present for the support group trainings. Four groups of twelve persons each were formed. Six people did not present to the training on the first day of education. The first meetings were held with 42 women in total who attended the support group trainings. Each and every woman participating in the meetings was very willing. In the consequent meetings, five people did not continue to attend the trainings for reasons such as pain, tiredness, unwillingness to hear anything about treatment, to be in the same environment with the same patient group and not answering the phone. Therefore, the group sizes were changed and four different support groups of 7-11 persons each were formed. One patient did not come to the meeting due to pain and another patient gave the following feedback: "I was actually not going to attend today's meeting since I had pain. My husband insisted that I go. I am happy that I came, it's very interesting. I currently have no pain even though I took medication. Since I focused my attention on you and my friends instead of myself, this feels very good for me." This feedback was very important in the sense that it showed the effectiveness of the support group. The patients' opinions about the frequency of support group meetings were received. In keeping with the participants' willingness to learn and to prevent having too long intervals in between, the frequency of sessions was set to be once a week.

At every support group meeting, patients were given cosmetics such as eyebrow eyeliner, eye shadow and sunscreen and small gifts such as vaginal lubricant and preservative. The fact that the majority of patients came to the meeting held the week after having used the make-up products also motivated the patients who had not yet use them to do so. A patient who was a retired teacher of painting said: "You have reminded us to perform self-grooming. We are back in touch with life again thanks to you." This statement was an indicator of the positive effect of the support group intervention on the body image.

Performance of the Support Group Intervention

Four sessions of the support group intervention applied on women with breast cancer were conducted by a consulting nurse and one session by a psychologist. The support group intervention was completed with four groups in five weeks with meetings of 90-120 min. once a week. In total, 20 support group meetings were held with four groups. The program applied in the support group intervention is shown in (Table 1).

The support group meetings were held in a seating arrangement where everyone could see one another at a round table in the daytime treatment center meeting hall of a university hospital. The lack of an authoritarian figure in this seating arrangement and the moderator of the session being in the same position as the patients provided relaxation for patients and encouraged them to share more (21). The written feedback received from patients such as "Gathering at a table was a very nice and positive practice." showed that the setting of the sessions was crucial and it positively influenced the individuals regarding participation and listening.

The consulting nurse shared the literature information about the subject using a visually enhanced power point presentation and shared it in a language understandable by patients without using medical terminology. Furthermore, the consulting nurse also answered the questions from the group and promoted active participation by group members and encouraged patients to share more. In this context, the patients shared their experience in line with the new information they acquired and found solutions to their problems by sharing their experience or learning from other participants' experience.

Support group intervention consists of educating people experiencing similar problems in a safe and comfortable environment about the disease and disease management and having them listen to one another and have discussions for ensuring emotional support (8). In Canada, it was determined that participants who participated in support groups expressed that support groups offered an excellent meeting atmosphere facilitating safe discussion/talk, ensuring the unknown to be recognized, making it easier to take decisions and inspiring hope (22). The written feedback received from patients such as "Since I gained new information, I also learned what I should do and should not do in this process. I have applied them and I continue to do so", "I feel safe here", "We're given the opportunity to talk and I really like this", "Knowing that we're not alone and hearing different suggestions about how to cope with problems have been useful", "I have been able to express and share everything related to my disease very comfortably. I have really enjoyed these." (Table 2) is important in the sense that it showed that the support group initiative achieved its goal.

Support group intervention helps patients to save themselves from being stigmatized as a cancer patient, develop sound communication with their loved ones and the treatment team and develop coping methods. Furthermore, receiving support from friends and supporting them, getting away from the thought of death, relieving or eliminating stress, depression and anxiety and reducing the feeling or despair are some of the positive effects that enhance the psychosocial adaptation of patients (12, 23). In this context, it is important that a support group initiative be accompanied by a consulting psychologist to ensure psychosocial well-being. The secondary sessions of the support group intervention were conducted by a consulting psychologist who worked for a long time with cancer patients. The psychologist tried to understand how patients met breast cancer and how they were influenced by it in the sec-

Table 1. Support group intervention program administered for women with breast cancer

Support group intervention	Educational subjects
1. Support group intervention (90 min)	1. Introduction, Handing out the Educational books 2. Application of data collection tools 3. Sharing the expectations from the session 4. Sharing the educational program 5. Handing out the educational book prepared 6. Primary educational subjects • Incidence rate of breast cancer • Risk factors for breast cancer • Importance of diagnostics methods, diet and activity 7. Answering questions about the above-mentioned subjects and sharing experience 8. Receiving feedback and sharing the topic and date of the next session
2. Support group intervention (120 min)	1. The subject of the second session was “coping with stress and offering psychological support.” This training was conducted by a consultant psychologist working with cancer patients. 2. Sharing the emotions, thoughts and experience about the subject of the session 3. Receiving feedback and sharing the topic and date of the next session 4. Handing out the key-holders with blue 'evil eye' beads prepared for the patients
3. Support group intervention (90 min)	1. Subjects of the third training session • Suggestions to prevent and manage the side effects of chemotherapy and target-oriented therapy - Choosing a wig, hair loss, eyebrow and eyelash loss, skin changes, nausea, vomiting, changes in nails, vaginal dryness • Suggestions to prevent and manage the side effects of hormone therapy - Osteoporosis, vaginal dryness, hot flush, deep vein thrombosis 2. Answering questions about the above-mentioned subjects and sharing experience 3. Receiving feedback and sharing the topic and date of the next session 4. Offering eyebrow shadows, eyebrow eyeliners
4. Support group intervention (90 min)	1. Subjects of the fourth training session • Suggestions to prevent and manage the side effects of surgical treatment - Breast prosthesis, correct choice of bra, breast reconstruction - Frozen shoulder syndrome and its prevention - Lymph edema and prevention • Suggestions to prevent and manage the side effects of radiotherapy - Preventing skin changes in the breast, wet-dry desquamation, edema in the breast, fatigue 2. Answering questions about the above-mentioned subjects and sharing experience 3. Receiving feedback, sharing the topic and date of the next training session 4. Handing out sunscreens to prevent sunburns
5. Support group intervention (90 min)	1. Subjects of the fifth training session • Suggestions for improving sexual life • Safe sexual intercourse 2. Answering questions about the above-mentioned subjects and sharing experience 3. Receiving feedback 4. Filling in the evaluation forms on the support group intervention 5. Handing out vaginal lubricants and preservatives

Table 2. Opinions on satisfaction with the support group

Item	Responses from patients on the form
Help provided by the group process	- "I received the most accurate responses to the questions in my mind." - "It has been helpful to meet other people and share my experience." - "I have received sufficient answers to my questions." - "I have received sufficient and necessary information. I have learned very beneficial things about my disease process and it felt very good to communicate with the other patients." - "My perspective has changed. Now, I feel happy when I come to the hospital." - "I overcame my fears and I feel better." - "Knowing that we are not alone and hearing different recommendations about how we can cope with the problems." - "I realized that there were a lot of things I did not know about even though I am a healthcare professional."
The most likeable aspect of the group process	- "Communication among people in the group" - "Overcoming our deficiencies and learning what we did not know about" - "I really liked seeing that we were not alone at meetings and there were people ready to help" - "Sincerity" - "I was able to express very comfortably everything about my disease. I really enjoyed that." - "I felt that they were talking about me at the meetings. I thought there were people who understood me." - "The discussions and positive attitude of friends" - "The friendships we made" - "It was a really nice and positive practice to gather around a table." - "The group dynamic was really good. We received answers to all our questions." - "I am given the chance to speak, and I really like this." - "It has been a great source of morale for me to be together with friends who were fighting the same disease." - "I understood that we were not alone." - "The information shared was a real source of comfort for me." - "It was a sincere family atmosphere."
Different emotions inspired by the group process	- "I am happy that I joined this group. I feel safer." - "I feel more aware and cold-blooded." - "It is relaxing to see that I am not alone in having this problem." - "I feel that I am very relaxed and I have been able to express myself. My outlook on my disease has changed." - "I have learned what awaits me and what I should not do." - "I am happy as I leave every meeting." - "I have increased awareness; it is really nice that we can have these conversations without the relatives of patients with whom we have a lot of shared points." - "We shared our experience as people who experience the same problem. This gave us hope and ensured that we supported each other." - "I feel more comfortable. I have fewer worries about the disease." - "I feel safe here."
Changes in behaviours and habits after joining the group	- "I started to take better care of myself and do sports." - "Since I learned new information, I learned what I should and should not do in this process. I have applied them and I continue to do so." - "I no longer cry. I eat regularly. I take time for myself and this makes me happy." - "I am no longer pessimistic." - "I have a more positive outlook on my disease process." - "I have learned to share my emotions and thoughts instead of keeping them for myself." - "I started to smile more, my pessimism has disappeared."

Suggestions for the future meetings	- "Such meetings should be held with every patient group." - "Shared events can be organized." - "I would like these meetings to continue on a continuous and regular manner. Because they have a very positive effect on me." - "It would be nice if the meetings are longer and shared activities such as trips are organized." - "It would be nice to give information to partners especially regarding sexual topics; there could at least be a booklet specific to them. Action must be taken especially to tackle the fears of partners. They abstain from sexual intercourse since they are afraid of passing germs to us and hurting us." - "The duration of meetings can be longer." - "Participation of fully recovered people in future meetings can inspire more hope in us."
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Table 3. Process of evaluating the support group meetings of the intervention group (n=37)

Process of support group meetings	 0	 1	 2	 3	 4	 5	Total
Emotions regarding the process	n=30 81.1%	n=6 16.2%	n=1 2.7%	-	-	-	n=37 100%
Duration of meetings	n=28 75.7%	n=5 13.5%	n=4 10.8%	-	-	-	n=37 100%
Clarity of information	n=35 94.6%	n=2 5.4%	-	-	-	-	n=37 100%
Skills of the moderator	n=35 94.6%	n=2 5.4%	-	-	-	-	n=37 100%
Opportunity to speak	n=31 83.8%	n=6 16.2%	-	-	-	-	n=37 100%
Interaction within the group	n=29 78.4%	n=7 18.9%	n=1 2.7%	-	-	-	n=37 100%
Meeting place	n=32 86.5%	n=3 8.1%	n=2 5.4%	-	-	-	n=37 100%

ondary sessions which mostly bore witness to emotional moments and lasted approximately 120 min. The psychologist asked every patient to introduce oneself in turn and talk about how they encountered the diagnosis of breast cancer and how the diagnosis influenced them. There were some tears shed as emotions were expressed. A negative piece off experience explained by a member of the group may be intimidating or worrying for the other members (12). The therapeutic communication and psychological support offered by the psychologist were very comforting for the patients. It contributed to them coming to terms with the emotions they felt, feeling relaxed and accepting their disease. The written feedback given by participants such as "I am happy that I joined this group, now I feel safer", "We shared our experience as people having the same problem. This gave us hope and strength. We understood that we were not alone", "I feel more comfortable, I worry less about my disease", "I no longer cry, I take time for myself", "My pessimism has disappeared", "I have a more positive outlook on my disease process", "I started to laugh more, my pessimism has disappeared" (Table 2) suggests that education improves psychosocial well-being.

Finalization of the Support Group Intervention

In the last session of the support group initiative, visible differences could be discerned in the patients. In the first session, the patients

had come to the meetings in daily clothes such as lounge pants and were looking at each other with worried eyes while every patient was very chic and they had put on make-up in the last session. The worried looks had given way to sparkling gazes. Now, they were cracking jokes as they talked and they were happy as if they were friends who had long known each other. They remarked that they did not wish the sessions to come to an end, they were initially afraid as they came to the hospital but now they were happy since they knew they would see their friends, talk at sessions and learn subjects they did not know and were curious about.

To assess the satisfaction of patients with the support group, the support group meeting assessment for developed by Ordin and Karayurt (2016) was used (14). The patients stated that they were positively influenced by the support group initiative. The opinions of patients about their satisfaction with the support group are provided in Table 2 and (Table 3). After the support group meetings came to an end, the patients jointly agreed on dates and met in their houses or outside to maintain the support. Furthermore, they also established a communication network on social media and they continue to stay in touch and offer support to one another and celebrate each other on special days (festivities, religious holi-

days, Women's Day, etc.), thereby maintaining peer support. In line with the feedback received from patients, it can be concluded that the support group intervention increases the quality of relationships, relieves loneliness, positively influences life satisfaction and instigates positive changes in line with the studies performed (4, 8, 24)

Conclusion

In conclusion, the "Support Group Intervention" enabled women diagnosed with breast cancer to see that there are other women with breast cancer experiencing similar situations, they are not alone and can receive peer support. Furthermore, it also contributed to them gaining information from the correct resources regarding the disease and disease management. The fact that information, emotions and experience were shared in a group setting under the leadership of a consultant nurse and a psychologist created a proximity and togetherness among participants, thereby facilitating women to receive support from one another. Uncovering the challenges experienced by women, their needs, recommendations to one another and skills of coping with the disease during the support group intervention would contribute to the care provided for this patient group. It is thought that support group meetings would make it easier for patients to cope with the symptoms they experience, increase their quality of life and improve the patient care results if it is implemented as part of the nursing care. It is important to implement support group interventions in Turkey towards the aim of offering knowledge, consulting and psychosocial support to women diagnosed with breast cancer.

Suggestions

- Researchers who will implement a support group intervention in the future are recommended to select a place easily accessible by all the patients,
- Create a convenient environment for the patients (offering refreshments, gathering around one table and ensuring eye contact, having optimal room temperature and lighting),
- Ensure that the support group moderator is not an authoritarian figure, motivates patients to ask questions during the session and empower patients,
- Set the meeting days on the dates when they are to receive treatment in order to make it easier for patients to attend the sessions,
- Realize the support group sessions in future studies with participation of women who recovered from the disease and are currently in good health in order to have a positive influence on the morale and motivation of patients.

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Determination of the Health Belief and Attitude of Women Regarding Breast Cancer and Breast Self-Exam

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ABSTRACT

Objective: This study has been carried out with the purpose of determining the belief and attitude of women regarding breast cancer and breast self-exam and the factors which affect the performance frequency of breast self-exam and it is a descriptive kind of study.

Materials and Methods: Data has been collected through questionnaire forms created by the researchers based on literature information and Champion Health Belief Model Scale. Data collection was collected via face-to-face interviews with the patients. Questionnaire forms were applied to 350 women who accepted to participate in the study. Data was analyzed frequency, percentage, t-test and χ^2 test with SPSS for Windows 12.0.

Results: Average age of women who were included in the study was found to be 33.25 ± 10.27 . Average point for the sensitivity sub-dimension of the women within the scope of study was 7.79 ± 2.38 , average score for the seriousness sub-dimension 23.30 ± 5.82 , average score for the benefit sub-dimension 15.48 ± 4.03 , average score for the obstacle sub-dimension was 26.34 ± 7.64 , average score of health motivation sub-dimension was 32.77 ± 9.11 and average score for the self-confidence sub-dimension was 25.20 ± 5.02 .

Conclusion: The beliefs of women regarding the subject should be developed by providing in-service training regarding breast cancer and breast self-exam. It can be suggested that studies be carried out analyzing the effect of the attempts for increasing the performance frequency of breast self-exam of women on the beliefs and attitudes.

Keywords: Breast self-exam, breast cancer, health beliefs

Introduction

Breast cancer is the most frequent type of cancer among women in Turkey and in the world. According to data collected in 2015, breast cancer ranks number one with the percentage of 44.2% among the 10 most common cancer types seen in women (1).

It is detected that mortality rates and burden of disease of breast cancer can be reduced via screening programs. It has been found that the mortality rate of breast cancer can be reduced by 7-30% with community-based breast cancer screening applied to the proper age group at proper intervals (2).

The number of women with early diagnosis and treatment of breast cancer in Turkey is noticeably low when compared to women living in western countries (3-6). The ratio of women applying breast self examination (BSE) is relatively low in Turkey, the ratio of women that apply BSE every month is 10.1% (7). Although American Cancer Society does not currently recommend monthly BSE, it recommends BSE so that every woman would recognize the natural appearance, and texture of her own breast tissue so that she can alert the authorities in case of a change in these parameters (8). BSE is simple, cheap, painless and harmless; no tools need to be used and it is a method recommended for women over 20 years of age as part of the early detection applications recommended for the breast cancer (9). It is especially important when we think of the fact that in rural parts where access to mammography and clinic examination is limited, women detect the breast lumps in first hand and then present to a physician with that symptom. The investigations show that women have lack of knowledge about breast cancer and that their BSE beliefs and applications are not at the desired levels. It is shown in the studies about BSE is that the most important factor that affects breast cancer screening is the health beliefs (10-12).

This study was presented as a poster declaration and was published in abstract book as an abstract at the 17th National Surgery Congress (26-29 May 2010-Ankara).

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The health belief model (HBM) was first developed by Hochaboum et al. in 1950. It explains the correlation between persons' beliefs and behaviors. The model also defines what is motivating a person to do or not to do the acts he/she does about his/her health and the situations that influence the formation of health behavior. According to HBM; women who accept breast cancer as a serious health hazard, are highly sensitive about it, have a low level of perceived obstacle and a high level of perceived benefit apply BSE more often (13). Despite the fact that there are studies that examine women's application of BSE and influencing factors in Turkey, the studies that examine the beliefs about BSE are very limited. Taking this idea as basis, a study was conducted on women living the Ödemiş district of city of İzmir in order to determine their beliefs and behaviors about BSE.

Materials and Methods

The study was conducted as a descriptive study to determine the beliefs and behavior of women about BSE and define the factors that affect the frequency of them applying BSE. The universe of the study was constituted by women who presented to one of the family health centers affiliated to the Society Health Centers in Ödemiş/İzmir from 16.10.2007 to 31.05.2009. 350 women over 20 years of age who presented to the family health centers between those dates were included in the sample of the study.

The data of the study was collected by using a questionnaire form (22 questions) which was created per the literature by the researchers to investigate the definitive data of women participating and Champion Health Belief Model Scale (CHBMS) (42 items) via face-to-face interview method.

The CHBMS that is used to determine the beliefs and behavior of women about breast cancer and BSE were created by Champion V. in 1984 and amended in his latter studies (1993, 1997, 1999). The scale included 42 items and it was revised for validity and reliability for the Turkish society with data collected from 430 women by Karayurt in 2003. In that the study, Karayurt used the revised CHBMS in terms of validity and reliability for the Turkish society. In Karayurt's revised version, the cronbach alpha reliability modulus of CHBMS was between .58 and .89 and test-retest reliability was found to be .89 and .99 (14).

Six concepts of the Health Belief Model in Scale create the six sub-dimensions. There are three items (items 1-3) in the perceived susceptibility sub-dimension related to breast cancer, seven items (items 4-10) in the sub-dimension of perceived seriousness related to breast cancer, four items (items 11-14) in the perceived benefit sub-dimension for the implementation of BSE, 11 items (items 15-25) in the perceived obstacle sub-dimension for the implementation of BSE, 10 items (items 26-35) in the self-confidence sub-dimension for the BSE, seven items (items 36-42) in the sub-dimension of health motivation (15).

Likert type with 5 options ranging between 1 and 5 as a scaling method was used to evaluate the scale. The options were definitely disagree (1), disagree (2), indecisive (3), agree (4), and definitely agree (5). In the scale, each sub-dimension is evaluated separately and is not collected under one score. For each person, 6 different scores are calculated. The higher the score, the higher the sensitivity and seriousness, the higher the benefits for the perceived benefits, the higher the obstacles for the perceived obstacles, the higher the motivation for health motivation and the higher the self-efficacy for perceived self-efficacy are (15, 16).

Statistical analysis

The data was evaluated by SPSS 12.0 statistics program via computer. The descriptive data of the women was given in numbers and percentages and the comparison of CHBMS sub-dimension scores among women who apply BSE and those who do not was done by statistical significance (t-test) test. χ^2 test was used in assessing the difference between the groups.

Written consent of Ödemiş Health Group Chairmanship was obtained in order to carry out the investigation. The purpose of the study was stated clearly and it was explained to the women who took part in the study that they were free to join or leave the study.

Results

It was found that the average age of women who participated in the study was 33.25 ± 10.27 (min:20, max:85). It was found that 47.7% of the women participating were in age group of 20-29, 72.3% of them were married, 43.7% of them were primary school graduates and that 64.3% had a monthly income that was just equal to their monthly expenditure (Table 1).

It was detected that 87.4% of the women taking part in the study were not in menopause yet, 38.6% of them had 2 children, 65.4% of them were breastfeeding at the time, 90.0% did not have any other diseases related to their breasts other than cancer, 98.0% were not diagnosed with breast cancer, 92.0% did not have any relatives in their families with a cancer diagnose in their medical history and that 64.9% of them perceived their body weight as normal (Table 2).

It was detected that 52.3% of the women were informed about BSE and 54.6% of them received that information from a healthcare professional.

Table 1. Demographic information of the women

Variables	n	Frequency
Age group		
20-29	167	47.7
30-39	88	25.1
40-49	69	19.7
50 ≥	26	7.5
Marital status		
Married	253	72.3
Single	97	27.7
Education status		
Illiterate	5	1.4
Primary education	153	43.7
Secondary education	95	27.2
High School/ university	97	27.7
Level of economic status		
Low	108	30.8
Moderate	225	64.3
High	17	4.9
Total	350	100

Table 2. Distribution of women's breast cancer risk factors

Breast cancer risk factors	n	Frequency
Status of menopause		
Postmenopausal	44	12.6
Premenopausal	306	87.4
Number of children		
1	63	18.0
2	135	38.6
3	32	9.1
4 ≥	8	2.3
Non-child	112	32.0
Breastfeeding status		
Breastfeeding	229	65.4
Doesn't breastfeeding	121	34.6
Out of cancer disease status		
Yes	33	9.4
No	317	90.6
Breast cancer diagnosed status		
Yes	7	2.0
No	343	98.0
Breast cancer diagnosis status in family		
Yes	28	8.0
No	322	92.0
Perception of weight status		
Weak	31	8.9
Normal	227	64.9
Fat	92	26.2
Total	350	100

It was found that 82.0% of the women participating in the study did not receive breast examination done by a healthcare professional in the last year, 89.7% of them had not undergone mammography in the last year, 60.3% of them had been performing BSE in the last year and 39.7% of them did not perform BSE in the last year (Table 3).

When the CHBMS sub-dimension scores of the women participating was investigated, it was found that the average score of the susceptibility sub-dimension was 7.79 ± 2.38 , the average score of the seriousness sub-dimension was 23.30 ± 5.82 , the average score of the benefit sub-dimension was 15.48 ± 4.03 , the average score of the obstacle sub-dimension was 26.34 ± 7.64 , the average score of the health motivation sub-dimension was 32.77 ± 9.11 and the average score of the self-confidence sub-dimension was 25.20 ± 5.02 (Table 4). When the difference between the average CHBMS scores of women according to whether they apply BSE or not, the difference between the average sub-dimension scores of benefit ($t=3.608$, $p=0.000$), obstacle ($t=-4.915$, $p=0.000$), health motivation ($t=9.142$, $p=0.000$), and self-confidence ($t=4.157$, $p=0.000$) was found statistically significant

Table 3. Application status of women's early diagnosis methods

Early diagnosis methods	n	Frequency
Breast examination by healthcare worker		
Yes	63	18.0
No	287	82.0
Scan mammography in the last year		
Yes	36	10.3
No	314	89.7
Perform BSE in the last year		
Yes	211	60.3
No	139	39.7
Frequency of BSE		
Every month more than one	39	11.1
Once a month	65	18.6
Once every two months	29	8.3
Once every 3-4 months	35	10.0
Once every 5-6 months	18	5.1
Once a year	25	7.2
I never examined it	139	39.7
Total	350	100.0
BSE: breast self examination		

Table 4. Distribution of scores taken by women from the sub-dimensions of the health beliefs scale for the breast examination

Sub-dimensions	Sub-dimension min-max scores	Number of items	Total score ($\pm$ SD)
Susceptibility perception	3-15	3	7.79 ± 2.38
Seriousness perception	7-35	7	23.30 ± 5.82
Benefit perception	4-20	4	15.48 ± 4.03
Prevention perception	11-55	11	26.34 ± 7.64
Health motivation	10-51	7	32.77 ± 9.11
Confidence	7-37	10	25.20 ± 5.02
SD: standard deviation			

($p < 0.05$). Between the group that applied BSE and the group that did not apply it, the differences between the scores of susceptibility ($t=0.229$, $p=0.819$) and seriousness ($t=-0.024$, $p=0.981$) sub-dimensions were not statistically significant ($p > 0.05$). When the CHBMS scores of women participating were evaluated according to the parameter of mammography scanning, it was seen that the difference between the scores of sub-dimension of susceptibility ($t=13.930$, $p=0.000$) and benefit ($t=3.170$, $p=0.046$) were statistically significant ($p < 0.05$). In the group of women who did not have a mammography scan and

who had a mammography scan, no statistically significant difference was detected between the average scores of the sub-dimensions of seriousness ($t=2.189$, $p=0.140$), obstacle ($t=1.619$, $p=0.204$), health motivation ($t=0.011$, $p=0.917$), and susceptibility ($t=0.001$, $p=0.979$), ($p>0.05$).

No statistically significant difference was detected between the two socio-demographic parameters of age ($\chi^2=0.207$, $SD=3$, $p=0.977$) and monthly income ($\chi^2=1.684$, $SD=2$, $p=0.431$), and BSE application ($p>0.05$). The difference between the level of education of women and BSE application was statistically significant ($\chi^2=20.200$, $SD=2$, $p=0.000$) ($p<0.05$). When the marriage status of the women participating in the study and BSE application were compared together, a statistically significant difference was found ($\chi^2=3.875$, $SD=1$, $p=0.049$) ($p<0.05$). The difference in terms of BSE application between women who participated in an education program about BSE and who did not were found statistically significant at an advanced degree ($\chi^2=81.106$, $SD=1$, $p=0.000$) ($p<0.05$). When the BSE application was evaluated according to whether the women had undergone a mammography scan in a year or not, a statistically significant difference was found ($\chi^2=5.975$, $SD=1$, $p=0.015$) ($p<0.05$). No statistically significant difference was detected between the presence of breast cancer in the women's family history and the status of BSE application ($\chi^2=3.461$, $SD=1$, $p=0.063$) ($p>0.05$).

Discussion

The average age of women taking part in the study was found to be 33.25 ± 10.27 . Also, 92% of the women participating had no family members with breast cancer history, and 72.9% of the women participating also neither had any friends with breast cancer. In a study done by Gerçek et al., in 2008 it was detected that 76.8% of the students did not have any family members diagnosed with cancer, and in those with a family member having a cancer diagnosis, 46.3% of the relatives with the cancer diagnosis was in second degree (15). In a study done by Avcı and Keskin in 2005, it was detected that 94.8% of the students did not have a family member with a breast cancer diagnosis (17). According to a study done by Avcı in 2008, 93.7% of the students did not have a family member with a cancer diagnosis (18). In a study performed in 2007, it was detected that 91.7% of the women did not have any relatives with a breast cancer diagnosis, and in a study done by Altunkan et al. in 2008, it was found that 5.5% of the women had breast cancer history (19, 20).

In other studies as well as in our own study, it has been found that clinical examination as one of the early diagnosis methods of breast cancer was not applied by most of the women (15, 21).

In our study, it was found that the CHBMS sub-dimension grade averages were as follows: for the susceptibility sub-dimension, it was 7.79 ± 2.38 , for the seriousness sub-dimension, it was 23.30 ± 5.82 , for the benefit sub-dimension, it was 15.48 ± 4.03 , for the obstacle sub-dimension, it was 26.34 ± 7.64 , for the health motivation sub-dimension, it was 32.77 ± 9.11 and for the self-confidence sub-dimension, it was 25.20 ± 5.02 . In the study by Gerçek et al. (15), the average scores of students for each sub-dimension were as follows: for sensitivity, it was 7.78 ± 1.91 , for seriousness, it was 19.16 ± 5.48 , for benefit, it was 15.92 ± 6.52 , for obstacle, it was 26.13 ± 4.78 , for self-confidence, it was 29.13 ± 8.76 , for health motivation, it was 19.25 ± 7.13 . In Karayurt's study (22), the average scores for sub-dimensions were as follows: for susceptibility, it was 8.0 ± 2.1 , for seriousness, it was 21.5 ± 5.1 , for benefit, it was 19.1 ± 3.8 , for obstacle, it was 27.0 ± 5.9 , for self-confidence,

it was 31.2 ± 6.9 , for health motivation, it was 25.1 ± 5.3 . It can be seen that the seriousness and health motivation scores of the women were higher in our study. In a study done by Yılmaz and Durmuş in 2016, the seriousness and perceived susceptibility scores of doctors were lower than nurses and midwives, but the perceived benefit and self-confidence as well as health motivation scores were higher (21).

When the average CHBMS scores of women taking part in the study were investigated according to BSE application, a statistically significant difference was determined between the average scores of benefit, obstacle, health motivation and self-confidence sub-dimensions ($p<0.05$). There was no statistically significant difference between the mean scores of susceptibility and seriousness sub-dimension scores in the groups that did apply and did not apply BSE ($p>0.05$). In Karayurt's study (2003), a positive correlation was detected between BSE application frequency and scores of CHBMS sub-dimensions of self-confidence, perceived benefit, health motivation, susceptibility and seriousness (22). In another study, the benefit, obstacle and health motivation were found to be related to BSE application frequency (19). A positive correlation was detected between BSE and self-confidence, obstacle and perceived benefits in the study by Sortet and Banks (23).

In the study by Gerçek et al. (15), the average scores of CHBMS were investigated in correlation to BSE application frequency and a statistically significant correlation was found in the average scores of susceptibility, seriousness, benefit, obstacle and health motivation sub-dimensions.

In a study completed by Dündar et al. (3), the CHBMS average scores were investigated according to BSE application frequencies and a statistically significant difference was determined in the average scores for the sub-dimensions of self-confidence and obstacle.

As can be seen, some of the studies done by using CHBMS found a correlation between BSE application frequency and all the concepts while others found a correlation with only 2 or 3 of the parameters. In our study, we found a statistically significant correlation between 4 of the sub-dimensions and no statistically significant correlations were detected with 2 of the sub-dimensions.

When the average CHBMS scores of the women taking part in the study were investigated according to whether they underwent mammography scans, the differences of the average scores of the susceptibility and benefit sub-dimensions were found to be statistically significant ($p<0.05$). No statistically significant difference was detected among the average scores of seriousness, obstacle, health motivation and self-confidence sub-dimensions in the group of women who had undergone a mammography scan and who had not ($p>0.05$). In the study done by Dündar et al. (3), the difference of average scores of benefit, self-confidence, health motivation sub-dimensions were found to be statistically significant ($p<0.01$).

A statistically significant difference was determined between the BSE application frequency and the level of education of women ($p<0.05$). Karayurt (22) and Bahar and Özsoy (24) found that there was a significant correlation between the level of education and the frequency of BSE application in their studies. It is stated that it is important to raise awareness of individuals in health issues for changes in behaviors, attitudes and beliefs (22).

A statistically significant difference was found when the women participating in the study were examined in terms of the menopause status

with respect to BSE ($p < 0.05$). In a study done by Altunkan et al. (20), the parameters of age, social security, having children, use of contraceptive pills, age of first menstruation, menopause, receiving hormone replacement therapy after menopause were found not to have any effects on the BSE application frequency, only the parameters of education and having a family member diagnosed with breast cancer had a positive correlation with the BSE application frequency.

Conclusion

It was seen in this study that clinical examination, which is an early diagnosis method of breast cancer, was not applied by most of the women. The average scores in CHBMS for the sub-dimensions of benefit, obstacle, health motivation and self-confidence of women were found to be effective on BSE application. Considering these results, for women to apply self-breast examination on regular basis, it can be advisable to improve their health motivation, to increase their awareness about the risk factors contributing to breast cancer development, to increase their consciousness about early diagnosis behavior, to raise a proper level of awareness, to apply education supported with models to make sure that these attitudes become permanent, to inform women about BSE through newspapers, television, magazines, etc. by means of experts and to ensure the continuity of these education programs.

Ethics Committee Approval: Ethics committee approval was received for this study from Ödemiş Health Group Presidency.

Informed Consent: Informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

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An Example from the Rural Areas of Turkey: Women Breast Cancer Risk Levels and Application and Knowledge Regarding Early Diagnosis- Scan of Breast Cancer

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ABSTRACT

Objective: This research has been conducted for the purpose of determining the cancer risk levels of women living in a small village of in Saraycık village of Ankara and their knowledge and application of breast cancer early diagnose-scan methods.

Materials and Methods: 317 women were taken as examples for the study. Data were collected by giving survey forms to women and conducting face-to-face interviews. In determining breast cancer risk, "the form to determine the breast cancer risk" has been used. For breast cancer informational questions, one point has been given for each correct answer. In evaluating the data, number, percentage calculations, average and standard deviation, Mann-Whitney U (MU), Kruskal-Wallis (KW), One-way analysis of variance (F) independent sample T (t) tests have been used.

Results: It has been found that breast cancer risk is low, the knowledge level about cancer early recognition methods are medium among the women. It has been determined that 74.4% women didn't perform breast self-examination. 89.6% of women don't have mammography taken and 88.6% don't have their breast examined by health personnel.

Conclusion: In our study, it has been found that the risk levels of women are low, their knowledge about early diagnosis and cure are at a medium level and their use of these methods are inadequate. For this reason, we suggest that responsibility of healthcare professionals have to be increased in determining breast cancer risk among women and education and advisory services for this subject to be offered.

Keywords: Breast cancer, early diagnosis methods, risk level, women

Introduction

Breast cancer is one of the types of cancer that are most commonly seen among women and cause the highest mortality and it constitutes approximately 25% of all cancers in women and 15% of all cancer-related deaths in women (1).

The International Cancer Agency stated that the incidence of breast cancer increased by 20% and deaths by 14% among women in the year 2012 according to the 2008 data (2). The incidence of breast cancer is higher in developed countries than in developing countries and mortality due to breast cancer is lower in developed countries in comparison to developing countries (3). The most commonly seen cancer type in American women is the invasive breast cancer with 231,840 new cases and it is estimated that 40,290 women died because of that (4). In Turkey, breast cancer is the most commonly seen type of cancer among women. One out of every 4 cancers diagnosed in women within the year 2013 is breast cancer (5). While the incidence of breast cancer in 2006 was 37.6 out of 100.000, this rate rose to 41.6 in 2008 (6) and to 45.9 between the years 2009-2013 (5). Additionally, breast cancer ranks the first among the reasons for cancer-related deaths in women with a ratio of 16.7% (7). In Turkey, it is seen that 45% of women diagnosed with breast cancer are aged between 50 and 69 and 40% are aged between 25 and 49 (5). Breast cancer not only threatens the lives of women, it also influences their sexual identity and physical appearance, thereby jeopardizing their mental health. For that reason, early diagnosis protects women against mental troubles as well as any disruptions that may occur in their physical structures. Mammography, ultrasonography (USG), clinical examination and breast self-examination (BSE) rank the first among the methods for early diagnosis and screening in breast cancer (8). Methods for early diagnosis facilitate women to become knowledgeable about this subject and participate in screening programs (9).

Several studies conducted demonstrate that women do not have knowledge about BSE, which is free of charge and takes a very short time, and do not perform BSE (10-12). According to the study report on health improvement in Turkey, 65.1% of the individuals above the age of 19 have not performed BSE at all to date (13). The American Ministry of Health and Cancer Society conducted 5-year-long study recommending BSE, mammography and clinical examination to 280 thousand women inhabiting in 29 different areas and 75% of the women (1200 women) were found to have early-stage breast cancer (14).

Therefore, it is primarily necessary to ensure that women regularly perform BSE, undergo clinical examination and mammography as methods for early diagnosis of breast cancer and to demonstrate the breast cancer risk factors and identify the risk groups in every society towards the aim of enhancing the effectiveness of early diagnosis programs (15).

High-risk groups should be identified and early diagnosis and treatment programs should be primarily implemented in risky groups to ensure the effectiveness of early diagnosis programs for breast cancer (8). Important risk factors for the development of breast cancer include age, family history of cancer, early menarche or late menopause, history of childbirth and ionized radiation (16-18). Knowledge of the afore-mentioned risk factors is very important in protecting against breast cancer, early diagnosis and increasing the chance of treatment.

The approaches that are most commonly known and applied globally are cancer screening programs. These programs enable a higher awareness of cancer among individuals, an understanding of the importance of early diagnosis and provision of appropriate treatment (19). In Turkey, the awareness level of women about breast health is very low in comparison with women in western countries (20, 21). Even though cancer screening centers have recently been opened in Turkey, the number of women presenting to these centers is still not at the desired level. The attitudes/beliefs and perceptions of women about the value of health may be considered as an important barrier in the way of their participation.

Therefore, the responsibility of healthcare professionals is to provide women with advice on early diagnosis and treatment. To be able to effectively carry out the training programs and advisory services towards women, it is required to determine the knowledge women regarding their breast cancer risk levels as well as their knowledge and practices regarding the methods for early diagnosis and treatment. Hence, this study was conducted to identify the knowledge of women living in a village of Ankara, the Turkish capital, about their breast cancer risk levels and their knowledge and practices regarding the methods for early diagnosis and treatment.

Materials and Methods

This descriptive study was conducted in Saraycık village of Ankara. The study universe was made up of women at an above the age of 20 registered at the family health center of 6th Health Care. The study sample was calculated based on the formula of the frequency at which an event occurs in situations where the universe is known (22). It was identified that 317 women above 20 had to be contacted and the entire sample was contacted.

The data were prepared by the researchers based on a literature review (8, 16, 17, 19, 21, 23, 24). After that, a face-to-face interview method was employed using a survey form the scope of which was validated based on the opinions of three experts; the data were collected by two people conducting the said interviews at the houses of women. The survey form is composed of four sections that include multiple choice and open-ended questions. In the first part, questions

about the socio-demographic characteristics of women (10 questions) were included; in the second part, knowledge check questions about methods for early diagnosis (18 questions) were included; in the third part, questions about the application of methods for early diagnosis (15 questions) were included and in the fourth part, questions about the risk assessment form geared towards breast cancer were included. It took approximately 30-45 minutes to complete the survey form. A written approval from the Ethics Committee and written consents from women were obtained to be able to conduct the study.

Statistical Analysis

The information obtained was assessed by the researchers in the computer environment using the SPSS (Statistical Package for Social Sciences) 11.5 (Chicago, IL, USA) package program. For assessment, the knowledge score was used as the dependent variable and descriptive characteristics were used as the independent variable. In assessing the answers to the knowledge check questions on the methods for early diagnosis of breast cancer, "1 point" was assigned to every correct answer and "0 points" were assigned to every wrong answer. The total score that can be obtained in knowledge check questions is 18. In our study, 18 points were considered to represent 100 and evaluations were made in four groups as follows: very good (13.5-18 points), good (13.4-9 points), moderate (4.5-8.9 points) and poor (4.4 points and lower).

The weights and heights of women were measured by the researchers. After that, the Body Mass Index (BMI) values of women were calculated as follows: the weight was divided to the squared height ($BMI = \text{Weight (kg)} / \text{Height (m}^2\text{)}$). Those with a BMI below 18.5 were assessed as underweight; those between 18.5 and 29.9 were assessed as normal and those at or above 30.0 were assessed as overweight (25).

For assessing the risk factors, the "Form for Assessing the Breast Cancer Risk", which was developed by the American Cancer Society and recommended by the Turkish Ministry of Health towards the aim of evaluation breast cancer risk, was applied. In the Breast Cancer Risk Assessment Form, specific scores are calculated for every risk factor including the age, family history of breast cancer, personal history of breast cancer, age at childbirth, menstrual history and bodily characteristics in order to determine the risk level (four levels as follows: "200 points and below" - low risk, "201-300 points" - moderate risk, "301-400 points" - high risk, "400 points and above" - the highest risk) (26). In order to assess the data, the number, percentage calculation, average and standard deviation, Mann Whitney U (MU), Kruskal-Wallis (KW), One-Way Analysis of Variance (F) and Independent Sample T-Test (t) were used.

Results

The average age of women in our study was 39.03 ± 14.979 , 57.7% were aged between 20-39, 82.3% were married, 53.9% had been living in their residence area for 12 years or more, 91.8% lived in the Central Anatolia region for the longest time of their lives, 58.7% were primary school graduates and 60.5% had husbands that were primary school graduates. It was identified that 98.4% of women were not working, 74.1% had some form of social security, 67.8% had social security provided by SKK (Social Security Agency of Turkey), 69.1% considered that they had mid-level income and 61.2% were overweight. While the difference between their average scores for breast cancer knowledge and their age, marital status, time of residence in their current location, the area where they lived the longest, employment status, perception of income level and bodily characteristics was not found statistically significant ($p > 0.05$) while the difference between their average scores for breast cancer knowledge and the area where they lived

Table 1. Comparison of the average breast cancer knowledge scores of women based on specific characteristics

			n=317	
			Average knowledge score (X±SD)	Statistical analysis
Characteristics	Number	%		
Age				
20-39	183	57.7	8.19±3.598	F=1.759
40-49	61	19.2	7.52±3.557	p=0.415
50 and above	73	23.0		
Marital status				
Married	261	82.3	8.13±3.589	KW=3005.000
Single	26	8.2	9.08±4.088	
Widow-divorcee	30	9.5	5.87±2.177	p=0.334
Duration of residence at the current Location				
5 years and below	97	30.6	8.05±3.607	F=1.475
6-11 years	49	15.5	8.45±3.658	
12 years and above	171	53.9	7.83±3.573	p=0.478
Region of longest residence				
Central anatolia	291	91.8	8.01±3.569	KW=0.438
Eastern anatolia	9	2.8	6.89±2.667	
Other	17	5.4	8.24±4.423	p=0.803
Location of longest residence				
Province	25	7.9	9.00±3.651	KW=3.541
Sub-province	60	18.9	8.82±3.762	
Village	232	73.2	7.67±3.501	p=0.030
Educational status				
Illiterate	58	18.3	5.86±2.585	KW=53.416
Literate	23	7.3	7.26±3.078	
Primary school	186	58.7		
Secondary school	21	6.6	9.38±3.775	p=0.001
High school-university graduate	29	9.1	11.28±2.59	
Education status of husband				
Illiterate	7	2.7	5.71±2.059	KW=27.791
Literate	11	4.2	4.64±1.206	
Primary school	158	60.5	7.83±3.506	
Secondary school	46	17.6	9.13±3.851	p=1.000
High school-university graduate	39	14.9		9.59±3.218
Employment status				
Working	5	1.6	8.60±3.715	MU=677.000
Not working	312	98.4	7.98±3.595	p=0.611
Social security status				
Present	235	74.1	8.60±3.715	t=-4.450
None	82	25.9	7.98±3.595	p=0.030
Social security type				
Social security agency	160	67.8	8.18±3.456	KW=8.491
SSA for self-employed	27	11.4	8.67±4.000	
Pension fund	28	11.9	9.18±3.791	p=0.037
Green card	21	8.9	6.33±2.331	
Perception of the income level				
Good	56	17.7	8.50±3.469	F= 2.660
Middle	219	69.1	8.08±3.594	
Low	42	13.2	6.88±3.597	p=0.072
Bodily characteristic				
Underweight	17	5.4	7.24±3.382	KW=1.394
Normal	106	33.4	8.33±3.807	
Overweight	194	61.2	7.88±3.487	p=0.498

X: mean
SD: standard deviation
MU: Mann-Whitney U testi
KW: Kruskal Wallis-H Testi
F: Varyans Analizi = ANOVA

Table 2. Distribution of average risk scores for breast cancer of women (n=317)

Risk Factor	Category	S	%	Average risk score X±SD
Age	30 years and below	105	24.5	93.14±34.055
	30-40 years	88	22.3	101.36±18.581
	41-50 years	55	20.6	149.36±16.640
	51-60	38	16.9	177.11±24.540
	60 years and above	31	15.7	202.42±19.743
Family history of breast Cancer	None	307	96.8	124.02±44.997
	An aunt or a grandmother	7	2.2	167.86±42.608
	Mother or sister	3	1.0	223.33±46.458
	Mother and sister	-	-	- -
	Mother and two sisters	-	-	- -
Personal history of cancer	No breast cancer	317	100.0	125.93±46.274
	Breast cancer present	0		±
Age at first childbirth	Before 30	266	83.9	122.91±46.083
	After 30	6	1.9	184.17±32.468
	No children	45	14.2	136.00±42.980
Age of first menstruation	15 years and above	-	-	-
	11 years and below	26	8.6	132.50±42.573
	12-14	291	91.4	125.34±46.613
Bodily characteristic	Underweight	17	3.7	85.88±30.580
	Normal	106	26.2	98.77±37.940
	Overweight	194	70.1	144.28±41.960
Total		317	100	125.93±46.274

X: mean
SD: standard deviation

the longest, their educational background, their husbands' educational background, social security status and type of social security was found statistically significant ($p<0.05$) (Table 1).

Almost all of the women were found to have a low Average Risk Score (ARS) for breast cancer: 125.34 ± 46.274 . The ARS was "93.14±34.055" for women below the age of 30, "101.36±18.581" for those aged between 30-40, "149.36 ± 16.640" for those aged between 41-50, "177.11 ± 24.540" for those aged between 51-60 and "202.42 ± 19.743" for those at or above 60 years of age. Additionally, it is seen that the risk score of women increased in parallel with age. Those who were below 60 years of age had low risk levels while those above the age of 70 had moderate risk levels (Table 2).

Table 3. Comparison of average breast cancer knowledge scores against the fertility characteristics

				n=317
Characteristics	Number	%	X ± SD	Statistical analysis
Age of first menstruation				
11 years and below	26	8.2	8.54±3.690	MU=3503.000
12 and above	291	91.8	8.44±3.658	p=0.532
Age at first childbirth				
30 and below	266	97.8	8.00±3.607	MU=365.000
30 and above	6	2.2	5.17±1.941	p=0.033
Number of pregnancies				
1-2	69	25.7	8.91±3.811	t=2.999
3 and above	199	74.3	7.59±3.438	p=0.003
Number of living children				
1	28	10.4	8.00±3.485	KW=16.734
2	78	29.0	9.26±3.869	p=0.000
3 and above	163	60.6	7.32±3.290	
Breastfeeding of the youngest child				
Breastfeeding	252	95.5	7.98±3.623	MU=1189.000
No Breastfeeding	12	4.5	6.67±2.535	p=0.211
Duration of breastfeeding for the youngest child (months)				
5 months and less	48	19.1	8.48±3.936	KW=1.594
6-12 months	75	29.9	7.95±3.401	p=0.205
13 months and more	128	51.0	7.83±3.534	
Climacterium status				
Climacteric	74	23.3	6.35±2.722	t= -4.126
Non-climacteric	243	76.7	8.49±3.679	p=0.000
Age of menopause				
Early Menopause	58	78.4	6.69±2.754	MU=406.000
Late Menopause	16	21.6	5.13±2.277	p=0.015
Status of taking medicines for menopause				
Taking Medicines	10	13.5	7.70±2.830	MU=207.00
Not Taking Medicines	64	86.5	6.16±2.662	p=0.074
X: mean SD: standard deviation U: Mann-Whitney U test W: Kruskal Wallis-H Test t: t test				

Also, 3.2% of women (10 women) had family history of breast cancer. Looking at the average score for breast cancer as compared to the family history of breast cancer, it can be seen that those who had history of breast cancer in an aunt or grandmother had an ARS of 167.86 ± 42.608 while those who had history of breast cancer in their mother or sister had an ARS of 223.33 ± 46.458 . As can be seen, those who had history of breast cancer in their mother and sister were found to

have higher risk scores than others and their risk was identified to be moderate (Table 2).

Additionally, 83.9% had given birth to their first child before the age of 30. The ARS of those who gave birth to their first child before the age of 30 was 122.91 ± 46.083 while this score was 136.00 ± 42.98 for women who had never given birth. The breast cancer risk score of women who gave birth after the age of 30 was higher in the study while they were found to have a low risk level (Table 2).

To add, 91.4% of women had their first menstruation between the ages 12-14 and their ARS was 125.34 ± 46.63 . According to the Body Mass Index calculation, 70.1% of women were overweight with an ARS of 144.28 ± 41.96 . The breast cancer risk level of these women was identified to be low according to the age at menstruation and body mass index of women (Table 2).

In our study, the Average Knowledge Score (AKS) of women regarding the early diagnosis methods for breast cancer was 7.99 ± 3.591 , which is the moderate level. Also, 10.1% of women were identified to have very good level of knowledge about early diagnosis methods for breast cancer, 28.7% good, 43.2% moderate and 18.0% poor.

In addition, 91.8% of women had the age of first menstruation at or above 12 years, 97.8% had the age of first childbirth at or below 30 years, 74.3% had 3 or more pregnancies, 60.6% had 3 or more children that were alive, 95.5% breastfed their youngest child, 51.0% breastfed their youngest child for 13 months or longer, 76.7% were climacteric, 78.4% had menopause at an early age and 86.5% did not use any medicines for menopause. The average of women at menopause was identified to be 46.04 years and the average breastfeeding duration was identified to be 2.3 months. The difference between the women's average scores for knowledge of breast cancer and their age at first menstruation, status of breastfeeding the youngest child and its duration, status of being climacteric, status of taking medicines for menopause was found not to be statistically significant ($p > 0.05$) while the difference between their average scores for knowledge of breast cancer and their age at first childbirth, number of pregnancies, number of living children, status of being climacteric and age at menopause was found to be significant ($p < 0.05$) (Table 3).

It was identified that 74.4% of women did not perform BSE, 82.4% did not undergo mammography and 88.6% did not have their breast examinations performed by healthcare professionals. As for the other findings not indicated on the table, it was found that 66.1% of women did not know how to perform BSE and 50.6% of those who performed BSE did it for early diagnosis of cancer. Furthermore, 53.1% of women specified that they regularly performed BSE. When women were asked how they performed BSE, 72.8% of them were identified as performing it wrong. It was determined that 78.5% of women did not undergo mammography since they did not have any complaints. Additionally, 48.4% stated that they did not undergo it since they had no complaints while 36.7% stated that the reason was that they were unaware of this clinical examination. It was determined that 63.7% of women did not know about BSE, 84.2% wanted to receive information on BSE and 92.9% of women who wanted to receive information on BSE wished to receive it from a healthcare professional (Table 4).

Table 4. Practices of women for early diagnosis and screening of breast cancer

Methods for early diagnosis and screening	n=317	
	n	%
Status of performing BSE		
Performing it	81	25.6
Not performing it	236	74.4
Status of undergoing mammography (at and above 40 years)		
Undergoing it	23	17.6
Not undergoing it	108	82.4
Status of having breast examination performed by healthcare professionals		
Having it performed	36	11.4
Not having it performed	281	88.6

BSE: breast self-examination

Discussion and Conclusion

Breast cancer is an important public health problem since it is frequently seen among women and it is a life-threatening disease. In the year 2008, it constituted 23% of all cancers in women globally (27) and in the year 2012, it was reported that it constituted 25% thereof. It has been reported that it has a share of 15% in all cancer-related deaths in women (1). In Turkey, it is stated that the share of breast cancer among the 10 most common cancers is 23.4% (13). For that reason, groups that are under risk should be prioritized by taking into account the economic burden that would be brought by handling the entire society at once in countries with limited resources (28).

According to the literature, the risk factors for breast cancer include the following: having a significant breast disease, family disposition, genetic factors, pregnancy at an early age, ovary activity, endocrine factors, early-onset menstrual cycle, late menopause, childbirth at a young age, not having given birth and short lactation period (24,29,30). In our study, the breast cancer risk level for all women was found to be low with ARS at 125.34 ± 46.274 (Table 2). In some studies performed, 91.8% (31), 94.4% (32), 98.5% (15) and 81% (33) of women were found to be in the low risk group. The fact that the majority of women had low breast cancer risk according to the specified research findings is similar to our research finding. It is considered that the low level of breast cancer risk found in our study was influenced by the following factors: the young age of women, most of them not being in menopause and the majority of women currently breastfeeding (Table 3).

Female sex and ageing are important risk factors for breast cancer (34). As a matter of fact, the breast cancer risk of a woman aged 20 is 0.05% while this rate goes up to 1.49% at the age of 40 and to 3.45% at the age of 60 (35). The average age of women in our study was 39.03 ± 14.979 and the risk score increases in parallel with age. In the studies performed, it has been identified that breast cancer risk increases in parallel with age (15,36). Our study finding is in keeping with the literature and other studies (37,38). In the studies performed, it is specified that genetic factors have play a role with an extent of

5-10% in breast cancer (35,39-43). In our study, those who had history of breast cancer in their mother or sister were identified to have moderate risk levels (Table 2). It can be said that all of the women in the study were in the low-risk group for development of breast cancer since they did not have any personal history of breast cancer.

It is known that hormones, especially oestrogen hormones influencing the breast tissue for a long time results in increased breast cancer risk. Early menarche, late menopause, not having given birth or having given birth for the first time after the age of 30 prolong the period during which oestrogens influence the breast tissue (44,45). Therefore, early menarche, childbirth before the age of 30, breastfeeding and early menopause reduce the risk for breast cancer (39). In our study, women who gave birth after the age of 30 were found to have a low risk for breast cancer (Table 2). McCredie et al. identified that childbirth before the age of 30 reduced the relative risk for breast cancer to around $RR=1.8$ (41). Furthermore, 97.8% of women in our study had their first childbirth before the age of 30 and the knowledge score of these women for breast cancer was found to be higher than women who had their first childbirth after the age of 30 with the difference between the two having been found to be statistically significant ($p<0.05$) (Table 3). Childbirth before the age of 30 in the majority of women might have played a role in that.

Age of menarche and regular ovulatory cycles are other factors that influence the risk for breast cancer. A study that was conducted specifies that every year of delay menarche reduces the risk for breast cancer by 20% per annum (46). In our study, 91.4% of women had their first menstruation at the ages of 12-14 and they were found to have a low risk for breast cancer. Our result is similar to those obtained in studies conducted on this subject (15,32).

Being overweight is one of the important health problems in Turkey. In a study, it was determined that being overweight increased the risk for breast cancer (47). In our study, 76.7% of women had not entered menopause (Table 3) and 70% were overweight. However, their breast cancer risk levels were found low since they were young. This result might have been influenced by the fact that the majority of women were housewives, did not traditionally have the habit of doing sports and had a high-carb diet.

It is known that breastfeeding reduces the risk for breast cancer (15,45,48) and women who do not breastfeed have a higher risk for breast cancer (45,48). It was identified in our study that 95.5% of women breastfed their children (Table 3). Therefore, the breast cancer risk in our group was low with respect to breastfeeding. This result was found to support the results of other studies performed (15,45,49).

Women having enough knowledge of breast cancer may also reduce breast cancer risk. In our study, the total Average Knowledge Score (AKS) of women about the methods for early diagnosis of breast cancer was 7.99 ± 3.591 and their knowledge of breast cancer was found to be at moderate level. Furthermore, a significant correlation was identified between having a higher educational status, having some form of social security and the knowledge score for breast cancer ($p<0.05$) (Table 1). A study that was conducted emphasizes that women have insufficient knowledge about breast cancer and did not adequately perform BSE (50). These results indicate that women have a requirement for knowledge about the methods for early diagnosis of breast cancer.

The most effective means to protect/improve health and reduce morbidity and mortality in breast cancer is the use of methods for early

diagnosis and screening. BSE, one of the methods for early diagnosis, has a significant importance in early diagnosis of breast cancer. In the studies performed, it was identified that breast cancer could be diagnosed at an earlier stage in women that performed BSE compared to those who did not (51-53). Our study identified that 74.4% of women did not perform BSE, 66.1% did not know about BSE and 72.8% of those who performed BSE did it wrong (Table 4). According to the research report on improvement of health in Turkey, it was identified that 65.1% of individuals above the age of 18 had not performed BSE at all to date (13). Findik et al. (2004) identified in their study that 58% of women did not perform BSE at all and 52.9% of those who performed it occasionally did it wrong (30). Similarly, in another study, it was identified that 81.3% of women did not know how to perform BSE (50). In the study by Seçginli and Nahcivan (2006), the share of those performing BSE regularly on a monthly basis was stated to be 17% (54). In the recent study conducted by Gölbaşı (2007), it was determined that more than half of the women (63.4%) did not perform BSE at all within the past year (13). These results point out to the fact that women do not have sufficient knowledge and skills regarding BSE for early diagnosis of breast cancer and they need education on this matter. On the other hand, our study found that 89.6% of women did not undergo mammography and 88.6% did not have their breast examination done by healthcare professionals (Table 4). In study found that 71.5% of women did not undergo mammography and 34.9% of them did not no information about the frequency of mammography however, they did not have breast examination done by healthcare professionals (55). Another study identified that 71.5% of women did not undergo mammography at all and that 34.9% of them did not have any knowledge about the frequency of undergoing mammography. In the same study, 37.4% of them stated that never underwent any breast examination to date (17). These study results are similar to our research findings and illustrate the requirement to implement educational programs targeted at raising the awareness of women about breast cancer.

In conclusion, our study identified that women in our sample had low risk levels; they had moderate level of knowledge regarding the methods for early diagnosis and treatment of breast cancer and were insufficient in performing the methods for early diagnosis and screening. For that reason, it is recommended that healthcare professionals identify the risk groups for breast cancer among women and raise the awareness of women regarding breast cancer. This way, it will be ensured that women assume the responsibility for their own health and take part in the process of early diagnosis and treatment.

Ethics Committee Approval: Ethics committee approval was received for this study.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

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Ultrasound Guided Therapeutic Excisional Vacuum Assisted Biopsy in Breast Fibroadenomas

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ABSTRACT

Objective: The aim of this study was to evaluate the performance of ultrasound (US) guided Vacuum Assisted Biopsy (VAB) in the therapeutic excision of breast fibroadenomas.

Materials and Methods: Patients who underwent excisional US guided VAB of their fibroadenomas between December 1999-May 2001 were retrospectively evaluated. Seventy-eight patients with BI-RADS category 3 and 4a lesions (one lesion per patient) with a maximum diameter smaller than 3 cm were enrolled in the study. Fifty-one of those were diagnosed with fibroadenoma. Biopsies were performed with a 11G needle using the Mammotome (Johnson & Johnson, New Jersey, USA) vacuum biopsy device. Patients were followed up with US for three years. Follow-ups were done semiannually in the first year and annually afterwards.

Results: Ten patients (19%) were found to have residual lesions in the first week after the biopsy. Additional eight patients (15%) were found to have residual-recurrent lesions in their annual follow up. However, none of these eight lesions demonstrated growth during the three year follow-up. The initial size of the FA was not found to be significantly different between the lesions which were completely excised with no residue or recurrence and those which were not ($p>0.05$).

Conclusion: The VAB method for the therapeutic excision of small FAs or other benign lesions is practical and easily tolerated by patients. Lesions smaller than 3 cm should be preferred for VAB. A multidisciplinary clinical environment is necessary for each step of the treatment.

Keywords: Fibroadenoma, needle biopsy, image-guided biopsy, ultrasonography

Introduction

Sixty nine percent of breast lesions undergoing open surgical biopsy are found to be benign (1) and fibroadenomas (FA) constitute about 50% of those lesions (2). Vacuum assisted excisional biopsy (VAB) utilizes 8G or 11G large bore needles and can extract larger tissue samples compared to fine needle biopsy and core biopsy. This leads to a decrease in the rate of negative biopsies as well as a decrease in discordance between the biopsy material and surgical specimen. In addition, some invasive lobular carcinomas grow in an infiltrative pattern, rather than forming a mass and require larger tissue samples for accurate diagnosis. VAB is also recommended for lesions located close to the thoracic wall or nipple, since it does not employ a forward moving needle (3). Benign lesions may need to be removed if they grow, are symptomatic or produce anxiety in the patient. However, surgical excision is costly, since it requires an operating room and sometimes hospitalization (4). Because it can extract large volumes of tissue, VAB can also be used for the excision of benign breast lesions (3, 4). The purpose of our study is to investigate the usefulness of VAB in the excision of benign breast lesions.

Materials and Methods

We retrospectively evaluated breast lesions excised using VAB between December 1999-May 2001 in our center, which had a proven diagnosis of FA. An informed consent form was obtained from each patient for the procedure and the retrospective review was approved by our university ethics committee.

Fifty-one cases with a diagnosis of FA were found and analyzed in a study group of 78 patients with one BI-RADS (Breast Imaging - Reporting and Data System) category 3 or 4A breast lesion in each patient. This study group consisted of women between 22-72 years of age (average 34 years) with eventual diagnoses of 51 FA, 15 fibrocystic change, 9 adenosis and 3 intraductal papilloma. Lesions were smaller than 3 cm in size. Lesions larger than 2 cm had histopathological diagnoses before the procedure, whereas smaller ones did not. Lesions were excised because of patient anxiety or at the recommendation of the treating surgeon.

Biopsies were performed using a 11G needle with the Mammotome vacuum assisted breast biopsy device (Johnson & Johnson, New Jersey, USA). The biopsy area was covered using proper biopsy technique. Ten ml of local anesthetic (2% prilocaine) were injected into the incision site and biopsy tract. A 5 mm incision was made and the needle was advanced to the posterior of the lesions using ultrasound (US) guidance (Logiq 700, GE Healthcare - Milwaukee, USA). The lesion was aspirated until no residue was observed on the US image. This required a minimum of 4 and a maximum of 24 aspirations. A metallic marker was placed before withdrawing the needle. Hemostasis was achieved with manual compression of the biopsy site for approximately 15 minutes. A compression bandage was applied and patients were informed about possible complications. All patients were examined with US one week after the procedure.

After the procedure, all patients were followed up for residues and recurrences for 3 years with US, bi-annually in the first year and annually in the following two years.

Statistical analysis

Differences between lesions exhibiting any residue or recurrence and those which did not were analyzed using Student t-test with SPSS v22 software (Armonk, NY: IBM Corp).

Results

Of the total 51 FAs, 13 were smaller than 1 cm, 32 were between 1-2 cm and six between 2-3 cm. Residual lesions were detected on the one week control US exam in 10 (19%) patients. Recurrent lesions were detected within the first year of the follow-up in eight (15%) patients. None of those eight lesions demonstrated further growth in the following two years of the follow-up.

A total of 18 (35%) of patients had residual or recurrent lesions. The initial lesion sizes in these patients were smaller than 1 cm in six, 1-2 cm in 11 and 2-3 cm in one. Initial lesion size in the 33 (65%) patients without any residue or recurrence were smaller than 1 cm in seven, 1-2 cm in 21 and 2-3 cm in five (Table 1). There was no statistically significant difference between the initial lesion size in patients with residue/recurrence and those without ($p>0.05$).

None of the patients experienced significant enough pain to require the cessation of the procedure. At the one week control, 17 (33%) patients reported taking paracetamol for pain. In four of them (5%) the pain was strong enough to interfere with sleep. Eight (10%) patients returned in the first week with ecchymosis. None of the patients developed a large enough hematoma requiring aspiration. Two patients (2.5%) developed infection which was controlled with oral antibiotics.

Table 1. Initial size of fibroadenomas which were completely or partially removed

Size	Completely removed (n=33)	Partially removed (n=18)
< 1 cm	7	6
1-2 cm	21	11
2-3 cm	5	1

Discussion and Conclusion

Open surgical biopsies are still widely used. A study analyzing approximately 26 thousand breast biopsies in the US revealed that 34% of benign lesions had undergone open surgical biopsy (5). Lesions, if not excised, require follow-up and can cause anxiety in patients (6). US guided VAB of breast lesions does not require hospitalization, is less invasive and cosmetically more pleasing (7). Especially in lesions smaller than 2 cm in size, success rates of 95-100% are reported. The method provides significant time and cost savings (8). Unfortunately, we did not record procedure durations in our study. However, the procedure took around 30 minutes on average, as reported in the literature (8).

The method is also well tolerated by patients. Thurley et al. (9) reported that 94% of their patients preferred VAB over surgery and would also recommend it to others. Eighty five percent of patients were completely satisfied with cosmetic results. Fifty-four percent did not experience any pain during the procedure. Although not recorded, most of our patients tolerated the procedure well and were satisfied with the result.

Residual lesions are the main disadvantage of VAB. We found ten patients with residual lesions at the one week control. The main reason for this is that hematomas and edema impair the US image during or immediately after the procedure and mask any residual tissue (7). In the literature, residual lesions are reported in 2-38% of the excisions (9-11). Our experience is similar to the literature with 19% of patients having residual lesion and 15% developing recurrent lesion within one year.

One of the most comprehensive studies on this subject has been performed by Lee et al. (12). They reported 1522 excisions with VAB and followed up all patients for more than a year. No residual or recurrent lesion was seen in 84.9% of their patients. Residual lesion was found in 12.7%, while recurrent lesion was found in 2.3%. The rates are higher in our study. This could be due to our smaller sample size. It should also be kept in mind that every procedure has a learning curve. In the study by Park et al. (13), complication rates and procedure time decreased significantly after 20 patients and 28 lesions.

We did not find any correlation between recurrence rates and initial lesion size. In the literature there are studies reporting this as the only correlation (6, 7, 14), but there are also studies which did not find this relationship (9).

The study by Grady et al. (14) is similar to ours in terms of follow-up duration. They followed up 52 FAs for periods between 7-59 months. However, the follow-up period was not the same for every lesion. They report that every case of recurrence was found after the first 6 months. The reason for this may be that Grady et al. (14) used a larger 8G bore needle.

An interdisciplinary consensus published in 2012 in Germany declared that benign lesions smaller than 2 cm in diameter can be excised using VAB. They also noted that the procedure should be performed in specialized breast centers with multidisciplinary evaluation and that patients should be followed up afterwards, but no longer than 12 months (8).

Another method for percutaneous excision of breast lesions is BLES (Breast Lesion Excision System, Intact Medical Corporation, Natick, MA, USA). In this method, a 6-8 mm incision is made and a radio-frequency (RF) probe is advanced close to the lesion. Then, a metal basket is advanced around the lesion and RF energy is used to separate the lesion from its surroundings. The main advantage of this method is that it can remove lesions 10-20 mm in size without fragmenting them. However, because it uses RF energy, its use is limited in small breasts and lesions located close to the skin or thoracic wall (15). The ABBI system (Advanced Breast Biopsy Instrumentation, United States Surgical, Norwalk, CT, ABD) is no longer commercially available (4).

In conclusion, VAB is a practical and well-tolerated method in the treatment of benign breast lesions, like fibroadenomas. Per consensus, only lesions that are smaller than 2 cm should be excised in this manner. A multidisciplinary evaluation and decision making process is required beforehand.

Ethics Committee Approval: Ethics committee approval was received for this study.

Informed Consent: Informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

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University Students' Awareness of Breast and Cervical Cancers: A Comparison of Two Countries and Two Different Cultures

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ABSTRACT

Objective: This study aims to evaluate Turkish and Polish female university students' awareness of breast and cervical cancers. The study was conducted in Turkey and Poland with 350 female students.

Materials and Methods: This descriptive and cross-sectional study's data were collected using Self-Administered Form questioning students' sociodemographic characteristics and awareness of breast and cervical cancer. Data were analysed using SPSS version 16.0 for Windows with number, percentage, and chi square test.

Results: According to the findings, a significant difference was found between Turkish and Polish students on knowing and applying Breast Self-Exam (BSE) ($p < 0.05$). No difference was found between the two student groups on considering mammography as required. 81.1% of Turkish and 68.1% of Polish students considered Clinical Breast Examination (CBE) as required; the difference was significant. A significantly higher number of Turkish students knew high-fat diet, overweight, first childbirth at advanced ages, and not having given birth as risk factors, while a higher number of Polish students knew using oral contraceptive as risk factor for breast cancer. A significantly higher number of Turkish students knew cancer history in family, Human Papilloma Virus, smoking, immunodeficiency, overweight, three or more full-term pregnancies, the first pregnancy at advanced ages, and poverty as risk factors for cervical cancer. A greater number of Polish students only knew using oral contraceptive as a risk factor; the difference was not statistically significant.

Conclusion: Results of this study showed that breast and cervix cancer awareness is similar among university students in both countries.

Keywords: Breast cancer, cervical cancer, awareness, university students

Introduction

According to Globacon 2012 data, Breast cancer is the second most common cancer in the world, and by far the most frequent cancer among women, with an estimated 1.67 million new cancer cases diagnosed in 2012 (25% of all cancers). Breast cancer ranks as the fifth cause of death from cancer overall, and while it is the most frequent cause of cancer death in women in less developed regions, it is now the second cause of cancer death in more developed regions. Cervical cancer has been determined to be the fourth most frequently observed cancer type with 528,000 new cases and 266,000 deaths expected in females in 2012. Cervical cancer is an important health problem in the world; its incidence and mortality rate are reported to be 7.9% and 7.5%, respectively (1, 2).

The prevalence of cancer in Turkey and Poland is similar to that in other developing countries and to each other. In Turkey, breast cancer is the in the first place with 45.1 incidence per one hundred thousand, and cervical cancer is in ninth place with 7.1 incidence per one hundred thousand (3). The incidences of breast cancer and cervical cancer in Poland have been reported to be 69.9 and 15.3 per one hundred thousand, respectively (4).

Early diagnosis of cancer is important in terms of effective treatment of the disease and an extended life span. Cancer screenings consist of examinations and reviews carried out on healthy individuals while there are no symptoms or indications, to facilitate early diagnosis. Breast and cervical cancer are the most frequently observed types of cancer in females, and early diagnoses can successfully be made (5-7).

Early diagnosis is critical for breast cancer and increases the opportunity of recovery from the cancer and an extended life span (8). BSE (Breast Self-Exam), CBE (Clinical Breast Examination) and mammography are recommended for the early diagnosis of breast cancer (7-10). Studies in Turkey show that breast cancer screenings have increased but are still not at the desired level (7, 8). The Papanicolaou test (Pap smear), which is systematically used in the fight against cervical cancer, is an effective, low-cost, and highly sensitive early diagnostic method which is easy to apply and reduces the burden of the treatment, morbidity and mortality (2, 11, 12). Cervical cancer shows the benefit of early diagnosis best; developed countries report that invasive cervical cancer rates have been reduced with the use of routine Pap smear screening tests over the last 40–50 years (7, 13-15).

Nurses are responsible for primarily counselling and informing the individual on health issues. Nurses play a key role in raising awareness on the risks of breast and cervical cancer. However, studies have shown that the level of knowledge and practice on the early diagnosis of breast and cervical cancer is low (2, 16). Female students in the health field should especially be sensitive about female cancers such as breast and cervical cancer. These students will live as healthy women in the future and play a professional role in protecting and promoting community health as healthcare personnel. This study was planned to indicate the differences between students from the two countries of their awareness about breast and cervical cancer, and to guide future educational studies on this subject.

Objectives: This study aims to evaluate the awareness of female university students about breast and cervical cancer.

Research question;

What is the level of awareness of female Turkish and Polish university students about breast and cervical cancer?

Materials and Methods

Design: A Descriptive Cross-sectional Study

Sample: This study was conducted with female students studying in the nursing departments of a university in Samsun, Turkey and a university in Warsaw, Poland, between February and June, 2014. The Schools of Health of these two universities are partners within the scope of the Erasmus Program, and personnel and student mobility takes place pursuant to the agreement. Poland is a country influenced by western culture, and the elements of Catholic belief have an important place in its cultural texture. On the other hand, Turkey is a Muslim country and also contains elements of eastern culture. Despite the religious and cultural differences between Poland and Turkey, these countries are economically and socially similar. The sample for the study consisted of 350 nursing students from both countries: 190 from Turkey and 160 from Poland. The inclusion criteria were studying in the nursing departments of these two universities during the dates of this study, being a female student (as cervical cancer would also be covered), agreeing to participate, and completing the data collection tools.

Data Collection: The Self-Administered Questionnaire with 23 questions was used to collect data. This questionnaire form was prepared by the researchers by reviewing the literature. The first eight questions evaluated the sociodemographic characteristics of the students, and the remaining 15 questions evaluated their awareness about

breast and cervical cancer. These questions were on the etiology, risk factors, and early diagnostic practices for breast and cervical cancers. The study was announced to the students and conducted with the students who applied to participate in it. The students filled out the forms in their classes and when they were available. It took approximately 15 to 20 minutes to fill out the forms. The questions were tested with a pilot group of ten subjects in each site as a control before using them with the students. Upon understanding that no corrections were necessary, the forms were applied to the whole group of students. The pilot group was excluded from the study. The study was conducted by Turkish researchers in Turkey and by Polish researchers in Poland. The questionnaire was prepared in Turkish and then translated in different languages; in English and Polish. Written consents were obtained from institutions for data collection. All procedures adhered to the ethical principles of the Helsinki Declaration. Students were invited to participate in the study and were informed on all aspects of the study. Verbal informed consent was obtained from students who participated in the research in compliance with the principle of voluntariness. Before beginning the research, the required permissions were obtained from the Samsun management both school.

Statistical Analysis

The data collected by the researchers was analysed using Statistical Package for the Social Sciences SPSS for Windows, version 16.0 (SPSS Inc.; Chicago, IL, USA). In the evaluation of data percentage, chi-square test analyses were used. The chi-square test was used to analyse the categorical data. $P < 0.05$ was considered to be statistically significant.

Results

The data showed that the average ages of the Turkish and Polish students were 21.36 ± 2.08 and 19.9 ± 1.6 , respectively. Almost all the students in both groups were single. The rate of high-income students was greater among Polish students than among Turkish students. The rate of students exercising regularly was low in both student groups (14.7% in Turkey, 10.6% in Poland), while the rate of students exercising irregularly was high in both student groups (57.4% in Turkey, 63.1% in Poland). Approximately one-third of each group did not do any exercise at all. Of the Turkish and Polish students, 16.9% and 18.1% were overweight, respectively. This difference was found to be statistically significant. Of the Turkish and Polish students, 14.2% and 13.8% were smoking, respectively.

Early menarche was found in 10% of the Turkish students and 8.8% of the Polish students. A family history of breast cancer was reported by 12.6% of the Turkish students and 18.1% of the Polish students. Previous breast problem were reported by 2.6% of the Turkish and 1.3% of the Polish students. Almost all of the students- 99.5% of the Turkish and 98.1% of Polish students- considered BSE to be required. Of the Turkish students, 97.9% knew about, and 72.1% were applying BSE. Of the Polish students, 84.4% knew about, and 48.1% were applying BSE. The difference between the Turkish and Polish students in knowing about and applying BSE was found to be significant. No difference was found between the two student groups in terms of considering mammography to be required. Of Turkish students 81.1%, and of Polish students, 68.1% considered CBE to be required; the difference was significant (Table 1).

Table 1. Characteristics of Turkish and Polish students about early diagnosis of breast cancer

Characteristics	Students				χ^2 ; p
	Turkish n	%	Polish n	%	
Menarche age					
≥11-	19	10.0	14	8.8	3.301; p=0.192
12-14	158	83.2	126	78.8	
≥ 15	13	6.8	20	12.5	
BMI					
Slim	37	19.5	55	34.4	12.292; p=0.006
Medium weight	121	63.7	76	47.5	
Fat	29	15.3	24	15.0	
Overweight	3	1.6	5	3.1	
Breast cancer history in family					
Yes	24	12.6	29	18.1	2.040; p=0.101
No	166	87.4	131	81.9	
Breast problems in the past					
Yes	5	2.6	2	1.3	0.846; p=0.301
No	185	97.4	158	98.8	
BSE requirement					
Required	189	99.5	157	98.1	1.398; p=0.250
Not required	1	0.5	3	1.9	
BSE					
Knows	186	97.9	135	84.4	20.892; p=0.000
Does not know	4	2.1	25	15.6	
BSE					
Does	137	72.1	77	48.1	21.023; p=0.000
Does not do	53	27.9	83	51.9	
Considering mammography to be required					
Required	131	68.9	114	71.3	2.469; p=0.924
Not required	13	6.8	5	3.1	
Required only for women older than 40	46	24.2	41	25.6	
Considering clinical breast examination to be required					
Required	154	81.1	109	68.1	7.771 ; p=0.004
Not required	36	18.9	51	31.9	

BMI: body mass index; BSE: breast self-exam

p<0.05 was considered to be statistically significant.

Of the Turkish students, 78.9% knew about early diagnosis of cervical cancer, 66.3% knew about the recommendation of the Pap smear test, 14.2% knew about the HPV vaccine, and 25.3% knew about safe sexual practice. Of the Polish students, 68.8% knew about early diagnosis

Table 2. Awareness of Turkish and Polish students on the risk factors of breast cancer

Risk factors of breast cancer	Students				χ^2 ; p
	Turkish n	%	Polish n	%	
Being older than 50					
Knows	126	66.3	120	75.0	3.136; p=0.080
Does not know	64	33.7	40	25.0	
Not doing exercise					
Knows	76	40	3	1.9	72.238; p=0.000
Does not know	114	60	157	98.1	
A diet rich in fat					
Knows	118	62.1	36	22.5	55.293; p=0.000
Does not know	72	37.9	124	77.5	
Overweight					
Knows	99	52.1	53	33.1	12.736; p=0.000
Does not know	91	47.9	107	66.9	
Using oral contraceptive					
Knows	105	55.3	114	71.2	9.479; p=0.003
Does not know	85	44.7	46	28.8	
First pregnancy at an advanced age					
Knows	143	75.3	46	28.8	75.649 ; p=0.000
Does not know	47	24.7	114	71.2	
No pregnancy					
Knows	162	85.3	26	16.3	166.392; p=0.000
Does not know	28	14.2	134	83.8	

BMI: body mass index; BSE: breast self-exam

p<0.05 was considered to be statistically significant.

of cervical cancer, 41.9% knew about the Pap smear test, 20% knew about the HPV vaccine, and 15.6% knew about safe sexual practice.

Table 2 shows the awareness of the students of the risk factors of breast cancer. Of the Turkish students, 66.3%, and of Polish students, 75% knew age to be among the risk factors for breast cancer, and this difference was not significant. Of the other risk factors, a significantly higher number of Turkish students knew a high-fat diet, being overweight, first childbirth at an advanced age and not having given birth, while a higher number of Polish students knew using oral contraceptive was a risk factor.

Of the risk factors for cervical cancer, a higher number of Turkish students knew a history of cancer in the family, HPV, smoking, immunodeficiency, being overweight, insufficient consumption of fruit and vegetables, three or more full-term pregnancies, first pregnancy at an advanced age, and poverty as risk factors, and the difference was significant. A greater number of Polish students only knew using oral contraceptive was a risk factor; however, the difference was not statistically significant (Table 3).

Table 3. Awareness of Turkish and Polish Students on the Risk Factors of Cervical Cancer

Risk factors of cervical cancer	Students				x ² ; p
	Turkish n	%	Polish n	%	
Cervical cancer in family					
Knows	170	89.5	129	80.6	5.463; p=0.023
Does not know	20	10.5	31	19.4	
HPV					
Knows	161	84.7	111	69.4	11.835; p=0.001
Does not know	29	15.3	49	30.6	
Smoking					
Knows	126	66.3	42	26.3	55.861; p=0.000
Does not know	64	33.7	118	73.8	
Immunodeficiency					
Knows	85	44.7	54	33.8	4.379; p=0.038
Does not know	105	55.3	106	66.3	
Fungal infection					
Knows	79	41.6	51	31.9	3.503; p=0.075
Does not know	111	58.4	109	68.1	
Overweight					
Knows	71	37.4	30	18.8	14.666; p=0.000
Does not know	119	62.6	130	81.3	
Insufficient consumption of fruits and vegetables					
Knows	60	31.6	1260	31.67.5	30.820; p=0.000
Does not know	130	68.4	14860	31.692.5	
Oral contraceptives					
Knows	72	37.9	79	49.4	4.667; p=0.390
Does not know	118	62.1	81	50.6	
Intrauterine tool					
Knows	78	41.1	51	31.9	3.144; p=0.950
Does not know	112	58.9	109	68.1	
3+ full-term pregnancy					
Knows	67	35.3	13	8.1	36.278; p=0.000
Does not know	123	64.7	147	91.9	
First pregnancy at an early age					
Knows	108	56.8	10	6.3	99.480; p=0.000
Does not know	82	43.2	150	93.8	
Poverty					
Knows	69	36.3	12	7.5	40.548; p=0.000
Does not know	121	63.7	148	92.5	
HPV: human papilloma virus					

HPV: human papilloma virus

Discussion and Conclusion

Cancer is mostly observed in females at advanced ages; however, students are also at risk, and evidence has been found showing that the rate of mortality due to late diagnosis of breast cancer is very high (17). Therefore awareness should be raised in young females and they should be encouraged to acquire the health habits to facilitate early diagnosis of breast cancer (18, 19).

Another type of cancer that can be prevented by early diagnosis is cervical cancer. Because cervical cancer has a long pre-invasive process, the Pap smear screening test can detect cervical cancer with up to 90% or 95% accuracy before it is clinically diagnosed (11).

While some of the risk factors of breast cancer cannot be changed, obesity and physical inactivity can easily be changed. Obesity is considered as a risk factor in breast cancer, and exercising acts as a protective practice. This study showed that 16.9% of the Turkish and 18.1% of the Polish students were overweight, and this difference was significant; and that approximately one-third of the students in both groups were not doing any exercise at all. Another study conducted in Poland with university students showed that only 4.7% of the students were doing exercise (16). However, the emphasis on the effects of obesity and physical activity on health raises the expectation that awareness will become high on this subject. In the present study, 14.2% of the Turkish and 13.8% of the Polish students were smoking. Książek et al. (16) found in their study conducted in Poland with 168 university students that 66.4% of the students had quit smoking for their health and 44.5% did not drink alcohol (16).

Early menarche was found in 10% of Turkish students and 8.8% of Polish students. Of the Turkish students, 12.6%, and of the Polish students, 18.1% had a history of breast cancer in their family; and 2.6% of the Turkish and 1.3% of the Polish students had had breast problems in the past. A study conducted in Poland with university students reported that 4.4% of the students had a history of breast cancer in their family (16), and a study conducted in Malaysia with 237 female students found that 20.7% of them had a history of breast cancer in their family (20).

Breast Self-Exam is an important protective application for early diagnosis of breast cancer, and may be especially helpful for early diagnosis of malignancies in young females who are not appropriate for mammographic screening (16). The American Cancer Society recommends informing young women about the benefits and limitations of BSE by the age of 20, explaining the importance of consulting healthcare personnel when an abnormal change is observed, and instructing the examination technique to the women who want to apply BSE (9, 16, 21). In this study, almost all of Turkish and Polish students considered BSE to be necessary and knew how to apply it. However, the rates of the students applying BSE were low in both Turkish (72.1%) and Polish (48.1%) students, and lower in the Polish students than Turkish students ($p<0.05$). Various studies have emphasised that university students were not applying BSE sufficiently. A research on the awareness of 355 college and 132 high school students in Midwestern America on breast cancer reported that their awareness was insufficient; 66% of the college students and 40% of the high school students had been educated on how to apply BSE, but only half of them were doing it frequently enough (19). Akhtari-Zavare et al. (20) found that the rate of applying BSE was

low in female students (36.7%). The findings are similar in the studies of Sönmez et al. (22) conducted with 334 females (33.2%), and the study of Karayurt et al. (23) (27%). Książek et al. (16) reported that 26.9% of the students knew that regular BSE is required; 25% were applying BSE regularly; and those who did not know the necessity of BSE were not applying it.

Clinical Breast Examination should be done as part of a periodical health examination once in every three years between the ages of 20 and 39, and once a year after the age of 40 (9, 21). The rate of Turkish students who knew the necessity of CBE was higher than the rate of Polish students in the present study. Turkish students knew the necessity of CBE better; however, Polish students were more successful in having CBE. The difference between the two groups in having CBE may be caused by the different cultural approaches in these two countries to the health examination of females. Sociocultural factors affect the behaviours for early diagnosis of breast cancer and maintaining them (10, 24). Knowing the effect of the females' culture on their behaviours around early diagnosis is important in teaching and adopting the practices of early diagnosis (10, 25).

Of the risk factors for breast cancer, a significantly higher number of Turkish students knew a high-fat diet, obesity, first childbirth at an advanced age, and never having given birth while a higher number of Polish students knew using oral contraceptive was a risk factor. Książek et al. (16) emphasized that the students considered oral contraceptives to cause breast cancer.

Cervical cancer is the fourth most common type of cancer in the world. It is emphasized that HPV vaccination is required together with community-oriented early diagnosis practices organised at national level to prevent this type of cancer (13, 21). The Pap smear screening test detects cervical cancer with up to 90% or 95% accuracy before it is clinically diagnosed (11). The incidence of invasive cervical cancer has decreased since the Pap smear test became common (11, 21). A study in Turkey reported that 77.9% of girls older than 15 had never undergone a smear test (3). A study conducted in India on the awareness of 102 nursing students aged between 17 and 20 about cervical cancer found that 30% of the students knew about cervical cancer, 30.8% knew about the preventive inoculation, 30% knew about the existence of a screening method, and 17.5% knew about the Pap smear test (26). In the present study, of the Turkish students, 78.9% knew about early diagnosis of cervical cancer, 66.3% knew about the smear test, 14.2% knew about the HPV vaccine, and 25.3% knew about safe sexual practices. On the other hand, of the Polish students, 68.8% knew about early diagnosis of cervical cancer, 41.9% knew about the smear test, 20% knew about the HPV vaccine, and 15.6% knew about safe sexual practices. Of the risk factors of cervical cancer, a higher number of Turkish students knew a history of cancer in family, HPV, smoking, immunodeficiency, being overweight, insufficient consumption of fruit and vegetables, three or more full-term pregnancies, first pregnancy at an advanced age, and poverty. Of the Polish students only a higher number knew using oral contraceptive as a risk factor; however, the difference was not statistically significant. Tang et al.'s (27) study showed that cultural differences were evaluated for breast and cervical cancer screening. Lee and Lee (28) showed that immigrant young women had limited cervical cancer knowledge and culture-specific barriers. These results were similar to this study. Culture is very important issue for cancer screening. For this reason, this study results can be caused from these cultural differences.

Study limitations;

This study was limited by a small convenience sample, self-selection, and two countries; therefore, findings only can be generalized to only these students.

Conclusions and Recommendations

In conclusion, the awareness about breast cancer and cervical cancer of the students in this study is insufficient and should be raised. University students receiving health education will both manage their own health and be responsible for providing their community with health-care. It is important for nursing students to inform their society, particularly the people at risk, about early diagnosis and to provide them with health counselling. These students should be informed about their responsibilities on this topic during their education, and be raised to be well-equipped and to acquire the expected behaviours. Students should also be made aware of taking the required steps while they are healthy, and encouraged to be active rather than passive in promoting health. This is required both for their profession and care of their own health. It should particularly be noted that it can have a positive effect on healthcare if the practices about early diagnosis of cancer for health professionals in different cultures have a universal content.

Clinical Effect;

This research includes intercultural aspects for breast and cervical cancer screening of university students in both countries. Oncology researchers can use these results for their studies. Breast and cervical cancer awareness education can add to nursing education programmes in both countries.

Ethics Committee Approval: Authors declared that the research was conducted according to the principles of the World Medical Association Declaration of Helsinki "Ethical Principles for Medical Research Involving Human Subjects", (amended in October 2013).

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

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Early Diagnosis of Lymphedema after Breast Cancer Treatment: Bio-Impedance Spectroscopy

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ABSTRACT

Objective: Breast cancer-related lymphedema is an important health problem. The aim of this study is to ensure early diagnosis of patients at risk of developing lymphedema and revealing the predisposing factors.

Materials and Methods: Measurements in the pre-operative period and in postoperative months 3, 6, 9 and 12 and years 2 and 3 were performed prospectively with bio-impedance spectroscopy for patients treated for breast cancer between November, 2013 and November, 2016. Demographic and clinical-pathological data of the patients were investigated to assess the factors that affect the development of lymphedema.

Results: 245 measurements were obtained from the 67 patients who participated in the study.

18 (26.8%) patients were diagnosed with lymphedema and 16 (89%) of these patients were clinically diagnosed with stage 0 and 2 (1%) patients with stage 1 lymphedema. The median age was 50.7

(32-77) years. Performing axillary dissection and positivity in more than 3 nodes were found to be statistically significant with a percentage of 63.3% (n=15) and 64.7% (n=11) p=0.049 and p<0.001, respectively.

Conclusion: Periodic measurements with bio impedance spectroscopy can be an effective method to diagnose early stage lymphedema after breast cancer, and enable selecting the group of patients who would benefit from early treatment.

Keywords: Lymphedema, early diagnosis, breast cancer, bio-impedance spectroscopy

Introduction

Lymphedema is a condition which is characterized by the generalized or regional accumulation of protein-rich interstitial fluid in the soft tissue as a result of the disturbance of lymphatic circulation due to certain congenital and acquired reasons. The most frequent reason for secondary lymphedema in the upper and lower extremities is cancer-related lymphedema (1).

Among patients receiving primary treatment for breast cancer, nearly one million patients globally fight the problem of lymphedema (2). The symptoms of breast cancer-related lymphedema (BCRL) may emerge at any time following surgery. BCRL generally starts in a stealthy way without any specific reasons. Patients may have symptoms such as swelling, painfulness, tightness of jewelry like rings and bracelets or garments, tingling and fatigue. Damage that occurs on the skin and lymphatic vessels caused by chronic inflammation, infection, minor traumas and fibrosis may cause lymphedema to progress. The initial changes in soft tissue are reversible; however, irreversible, permanent sequel and fibrosis may develop in advanced stages (3).

It is difficult to identify the actual incidence of BCRL due to differences in the diagnostic and measurement methods and follow-up periods (1, 2, 4). The lack of a standard in measurement standards and differences of approach among centers are some of the difficulties experienced in approaching lymphedema. Since there are no well-designed and sufficient randomized studies, there is no consensus on the appropriate treatment for lymphedema (5, 6).

When lymphedema becomes clinically significant, the difference between the two arms may be assessed using traditional methods such as measuring the arm diameter with a meter or volume measurement by water displacement test. However, the fact that these

measurements are not standard (measurement points may change at every examination), interpersonal measurement differences and limited effectiveness at the early stage are the disadvantages for these methods (5). Early diagnosis before the development of clinical signs and early start of therapy for the patients may prevent lymphedema from progressing to further stages irrevocably. For that reason, it is of critical importance to recognize the group of patients that may develop lymphedema in advance. The method of bio-impedance spectroscopy (BIS) developed by Cornish et al. (7) in recent years enables precise measurement of any changes in the extracellular fluid and numerical assessment of the difference between the arms through a direct measurement of the electrical resistance of the extracellular fluid in the soft tissue of the arm, thereby making it possible to make a diagnosis of lymphedema before clinical signs occur, which are expressed as Stage 0. It has been reported that objective comparison can be made at follow-ups and the patients' clinical progress can be monitored by performing regular measurements and analyzing the numerical values obtained (7-11).

This study is aimed at assessing the effectiveness of prospectively applied BIS monitoring in identifying subclinical lymphedema, recognizing the patients that have a risk of developing lymphedema in advance and demonstrating the predisposing factors.

Materials and Methods

Ondokuz Mayıs University Ethics Committee approval and patient consents were obtained. Patients were scheduled for follow-up via arm measurements following breast cancer treatment using the bio-impedance spectroscopy (L-Dex® U400 ImpediMed, Australia) device. Regarding the measurement protocol, measurements were scheduled to be made in the preoperative period and in postoperative months 3, 6, 9 and 12 followed by annual measurements. Those with a postoperative L-Dex score below 10 units and with more than 7 units of difference between the preoperative measurement and follow-up measurements despite the score being in normal limits were considered to have Stage 0 lymphatic edema and were planned to be included in the early treatment program. In order to assess the factors that influence lymphedema development, the demographic and clinical-pathological data of the patients; age, dominant arm, disease side, breast and axilla surgery, radiotherapy (RT) and the side receiving it, the total number of excised lymph nodes, additional diseases and association with the tumor stage were investigated.

Statistical Analysis

The Statistical Package for the Social Sciences (SPSS Inc.; Chicago, IL, USA) 18.0 program was used for statistical analyses. The data were demonstrated including the arithmetic average $\pm$ standard deviation (AO $\pm$ SS), median (minimum-maximum) and frequency (%). The Shapiro-Wilk test was used in order to analyze the normal distribution of results pertaining to quantitative data. For comparing the two independent groups, the Student t-test was used for data with normal distribution and Mann-Whitney U test was used for data without a normal distribution. The frequencies were compared using the Continuous corrected chi-squared, Pearson chi-squared and Fisher Exact test. The statistical significance level was accepted as $p < 0.05$.

Table 1. L-Dex scores obtained in patient follow-ups

		Lymphedema		
	Follow-up period	Number of patients (n%)	L-Dex score >10 (n%)	L-Dex score increase >7 (n%)
245				
Follow-ups	Month 3	5 (7.4)	-	
	Month 6	9 (13.4)	4	
	Month 9	13 (19.4)	2	2
	Month 12	19 (28.3)	4	
	Year 2	9 (13.4)	2	
	Year 3	12 (17.9)	3	1
	Total: 67 (100%)		15 (22%)	3 (4.4%) 18 in total (26.8%)

Table 2. Relationship between age, body mass index, history of hormone use, tumor size and lymphedema in patients

	Description	Average	SD	Median	min-max	p
Age	No lymphedema	50.9	10.3	53	32-77	0.717
	Lymphedema	49.9	11.5	46.5	32-76	
	In the entire group	50.6	10.6	51	32-77	
BMI	No lymphedema	28	4.9	28	19-42	0.837
	Lymphedema	28	5.1	26.5	20-42	
	In the entire group	28.2	4.9	28	19-42	
Hormone therapy	No lymphedema	2.43			0-60	0.546
	Lymphedema	5.67			0-72	
	In the entire group	3.3				
Tumor size	No lymphedema	13.86	9.7	13	1-35	0.547
	Lymphedema	12.1	7.4	13	1-28	
	In the entire group	13	9.1	13	1-35	

SD: standard deviation, BMI: body mass index; min: minimum; max: maximum

Results

In order to provide the preliminary results in the third year of the study, the assessment on follow-ups performed between November, 2013 and November, 2016 excluded 4 patients since they lacked follow-up and 1 patient due to exitus out of the 72 patients that were treated for breast cancer and took part in the study. In 245 measurements taken from 67 patients, the number of patients diagnosed with lymphedema was 18 (26.8%); in 15 (22%) patients, the L-Dex score was above 10 units and in 3 (4.4%) patients, the difference between follow-up measurements was more than 7 units (Table 1). Among these patients, 16 (89%) were diagnosed with Stage 0 lymphedema, 2 (1%) patients developed clinically significant Stage 1 lymphedema and the difference between the arms was 2 and 2.5 cm in arm circumference measurements. The patients' median age

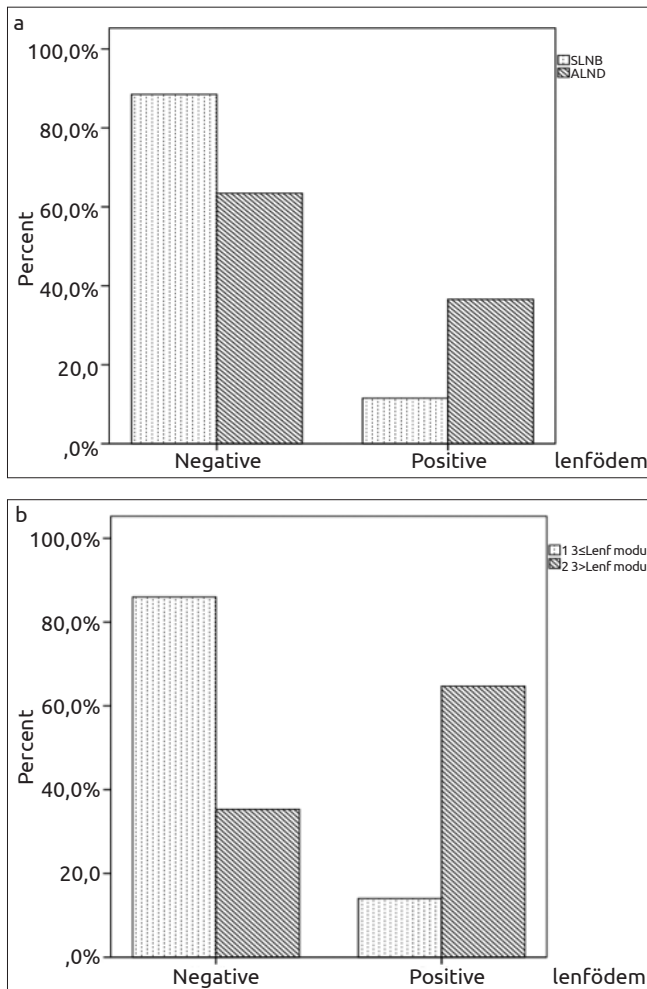


Figure 1. a, b. Relationship between axillary dissection and lymphedema; Relationship between more than 3 positive lymph nodes in the axilla and lymphedema.

was 50.67 (32-77) (Table 2). In the patients, the dominant arm was the right one with 87% (n=58) and the diseased side was the left side with 79% (n=53) and no differences were identified in terms of lymphedema ($p=1.0$). Additional diseases [diabetes mellitus (5; 7.5%), hypertension (7, 10.4%), coronary artery disease (4, 6%), rheumatoid disease (4, 6%) and chronic obstructive pulmonary disease (4, 6%)] were present in 30% (n=20) of the patients. The ratio of patients receiving neo-adjuvant chemotherapy was 10.4% (n=7) and its effect on lymphedema was not identified ($p=0.375$). Among the patients that developed lymphedema, the effect of age, body mass index, tumor size, tumor type, stage, grade and hormone receptor status was not found to be significant (Tables 2 and 3). Among the surgeries performed on breast, the ratio of breast-conserving surgery was 66% (n=44) and mastectomy $\pm$ reconstruction rate 34% (n=23) and no significant differences were seen in terms of their effect on lymphedema ($p=0.178$). However, when comparison with sentinel lymph node biopsy (SLNB) was made with respect to surgery on the axillary side, lymphedema was 36.6% (n=15) in those that received axillary dissection (AD) while it was identified to be 11.5% (n=3) following SLNB and the difference was found statistically significant ($p=0.049$). Additionally, positivity of more than 3 lymph nodes (n=11, 64.7%) was another factor found to be associated with lymphedema ($p<0.001$) (Figure 1a, b) (Table 3). While the rate of

Table 3. Effect of demographic, clinical and pathological characteristics of patients and treatment practices on lymphedema

	n	%	Lymphedema	%	p
Profession	9	13.4	3	16.7	0.693
Dominant arm, right	58	87	16	27.6	1
Diseased side, left	53	79	14	26.4	1
Additional disease:					
DM, HT, CAD, COPD, RD	20	30	2	11.2	0.276
NCT	7	10.4	1	5.6	0.665
Pathology IDC	58	86.6			0.684
ILC	4	6	15	83.3	
Mixed	4	6	2	11.1	
Medullary	1	1.5	1	5.6	
Grade 1	6	9			0.351
Grade 2	39	58.2	11	61.1	
Grade 3	22	32.8	7	38.9	
ER (+)	49	73	11	61.1	0.219
PR (+)	42	62.7	7	38.9	0.031
HER2 (+)	10	14.9	3	16.7	1
BCS	44	65.7	9	50	0.178
MRM	18	26.9	6	33.3	
MRM + Reconstruction	5	7.5	3	16.7	
ALND	41	61	15	36.6	0.049
SLNB	26	39	3	11.5	
More than 3 positive LNs	17	25	11	64.7	0.001
Stage 1a	12	17.9	2	11.1	0.459
1b	10	14.9	3	16.7	
2a	12	17.9	4	22.2	
2b	26	38.8	6	33.3	
3a	5	7.5	3	16.7	
3b	2	3			
RT lymphatic	46	68	14	30.4	0.498
10 or more LNs in total	45	67	15	33	0.157

DM: diabetes mellitus; HT: hypertension; CAD: coronary artery disease; COPD: chronic obstructive pulmonary disease; RD: rheumatoid disease NCT: neo-adjuvant chemotherapy; IDC: invasive ductal carcinoma; ILC: invasive lobular carcinoma; ER: estrogen receptor; PR: progesterone receptor;

HER-2: human epidermal growth factor-2; BCS: breast-conserving surgery; MRM: modified radical mastectomy; ALND: axillary lymph node dissection; SLNB: sentinel lymph node biopsy; LN: lymph node

treatment involving lymphatics in the radiotherapy field was 68% (n=46), its effect was not found to be statistically significant in terms of lymphedema ($p=0.498$).

Discussion and Conclusion

On average, one fourth of patients receiving treatment for breast cancer develop lymphedema with the highest frequency being in the first 18 months following treatment (1-6). In addition to the burden caused by cancer diagnosis following breast cancer treatment, the physical limitation of the arm due to lymphedema and the resulting social limitation, labor loss of patients, body image-related worry, anxiety depression and adaptation problems, social and sexual problems put the patients in a difficult condition in their professional and private lives. Therefore, the problem of lymphedema should be importantly taken into consideration in the group of patients diagnosed with breast cancer as an important social problem (5, 6).

Lymphedema was reported in the literature with difference rates of incidence such as 6-30% and 6-62.5% (4, 6, 12-15). Since the standards for evaluation are not consistent, there is no consensus on the actual incidence rate. However, it is most frequently reported as being 30% on average (1-4, 15). As a result of our study, the cumulative incidence was 26.8%, which was found to be consistent with the literature.

It has been demonstrated that the treatment methods applied for breast cancer are generally associated with lymphedema development; there is evidence in the literature that it generally occurs as a result of axillary lymph node dissection and/or axillary radiotherapy resulting in deterioration of the lymphatic in the upper extremity and it has been shown that preserving axillary surgeries such as sentinel SLNB reduce the risk (1, 2, 5, 9, 10, 16, 17). Among the factors influencing BCRL, performing dissection on the axilla was demonstrated as a reason contributing to the development of lymphedema in our study. Lymphatics were included in the radiotherapy treatment field at a high rate of 68% (n=46), however, no statistically significant result was obtained that it increased lymphedema (p=0.498). Coen et al. (16) identified in their series of 727 patients that BCRL incidence was 2% with tangential radiation and 9% with lymphatic radiation as a result of 10 years of radiotherapy in the entire breast. Jose' Luiz B. Bevilacqua et al. (15) and Bergmann et al. (17) reported in their studies that BMI, RT, post-operative seroma, age and chemotherapy on the same arm were independent factors associated with lymphedema. However, no relationship was identified in our study between age and BMI and lymphedema with p=0.717 and p=0.837, respectively.

Early diagnosis of lymphedema, i.e., its identification before it becomes clinically recognizable, enables the treatment to be started earlier and measures to be taken more effectively. Only this can make it possible to keep lymphedema under control before it results in sequelae, fibrosis and limitation (7, 10). From an economic point of view, the treatments and preventive services provided when lymphedema is at earlier stages (bandage, massage, exercise) are both more cost-efficient and promising in terms of treatment efficacy as compared to the treatment methods applied when advanced lymphedema develops (pumps applying pressurized massage, surgical procedures) (5, 9, 10). Lacomba et al. (18) reported in their study that early physiotherapy was effective in preventing lymphedema although it was not cost-efficient to include all the patients in the exercise program. For that reason, selection of patients with a high risk for developing lymphedema who would benefit from treatment becomes important (19).

BIS offers the advantage of identifying lymphedema as early as 4 months in advance as it provides more precise and standardized measurements as compared to conventional measurement methods (7,

10). This way, it may become possible to reduce long-term morbidity related to lymphedema. Soran et al. performed monitoring with BIS in their study where they were able to detect subclinical lymphedema with early diagnosis, made 28 (38.9%) subclinical lymphedema diagnoses in their series of 180 patients and managed to reduce clinical lymphedema incidence from 36.4% to 4.4% with early treatment (10).

Although the strength of our study is that it is a prospective and observational study, its limitations include the currently low number of patients and the lack of randomization possibility. The predisposing factors for lymphedema can be demonstrated more clearly in a larger patient group and with a longer follow-up period.

In conclusion, lack of standard diagnostic and treatment methods not only lead to difficulties in correctly identifying the incidence of lymphedema but also constitute an obstacle to creating a universal approach. However, the fact that awareness of lymphedema has been rising in recent years and early diagnosis may increase the success of preventive and treatment practices is promising. In the light of our knowledge, the first measures to be taken may include performing lymphatic-sparing surgeries in the axilla as part of breast cancer treatment based on the evidence that it increases the risk for lymphedema and avoiding wide dissections unless it is required for oncological reasons. The objective should be to evaluate lymphedema with an accurate and standard method in order to identify patients with high risk for lymphedema among those receiving treatment for breast cancer at an early stage, monitor them closely and to treat patients at an early stage before any clinical signs develop. BIS monitoring may provide the means to determine the group of patients that may benefit from treatment based on early diagnosis.

Ethics Committee Approval: Ethics committee approval was received for this study from Ondokuz Mayıs University.

Informed Consent: Informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

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Somatic Cell Count: A Human Breast Wellbeing Indicator

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ABSTRACT

Objective: Human milk is universally accounted as the preeminent source of nutrition for infants. Surprisingly, no approved diagnostic tests are available for the diagnosis of physical condition of the breast. Somatic cell count (SCC) is a key tool commonly used in the dairy industry to provide evidence of udder health, which in turn determines the quality of bovine and cattle milk. Elevated levels of somatic cells in milk are observed during intra-mammary infectious state in bovine animals, which is due to active participation of the immune system. This constraint in humans can principally be used to study breast health.

Materials and Methods: In the present study, 176 breast milk samples in total were randomly collected from four different regions of Gujarat, India. All the samples were subjected to somatic cell count and total bacterial count tests. The effect of geographical region and maternal health was studied on the basis of milk SCC and total bacterial load. Statistical interpretation of the results was done using PRISM 6.07.

Results: Breast showing clinical symptoms of mastitis yielded a high SCC ($>10^4$ cells/microliter (μL)) and bacterial count (between 10^5 to 10^{11} Colony Forming Unit (CFU)/milliliter (mL)) in comparison to milk collected from healthy breast ($<10^4$ cells/ μL and 10^3 to 10^4 CFU/mL). Statistical analysis reveals existence of significant correlation between the geographical region and SCC count of milk collected from healthy breast whereas no correlation was observed in infected breast milk. The study has also demonstrated that a linear correlation exists between SCC and abundance of bacteria present in breast milk.

Conclusion: The present study could be employed to predict lactating breast health.

Keywords: Breast milk, breast health, colony forming unit, somatic cell count

Introduction

Human milk is a dynamic and bioactive fluid, which undergoes changes in composition, i.e., from colostrum to late lactation, and also varies from mother to mother (1). Remarkably, the lactating mother breast is one of the metabolically important organs for which no medical tests exist to prove its health status. Milk consists of somatic cells that are 75% leukocytes, i.e., neutrophils, erythrocytes, macrophages, lymphocytes and 25% epithelial cells. During intra-mammary infection, a significant increase in total SCC is observed where mostly epithelial cells and white blood cells are present in large numbers. It is also observed that the cell count increases whenever the mammary glands are injured.

The white blood cells play a fundamental role in the immune system. They are considered as a defending element, which fights against infection and are actively involved in the repair of damaged tissue. During inflammation, a considerable number of neutrophils is reported in the milk, i.e., accounting for more than 90% of the total SCC (2). Alteration in neutrophil count is also dependent on the lactational stages and breast health in addition to the prevalence of pathogens (3-5). Recent studies illustrate that increase in a number of leukocytes and macrophage is directly associated with breast infection and that their number decreases significantly upon recovery (6, 7). This means that the amount of cellular constituent in milk foretells the health of a mammary gland. Also, to some extent, infants' respiratory or gastrointestinal infection contribute to the transmission of infection to the mother, thereby increasing the number of somatic cells and other immuno-components that fight against infection (6, 8).

Epithelial cells are the chief structural and functional constituents of the breast, constituting 99% of the cellular component of breast milk (7, 8). Mammary epithelial cells (MEC), which are milk-secreting cells of the mammary gland, play a unique functional role within the breast tissue.

Table 1. Distribution of sample collection according to city and number

Sr. no.	City name	Community	Latitude and longitude	No. of samples collection	
				Healthy breast milk	Infected breast milk
1	Anand	Urban	22.5645° N, 72.9289° E	22	22
2	Chikhli	Rural	20.7579° N, 73.0632° E	22	22
3	Valsad	Rural	20.4925° N, 73.1350° E	22	22
4	Dharpur	Rural	20.5401° N, 73.1792° E	22	22

While most epithelial layers in the body serve a protective function, MECs selectively take up components of the plasma and manufacture constituents of breast milk to secrete a nutritive and immune-factor-rich fluid providing defense against any type of inflammation or infection (9).

At the early stages of infection, the predominant defense strategy that is rapidly induced is the innate immune response. This response is ubiquitous, short-acting and targets a range of microorganisms (3, 10, 11). Cells participating in innate response are the infiltrated neutrophils and macrophages; these are the cells which are recruited at the site of inflammation (12). Series of specific and nonspecific events occur, which involve the participation of cytokines and chemokines secreted by neutrophils and macrophages leading to the eradication of antigens (13, 14).

However, little is known about the factors involved in this rapid recruitment at the site of infection. Thus, the need arises to study the MECs, which are the primary cells that encounter the antigens invading a lactating breast. There is abundant evidence the demonstrating prominent role of MECs during initiation of innate immune response through triggering neutrophil infiltration and activation of innate immune cells leading to increase in milk SCC (8, 15).

Thus, the objective of the present study was to confirm the significant association among SCC, bacterial count and influences of geographical location on lactating mother. The study will help conduct research into lactating breast health.

Materials and Methods

Study Population

Volunteers, lactating mothers aged between 20 to 30 years, were selected for the collection of milk with their prior consent. In total, 176 milk samples (88 from healthy breast milk and 88 from infected breast milk) were collected between postpartum days 15 and 90. Details of lactating mothers who participated in the study as sorted by geographical regions are given in (Table 1) The volunteers belonging to the same geographical area were placed in one group. Expertise of an experienced gynecologist was used to differentiate between healthy and infected breasts. Written consent forms were obtained from by all volunteer mothers that narrated history of health status, mode of delivery, medication and recurrent symptoms in case of an infected mother. All the infected mother that were selected for the study had common symptoms like breast engorgement, fever, redness on the breast, pus draining from the nipples and all the samples were collected before the administration of any treatment and medication. Also, milk was collected from women 20 to 30 days after the appearance of infection symptoms.

Collection of Samples

Before the collection of milk, mammary areola and nipples were cleaned with soap and sterile water followed by swabbing with sanitizer (Himedia) (16). The first few drops of milk were dis-

carded following the collection of milk in a sterile Falcon tube by manual expression. The collected samples were kept at 4°C until transportation to the laboratory. Human milk sample collection protocol was approved by the human ethics committee (Approval No- IEC-3/GJPIASR/2015-16/E/3).

Examination of Somatic Cells in Breast Milk

A SCC was performed using an electronic somatic cell counter (Foss, Hillerød Denmark).

Bacteriological Analysis of Breast Milk

Milk samples were diluted ten times using water for injection and plated on nutrient agar plate (Himedia), then incubated at 37°C aerobically for 24 hours. Bacteria were quantified based on colony forming unit (CFU).

Statistical Analysis

Experimental data obtained were entered in a spreadsheet and exported to a statistical package (Prism 6.07, GraphPad Software, Inc, San Diego, California, USA) for statistical analysis (17). Student t-test was performed in order to find the relation between SCC of healthy and infected breast milk, followed by analysis of variance (ANOVA) to know the effect of geographical region on SCC of healthy and infected breast milk. Further correlation between SCC and bacterial abundance in the milk was analyzed using paired t-test and linear regression analysis (18).

Results

Effect of Breast Condition in SCC

Intra-mammary health can be foreseen by performing a SCC. SCC represents the most profound and effective way to check the breast health. It reflects the response of the immune system to intra-mammary infection where an increase SCC is observed that is $<10^3$ cells/ μ L (healthy breast) to $>10^4$ cells/ μ L (infected breast) (Figure 1). In this study, we compared the mean SCC between the group of healthy mother's breast milk and the group of infected mother's breast milk using unpaired two tail t-test. The test assumes that variances for the two populations are the same. The t-statistic is 10.3946, which is greater than the t critical value ($t_c = 1.976$) at 174 degrees of freedom. The absolute value of the calculated t exceeds the critical value ($10.3946 > 1.976$); hence, the value of SCC of healthy human milk and infected human milk are significantly different. Using the P-value approach, the corresponding two-tailed p-value was found to be 0.00001, which is less than 0.05 (Table 2). We have concluded that the mean SCC values of healthy mother's breast milk and infected mother's breast milk are different, which reveals that SCC is affected by breast condition. Box plot graphs exemplify the response generated by the whole group based on which we can visualize the range and characteristics of responses for a large group. In our study, SCC in healthy milk was in the range of 16-614 cells/ μ L whereas SCC in infected breast milk was in the range of 572-17588 cells/ μ L.

Table 2. Effect of breast health status on somatic cell count (SCC)

Breast condition	Mean	Variance	Stand. Dev.	N	t-value	Degrees of freedom	Critical value	p (< 0.05)
Healthy breast milk	186.9659	24196.2402	155.5514	88	10.3946	175	1.976	0.00001
Infected breast milk	3604.0909	9485967.8997	3079.9299	88				

Table 3. Correlation between geographical region and somatic cell count of healthy milk by One-way ANOVA test

Group of geographical region	degrees of freedom (DF)	sum of squares (SS)	mean sum of squares (MS)	F-statistic	p (< 0.05)
Within the group	3	1,721,206	20,490.548	6.245	0.001
Between the group	84	383,871.3	127,957.103		
Total	87	2,105,077.3			

DF: degrees of freedom; SS: sum of squares; MS: mean sum of squares

Table 4. Effect of geographical region on somatic cell count of infected mother breast milk by One-way ANOVA test

Group of geographical region	degrees of freedom (DF)	sum of squares (SS)	mean sum of squares (MS)	F-statistic	p
Within the group	3	891,261,311.214	10,610,253.705	0.322	0.809
Between the group	84	10,253,339.151	3,417,779.717		
Total	87	901,514,650.365			

Table 5. Relation between somatic cell count and colony forming unit

p	< 0.0001
Significantly different? (P < 0.05)	Yes
R squared	0.5803
Correlation coefficient (r)	0.9778
R squared= coefficient of determination	

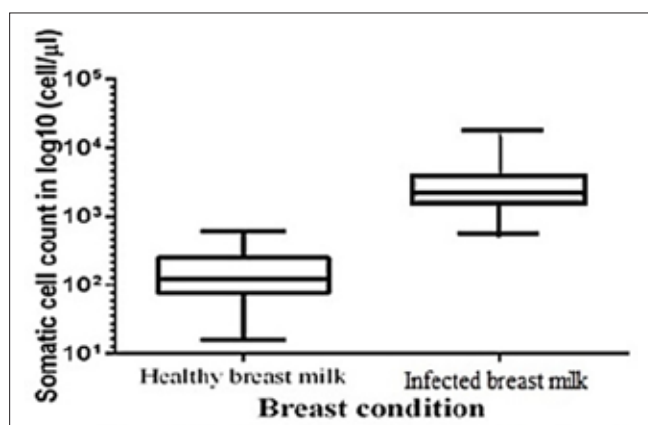


Figure 1. Effect of breast condition on somatic cell count

Correlation Between Geographical Region and Somatic Cell Count of Healthy and Infected Breast Milk Using ANOVA Test

An ANOVA test performed for healthy breast milk revealed that F-statistic (6.245) is greater than the critical value of F (F_c) ($F=6.245 > F_c=2.713$), which meant that SCC of healthy human milk was different when collected from four region. When a P-value analysis approach was adopted, the p-value obtained was 0.0007, which was

less than 0.05 (i.e. degree of freedom). This specifies that the population mean value of SCC for all four regions is not same at the 0.05 significance level (Table 3). Column statistics analysis reveals that the media of all four geographical regions are not closer to one other. Tail of box plot also reveals higher variability in SCC, Chikhli showing extreme variation followed by Valsad and Dharmapur (Figure 2a). Similarly, when a one-way ANOVA test was performed for the infected breast milk, it was observed that F-statistic was 0.322, which was less than F critical value, i.e., 2.713. This indicates that there is no significant difference observed in SCC of infected breast milk collected from four regions. Also, the P value obtained was 0.8094, which was greater than 0.05, indicating that the SCC value was same in all the infected milk samples (Table 4). The media of all four regions were found to be closer to one other after performing column statistics. Also, the box plot showed no significant variability in SCC; however, the sample collected from Dharmapur showed more variability than remaining three regions (Figure 2b). Thus, after performing the statistical analysis of somatic cells collected from infected and healthy human milk, it was observed that geographical regions influenced the SCC values of healthy milk whereas similar type of SCC were observed in the infected milk sample, which did not indicate any significant difference.

Correlation Between Somatic Cell Count And Microbial Abundance (CFU) in Breast Milk

As a purpose of total bacterial count, all the samples were spread on nutrient agar medium. After 24 hours of incubation, CFUs were calculated. Afterwards, the data generated were subjected to a linear correlation analysis. Figure 3 indicates a positive linear relationship that developed between SCC and the total count of microorganisms (Table 5). The numbers of microorganisms were increased by increasing the SCC. In infected breast milk, the CFU increased with a rapid rise in SCC- i.e., from 10^5 to 10^{11} CFU/mL. The abundance of microbes in milk is reflected by the presence of somatic cells in milk. In healthy milk, the total bacterial count was observed to be in the range of $2 \times$

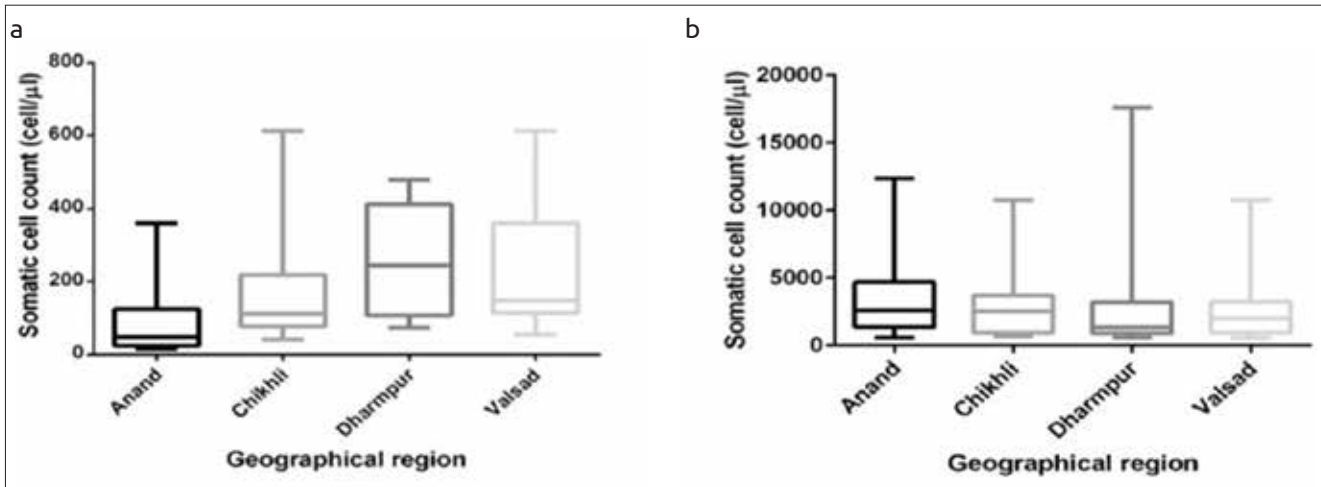


Figure 2. a, b. Effect of geographical region on somatic cell count (a) healthy breast milk and (b) infected breast milk

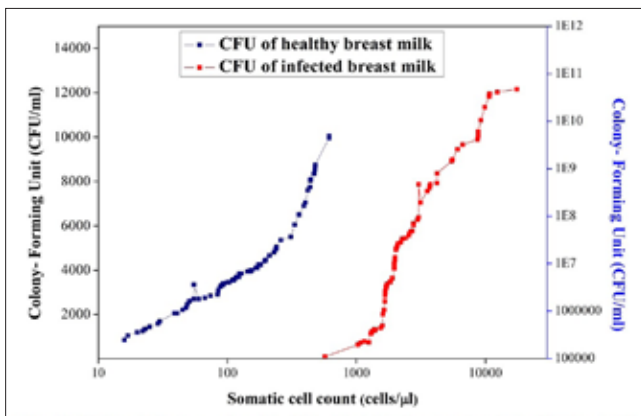


Figure 3. Relation between somatic cells and number of microorganisms in healthy breast milk

10^3 to 1.4×10^4 CFU/mL while CFU increase was in the range of 10^5 to 10^{11} CFU/mL for infected milk. Milk with low SCC reflected good maternal health. Also, Murphy et al. (19), Barbano et al. (20), and Malinowski et al. (21) investigated the relationship between the number of somatic cells and the mastitis causing microbes and reported similar results in this respect.

Discussion

The outcome of this study verifies that infected breast milk shows increased SCC compared to healthy breast (22). At the beginning of an inflammatory incidence, one of the prime responses of the innate immune cascade is to stimulate an influx of immune cells (mainly neutrophils) at the site of infection in the mammary gland (11). The measurement of somatic cells (immune cell) in the milk is normally used in the dairy industry to assess the severity of mammary inflammation. The concentration of cytokine (IL-8) triggers the infiltration of immune cells, which causes increase in the number of immune cells during inflammation observed both in bovine and human milk. The four key points of the inflammatory immune system are: (1) phagocytes and their secreted interferons and cytokines; (2) cell-mediated immunity composed of natural killer cells (NK), T-cells and secreted proteins which regulate, stimulate and inhibit the immune response like interferons and cytokines; (3) humoral immunity containing immunoglobulins, B-cells and plasma cells; (4) the complement cascade. Although discretely deliberated, there are extensive and complex interactions

between the four above-mentioned immunological responses, leading to the development of synchronized and effectual immune response against virtually any human pathogens. A complex series of events occur in the body in response to the entry of antigens and against its specific virulence factors. Because of these defending mechanisms developed by the body, a sudden increase in the SCC is observed at the time of infection (23). In 2013, Hassiotou et al. (7) observed an increase in leucocytes count from 0.7% to 96.3% in infected breast milk and it was already known that somatic cells consisted of 75% leukocytes and 25% epithelial cells (24). As such, it is known that leukocytes play an important role in fighting infection and it is also known that increase in neutrophils is observed during bacterial infection, which is further increased during the inflammatory response causing the invasion of immune cell at the site of entry of the pathogen (7). Thus, leucocytes may cause indirect increase in SCCs. In case of dairy animals, infection of the udder leads to development of the mastitis, which is the second most infectious disease - i.e., next to foot-and-mouth disease. In the present study, it could be clearly observed from Figure 1 that the endpoint (maximum value- 614 cells/μL) of healthy breast milk SCC and starting point (lowest value: 572 cells/μL) of infected breast milk is close to one other. Based on that, we can calculate that 10^3 cells/μL is the count that distinguishes the SCC in healthy and infected breast milk. Healthy subjects in the present study were screened based upon visual signs and symptoms of bacterial infection and the health of the infant was also considered as it may act as a source for the spread of infection to the mother. Clinical signs and symptoms such as breast engorgement, fever, redness on the breast and pus draining from the nipples were taken into consideration while the infected mother was screened (25, 26). According to the International Dairy Federation guideline, animals and their milk are classified as subclinical mastitis, clinical mastitis and non-mastitic (normal) using the SCC threshold of 500 cells/μL, >5000 cells/μL and <200 cells/μL for clinical mastitis (27). In Europe, milk with SCC higher than 400 cells/μL cannot be used for human consumption, whereas the thresholds are 750 cells/μL and 500 cells/μL in the USA and Canada, respectively (28).

Our observations also suggest that the geographical region does not have a significant effect on the SCC of infected breast indicating that a similar type of immune response is generated by the infected mother. A research by Patel et al. (29) reveals the difference in the microbial community observed in infected breast milk and healthy breast milk. When microbes invade the breast, the defense mechanisms become ac-

tivated; however, the level of immunity expresses very strong individuals to individuals. The hypothesis that geographical region has no significant correlations with the SCC of infected breast milk is supported by the ANOVA test. In terms of the geographical regions, Chikhli is classified as a rural area, where 97% rural population lives below the poverty line and is encircled by an unhygienic environment. In addition, Chikhli is the largest taluka of Gujarat state that has a diverse population, where only 53.77% of the females are literate (30). Hence, fostering mothers are less knowledgeable about sustaining hygienic condition, thus increasing the chance of breast infection by microbes leading to increased somatic cell count. Like Chikhli, Valsad also has mix kind of population and the environmental microflora is different due to industrialization. In contrast, Dharmpur is a small taluka typically populated by tribes with the least environmental variation (Figure 2a). Anand, which is a metropolitan town, has a rate of 72% literacy among mothers (30), who are very well aware of hygiene and sanitization. Moreover, Anand has a healthy environment, which in itself reduces the chance of infection.

There is ample evidence which articulates that human milk reflects a diverse and feasible microbial community, although it is secreted by a healthy lactating mother with no signs and symptom of infection or other mammary gland disease. Somehow, variations are observed in the microbial profiling, which may be due to behavioral, environmental or genetic differences or as a consequence of methodological variation (i.e. instrument, time of milk sample collection, maternal physiological and medical history). In 2003, Martin et al. (31) originally isolated lactic acid producing bacteria from healthy human milk. Furthermore, he also studied the abundance of microbes in breast milk collected from urban and rural habitats, which was 10^1 CFU/mL and 10^4 CFU/mL, respectively (31). On the other hand, to explore the healthy milk bacteria, a metagenomics approach was used by Hunt et al. The study reveals that the microbial abundance in healthy milk not only consist results healthy bacteria but also opportunistic microbes like *Pseudomonas*, *Staphylococcus*, *Corynebacterium*, *Streptococcus*, *Serratia*, *Sphingomonas*, *Ralstonia*, *Bradyrhizobium* that may be contributing to the development of minor immune response where the SCC count of $\log 10^4$ cells/ μ L can be observed (32). The paired t-test analysis of somatic cells and total bacterial counts of the same individual produces a positive linear correlation when elucidated, which suggests that SCC is amplified in parallel with increased microbial community in healthy human milk. The culture-dependent analysis of Indian infected mother breast milk is reported to be 5.0×10^8 CFU/mL on average (29). In 2015, Jimenez et al., (33) reported shotgun sequencing of 10 healthy and 10 mastitic breast milk samples, which revealed that microbial abundance in mastitis-infected mother was higher than that of the healthy lactating mother. Thus, based on culture-dependent and independent studies, it can be concluded that an infected mother has high abundance of bacteria resulting in high CFU/mL and the amount of somatic cell is also higher as a result of an action by the immune system. Therefore, SCC and CFU counts can be effectively used to predict lactating breast health.

Conclusion

It has long been known that human milk consists of maternal cells; however, less well-studied points include the number of somatic cells, their importance for the mother and infant as well as any factors affecting them. Naturally, it is believed that breast milk has immune cells and epithelial cells. In an effort to shed light on breast milk, we studied a population of breastfeeding mothers from four different regions hav-

ing healthy and infected breast conditions. Statistical results reveal that intra-mammary infection causes significant increases in total SCC in human milk. The present study reveals that the correlation between the SCC and bacterial counts gradually increase in the SCC observed during breast infection. The importance of the current study cannot be neglected as breast infection during lactation is found to be more common with the subsequent development of mastitis. Early diagnosis is expected to be instrumental in effective treatment, thus allowing for a longer duration of breastfeeding and confirming the healthiest initiation for the infant along with multidimensional benefits to the mother. In the present study, statistical analysis reveals that mothers from urban regions have lower counts of somatic cells as compared to mothers from rural areas as they are more conscious about hygiene and also consume healthy food. Also, the geographical region shows a significant correlation with the SCC in a healthy mother; however, in case of an infected mother, no such correlation was observed due to the prevalence of a similar type of pathogen. Also, if breast infection is identified during the initial course, then the consequences could be overcome without precluding lactation and transmission of the disease can also be prevented. Our data emphasize that somatic cells are used as a diagnostic tool for the preliminary assessment of lactating breast health status, which could play a significant role for health in later stages of life.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Govindbhai Jorabhai Patel Ayurveda College and Surajben Govindbhai Patel Ayurveda Hospital (Approval No- IEC-3/GJPIASR/2015-16/E/39).

Informed Consent: Informed consent was obtained from patients who participated in this study.

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The Impact of Lifestyle Interventions in Breast Cancer Women after Completion of Primary Therapy: A Randomized Study

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ABSTRACT

Objective: Many breast cancer survivors have unmet physical and psychological needs. Therefore, current study aimed to evaluate the impact of a lifestyle interventions program on fatigue, quality of sleep, quality of life (QoL), and body mass index (BMI) in women with breast cancer.

Materials and Methods: This randomized controlled trial study (RCT) was carried between 2012 and 2015, and included 80 women with breast cancer. They were divided into two groups via a random allocation process: 40 women were allocated to the lifestyle interventions group, and 40 to the control group. Women in the lifestyle group received dietary energy-restriction training and practiced supervised aerobic exercises for 45-60 minutes three times per week throughout 24 weeks and the control group continued their routine life.

Results: Differences between the two groups were significantly high for those who participated in the intervention group; this group reported significantly less fatigue, less BMI, improved QoL and better quality of sleep as compared to the control group ($p < 0.05$).

Conclusion: Breast cancer survivors may physically and psychologically benefit from participating in a healthy lifestyle interventions program. This program can help relieve fatigue, maintain healthy BMI, improve QoL and enhance the quality of sleep in women with breast cancer. Lifestyle interventions program may provide a non-pharmacologic adjunctive therapy for symptom management in breast cancer survivors.

Keywords: Breast cancer, fatigue, lifestyle, physical activity, quality of life, quality of sleep.

Introduction

A number of risk factors have been identified in the pathogenesis of breast tumors. Among these, a great number of factors are attributed to the lifestyle (1). Reduced physical activity during cancer treatment can decrease the capacity for physical conditioning. The late effects of cancer and its treatment may consequently reduce physical activity in survivors. Breast cancer survivors with sedentary lifestyle have a higher risk for early mortality (2).

About 20%–70% of breast cancer survivors may have sleep disturbance, which is twice of the general population. Sleep disturbance is more prevalent in women with breast cancer as compared to those with other cancers. They report new or worsening sleep disturbances with frequent nocturnal awakening. These problems are attributed to chemotherapy or endocrine treatments induced by early menopause (3, 4).

Obesity and severe or extreme obesity is becoming a complex health problem that healthcare providers must begin to address within the oncology community (5). Studies have shown that obese women constitute a high-risk population for developing post-menopause breast cancer, and it is estimated that up to half of breast cancers that develop after menopause are attributed to obesity (6).

One third of breast cancer patients report that Cancer-Related Fatigue (CRF) has an adverse impact on their daily living activities (7).

Quality of Life is a concept that receives a lot of interest from healthcare providers. QoL measures have been used to help identify problems associated with cancer, medical management, and effectiveness of rehabilitative interventions, and to set healthcare policy (8).

Accordingly, current research assessed the impact of a healthy lifestyle interventions program on QoL, quality of sleep, BMI and fatigue, i.e., our primary outcomes. We hypothesized that healthy lifestyle interventions program would decrease fatigue and BMI and would enhance quality of life and quality of sleep.

Materials and Methods

Sample and Setting

The sample of this randomized controlled trial was composed of 80 women in total who had undergone surgery for breast cancer and completed their radiation therapy or chemotherapy between three and eighteen months ago. Samples were allocated in two groups using the random allocation process: control group and healthy lifestyle interventions program group. For randomization in this study, an independent researcher made random allocation cards using computer-generated random numbers. The allocator kept the original random allocation sequences in an inaccessible third place and worked with a copy. Instead of the letters A and B, she used the codes I and C (I for intervention group and C for control group) to avoid further confusion. Then, she continued randomization until 40 samples were allocated to the intervention group and 40 to the control group.

Sample Size and Power

The body weight was chosen for sample size calculation in this study. In the study by Utter et al. (1998), body weight had decreased to 81.8 ± 10.8 kg, from a baseline $\pm$ SD level of 89.9 ± 11.7 after the lifestyle intervention and this amount of weight loss is related to better physical and mental health status in obese women (9). Utter et al. (1998) reported 8.1 kg reduction in body weight following a 12-week lifestyle intervention (moderate dietary energy restriction in conjunction with exercise) among obese women (9). Considering these data and accounting for an estimated patient drop-out of up to 10% (9), allocation of 40 patients for each group could give 90% power to detect a difference in body weight of 8 kg at α level of 0.05 (9). For this reason, we registered 80 patients (40 for each group) in this study.

Inclusion Criteria: a) breast cancer (stage I-III) women with a BMI > 25; b) samples must have completed their primary treatment (surgery, chemotherapy, radiotherapy) between 3 and 18 months ago; c) having received the permission from a cardiologist to participate in exercise sessions; d) patients on (Nolvadex; Tamoxifen) or other endocrine treatments will be included, but they should not receive hormone replacement therapy; e) patients must be 18 years old and above; f) patients must be able to read and write in Persian; g) samples must be able to continue their participation for a period of 24 weeks (at least 3 times per week) .

Exclusion Criteria: a) patients with terminal disease or metastatic breast cancer; b) patients who have severe anorexia, nausea, or other diseases that affect health; c) use of oral contraceptives (OCP) or hormone replacement therapy during the last 4 months; d) patients that receive high-dose antioxidant supplements or follow alternative/complementary diets; e) having a physical/psychiatric problem that could limit their participation in exercise sessions; f) survivors that were unable for other reasons to continue participating in this research; g) patients who were engaged in exercise at the beginning of study .

Data Collection and Instruments

Data were collected using BMI form, Patient Information Form, Cancer Fatigue Scale (CFS), Pittsburgh Sleep Quality Index (PSQI), EORTC QLQ-C30 and QLQ-BR23 (version 3.0) questionnaires. All

the patients in the case and control groups were asked to complete these questionnaires before and after the intervention. The patient information form and BMI form were researcher-made forms.

The EORTC QLQ-BR23 is a breast cancer-specific questionnaire including 23-items about the common adverse effects of treatment, outlook for the future, body image, and sexuality (10, 11). All of these items were scored on 4-point Likert scales ranging from 1 (not at all) to 4 (very much). The Persian version of the QLQ-BR23 that was developed by Montazeri et al. (11) was used in this study. According to the EORTC scoring manual (10); scoring of the EORTC QLQ-BR23 was performed. In our study of the EORTC QLQ-BR23 scale, the Cronbach's alpha reliability coefficient (α) in the first measurement was 0.790, and it was calculated as 0.796 in the last measurement.

The CFS measures the current fatigue status (12). The Persian Version of the CFS was used in this study. The reliability of the Persian Version of CFS was examined by Haghigat et al. in 2003 (13), and its reliability was found acceptable. (Cronbach's alpha coefficients for physical, emotional, cognitive, and total exhaustion were 0.92, 0.89, 0.85, and 0.94, respectively). In our study, Cronbach's alpha coefficient (α) reliability of CFS was calculated as 0.789 in the first measurement and 0.800 in the final measurement.

The Persian version of PSQI, which was developed by Afkham Ebrahimi et al. in 2008 (14), was used in this study. In our study, Cronbach's alpha reliability coefficient of PSQI scale (α) in the first measurement was calculated as 0.746. It was 0.783 in the last measurement.

Procedures

Ethics committee approval for human studies and informed consent were provided at first. After that, 80 women in total (according to the Sample Inclusion and Exclusion Criteria of study) were randomized to the lifestyle intervention and control groups. Patients in the control group continued their routine care. Patients in the healthy lifestyle interventions group followed these manipulations.

Supervised Strength Exercise: Strength exercise can improve health variables in cancer survivors such as body mass, muscular strength and endurance, quality of life, and fatigue (15). Patients who were randomized to the lifestyle interventions program in this study attended moderate-intensity aerobic exercise sessions under the supervision of a researcher and an exercise coach for 3-5 days per week throughout 24 weeks. Patients were encouraged to attend five supervised exercise sessions each week and had to try to attend at least three of them. Supervised exercises were performed in groups of 15 to 20 participants in an exercise room that contained a variety of aerobic exercise equipment. Each session comprised a 10-minute light aerobic exercise and a gentle range of motion exercises (warm-up period), followed by 30 minutes of aerobic exercise at an intensity of 70%–85% heart rate reserve, and a final ten minute lower intensity aerobic exercise (cool-down period). Also, exercise sessions used a variety of positive attitudes and experiences for promoting adherence to the exercises.

Dietary Energy Restriction: Patients who were randomized to the intervention group received healthy eating dietary advice that was individualized just for them. Counseling and advice were focused on reducing the patient's total daily calorie intake (to 600 kcal below their calculated energy requirements). Energy requirements were calculated using the basal metabolic rate formulae and caregivers' physical activity level for each participant. We aimed to apply this strategy to ensure

Table 1. Socio-demographic characteristics by group (n=80)

Characteristics	Total (n=80)		Lifestyle intervention (n=40)		Control (n=40)		X ² /z	p
	n	%	n	%	n	%		
Age (Mean ±SD)	48.99±9.42		48.75±9.49		49.23±9.46		-0.236	0.813
Marital status							-	1.000
Single	3	3.8	2	5.0	1	2.5		
Married	77	96.2	38	95.0	39	97.5		
Level of education							0.195	0.978
Primary school	19	23.7	9	22.5	10	25.0		
Secondary school	7	8.8	4	10.0	3	7.5		
High school	40	50.0	20	50.0	20	50.0		
Above high school	14	17.5	7	17.5	7	17.5		
Employment Status							0.063	0.802
Housewife	58	72.5	30	75.0	28	70.0		
Employee	22	27.5	10	25.0	12	30.0		
Having children							-	0.675
Yes	74	92.5	36	90.0	38	95.0		
No	6	7.5	4	10.0	2	5.0		
Number of children (mean±SD)	2.57±1.40		2.58±1.34		2.55±1.46		-0.192	0.848
Lactation (n=74)							-	1.000
Yes	68	91.9	33	91.7	35	92.1		
No	6	8.1	3	8.3	3	7.9		
Lact. Period (mean±SD)	39.92±28.71		42.11±30.91		37.84±26.72		-0.440	0.660
Comorbidity							0.000	1.000
Yes (HTN)	27	33.8	14	35.0	13	32.5		
NO	53	66.3	26	65.0	27	67.5		

p>0.05
X² = Chi-square test
z = Mann Whitney U test

that the participants have a steady (up to 0.5 kg/week) weight loss. Once a week, patients met with the researcher and received counseling on their individualized healthy diet.

Statistical Analysis

The Statistical Package for Social Sciences (SPSS) software for Windows 17.0 was used for statistical analysis in this lifestyle interventions study. Numbers are shown as a percentage and average for identifying the patient characteristics; Mann-Whitney U, and chi-square tests were used for evaluating the statistical significance in socio-demographic data, disease characteristics and differences in QLQ-BR23 scores between the experimental and control groups before and after the study. The results were accepted as having a confidence interval of 95% and a statistical significance level of p<0.05.

Results

Demographic or Medical Characteristics

Patients included in the study were compared to each other in terms of variables such as age, marital status, education level, employment status, number of children, number of lactations, duration of breast-feeding, comorbidities, use of other medications, surgical procedures applied to the breast, chemotherapy, radiotherapy, use of (Nolvadex; Tamoxifen) and duration of (Nolvadex; Tamoxifen) use that might af-

fect the results of the research. No baseline differences existed between the two groups in terms of either demographic or medical characteristic before the start of this study, and the groups were similar to one another (p>0.05, Table 1, 2).

BMI

The mean BMI in the lifestyle intervention group decreased to 25.12±2.86 after the application of the program, while it increased to 30.42±6.89 in the control group. There were no baseline differences between the two groups for the mean BMI (p=0.366) before the start of this study, but differences found in the mean BMI between the two groups after the application of lifestyle interventions program was statistically high (p<0.001) (Table 3) (16).

CFS

The mean CFS score in the lifestyle interventions program group decreased to 8.15±6.12 after the application of the program, while it increased to 22.30±7.73 in the control group. There were not any baseline differences between the two groups for the mean CFS scores (p=0.957) before the start of this study; however, differences in the mean CFS scores between the two groups after the application of the lifestyle interventions program were statistically high (p<0.001) (Table 4) (17).

Table 2. Medical characteristics by group (n=80)

Characteristics	Total (n=80)		Lifestyle intervention (n=40) Control (n=40)				X ² /z	p ²
	n	%	n	%	n	%		
Surgery type							-	0.241
Mastectomy	77	96.3	37	92.5	40	100.0		
Breast-conserving surgery	3	3.8	3	7.5	0	0.0		
Chemotherapy								
Yes	80	100.0	40	100.0	40	100.0	-	-
Radiotherapy								
Yes	80	100.0	40	100.0	40	100.0	-	-
Tamoxifen use							0.000	1.000
Yes	46	57.5	23	57.5	23	57.5		
No	34	42.5	17	42.5	17	42.5		

p>0,05
X² = Chi-square test

Table 3. Comparison before and after lifestyle intervention by body mass index (BMI) (n=80)

Before intervention	Group	n	Mean	SD	z ^a	p [*]
BMI	Intervention	40	29.37	2.59	-0.905	0.366
	Control	40	28.89	2.18		
After intervention	Group	n	Mean	SD	z ^a	p [*]
BMI	Intervention	40	25.12	2.86	-6.072	<0.001*
	Control	40	30.42	6.89		

BMI: Body mass index
^a= Mann Whitney U test
^{*}=p<0.001

Table 4. Comparison before and after lifestyle intervention by Cancer Fatigue Scale (CFS) (n=80)

Before intervention	Group	n	Mean	SD	z ^a	p [*]
CFS	Intervention	40	22.98	8.15	-0.053	0.957
	Control	40	22.88	7.90		
After intervention	Group	n	Mean	SD	z ^a	p
CFS	Intervention	40	8.15	6.12	-6.615	<0.001
	Control	40	22.30	7.73		

CFS =Cancer Fatigue Scale
^a= Mann Whitney U test
^{*}=p<0.001

Table 5. Comparison before and after lifestyle intervention by Pittsburgh Sleep Quality Index (PSQI) (n=80)

Before intervention	Group	n	Mean	SD	z ^a	p
PSQI	Intervention	40	9.83	3.90	-0.533	0.594
	Control	40	10.20	3.69		
After intervention	Group	n	Mean	SD	z ^a	p
PSQI	Intervention	40	2.40	1.39	-7.335	<0.001
	Control	40	9.45	3.95		

Sleep Quality Index (PSQI)
^a= Mann Whitney U test
^{*}=p<0.001

Table 6. Comparison before and after lifestyle intervention by quality of life score EORTC -QoL BR23 (n=80)

Functional scales	Group	Before intervention				After intervention			
		Mean	SD	z ^a	p	Mean	SD	z ^a	p
Body image	intervention (n=40)	63.54	24.80	-0.262	0.793	88.96	11.69	-5.326	<0.001*
	Control (n=40)	63.12	22.40			64.16	22.02		
Sexual functioning	intervention (n=40)	84.16	18.08	-0.320	0.749	43.71	17.64	-5.942	<0.001*
	Control (n=40)	85.41	18.56			80.83	23.13		
Sexual enjoyment	intervention (n=40)	83.33	18.49	-0.219	0.826	44.16	19.08	-5.947	<0.001*
	Control (n=40)	83.33	21.35			82.50	23.86		
Future perspective	intervention (n=40)	30.00	24.80	-1.172	0.241	77.50	23.13	-5.590	<0.001*
	Control (n=40)	36.66	25.93			37.50	28.43		
Symptom scales / items	Group	Mean	SD	z ^a	p	Mean	SD	z ^a	p
Systemic therapy side effects	intervention (n=40)	35.35	23.48	-0.455	0.649	4.02	5.59	-7.076	<0.001*
	Control (n=40)	38.33	25.59			34.80	22.40		
Breast symptoms	intervention (n=40)	34.51	25.60	-0.492	0.623	6.92	10.26	-4.928	<0.001*
	Control (n=40)	32.65	27.09			30.00	27.28		
Arm symptoms	intervention (n=40)	43.05	29.58	-0.493	0.622	8.89	11.85	-5.620	<0.001*
	Control (n=40)	38.61	26.98			33.33	21.35		
Upset by hair loss	intervention (n=40)	68.33	39.19	-0.477	0.633	16.67	22.64	-4.581	<0.001*
	Control (n=40)	64.17	40.22			59.16	40.99		

Quality of life score = EORTC -QoL BR23

a= Mann Whitney U test

*=p<0.001

PSQI

The Mean PSQI score in the lifestyle interventions program group decreased to 2.4±1.39 after the application of the program, while it decreased to 9.45±3.95 in the control group. There were no baseline difference between the two groups in terms of the mean PSQI score (p=0.594) before the start of this study, but the difference between the mean PSQI scores in the two groups was statistically high after the application of the lifestyle interventions program (p<0.001) (Table 5) (18).

Quality of Life (QLQ-BR 23)

The differences in “body image,” “sexual function,” “sexual enjoyment,” “future perspective,” “systemic therapy side effects,” “breast symptoms,” “hair loss upset”, and “arm-related symptoms” subscale scores between the two groups of this study were statistically significant (p<0.001) after the lifestyle interventions program (Table 6), but there was no baseline difference between the two groups in terms of the mean QLQ-BR23 subscale scores (p>0.05) before the start of this study. Also, the average scores for “future perspective” and “body image” subscales in the lifestyle interventions group were higher than in the control group after the application of interventions. The average score for “sexual enjoyment” and “sexual functioning” in this group were lower than in the control group of study. On the other hand, the average scores for “systemic therapy side effects,” “breast symptoms,” “upset by hair loss”, and “arm-related symptoms” subscales in the lifestyle interventions program group were lower than in the control group after the intervention (p<0.001) (Table 6) (19).

Discussion

The current study findings support our hypothesis that lifestyle interventions in women with breast cancer can relieve fatigue, maintain a healthy BMI, improve their quality of life and enhance their quality of sleep.

According to the previous studies, lifestyle interventions such as increasing physical activity or eating healthy benefit a wide variety of bio-psycho-social factors such as cardiovascular fitness, body composition, emotional and cognitive functions, self-esteem, mood states, fatigue, sleep quality, and quality of life in breast cancer patients (20-24).

Today, there is a growing interest in the non-traditional care options for breast cancer patients. The current study has shown that lifestyle interventions can help relieve fatigue, maintain healthy BMI, improve quality of life and enhance sleep quality among breast cancer survivors. Furthermore, these low-cost, effective, simple, and non-invasive lifestyle interventions program for breast cancer survivors may apply to other cancer patients.

Conclusion

The results of this lifestyle interventions study may contribute to the growing body of knowledge supporting the feasibility and effectiveness of lifestyle interventions as a non-pharmacologic option for enhancing the physical and psychological health status among the breast cancer survivors. The authors of this study feel that the involvement of clini-

cians, who are the closest to the patients, is valuable in identifying possible interventions to optimize patient care. To provide the best evidence-based care for patients with breast cancer, healthcare providers might be trained on the potential benefits of a lifestyle interventions program such as relieving cancer-related fatigue, improving quality of life, lowering body mass index, and enhancing quality of sleep in breast cancer survivors.

Ethics Committee Approval: Ethics committee approval was received for this study.

Informed Consent: Informed consent was obtained from all of the patients who participated in this study.

Peer-review: Externally peer-reviewed.

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Myofibroblastoma

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ABSTRACT

Myofibroblastoma of the breast is a rare benign mesenchymal tumor. We report a 61-year-old male case who presented to the orthopedic clinic with right shoulder pain. The physical and clinical examination was normal and he was referred to our clinic. Excision was performed and there were no postoperative complications.

Keywords: Myofibroblastoma, ultrasonografi, breast

Introduction

Myofibroblastoma of the breast is an uncommon benign stromal tumor. Myofibroblastoma belongs to the benign mesenchymal tumor class that shows deletion of the 13q.14 region, together with cellular angiofibroma and spindle cell lipoma (1). It is usually seen in menopausal women and elderly men. Physical examination reveals a solid and mobile mass on palpation (2, 3). Ultrasonography, mammography, and magnetic resonance (MR) imaging can be used for the diagnosis. These tumors can be confused with various lesions on imaging. For example, they need to be differentiated from hamartoma and fibroadenoma on mammographic and ultrasonographic images (3, 4).

Myofibroblastomas develop via the paracrine and autocrine secretion of cytokines and their transformation into certain growth factors. Myofibroblastoma types are cellular, infiltrative, collagenous, fibrous, lipomatous, myxoid, epithelioid and deciduoid. Structural collagen bands are histologically composed of bipolar spindle cells (4). Before planning surgical excision, a Tru-cut biopsy can be performed to obtain a histological diagnosis. The treatment is excisional biopsy of the lesion.

Case Report

A 61-year-old patient who presented to the orthopedic outpatient department with the symptom of right shoulder pain was referred to our clinic after a mass was found in the right breast. Physical examination revealed a mass about 7 cm in size in the right breast. The mass was mobile and painless with well-defined borders. The axilla examination was normal. The left breast was also normal. The mass was excised. The macroscopic appearance was a gray-white encapsulated mass 8x7x1.5 cm in size with a regular outer surface demonstrating occasional capillaries and a yellow-brown area. We palpated a mass 7 cm in size during the examination but we observed during surgery that there were parts of the mass that extended towards breast tissue and that we had not been able to palpate. The removed mass was therefore measured as 8 cm. The sections revealed yellow-brown grey-white areas and nodular structures with a mean diameter of 0.3 cm (Figure 1). Microscopically, hyalinized collagen bands were seen in various areas between neoplastic cells with abundant eosinophilic cytoplasm together with epithelioid cells making up more than 50%. Spindle cells were present between hyalinized collagen bands. Immunohistochemical staining was conducted and revealed that SMA, HMB-45, Ki-67, Pancytokeratin and Protein S-100 were negative while CD34 was positive. The pathology result was consistent with myofibroblastoma (Figure 2-6). No recurrence was found in the post-operative 3-year follow-up of the patient. Patients gave orally informed consent.

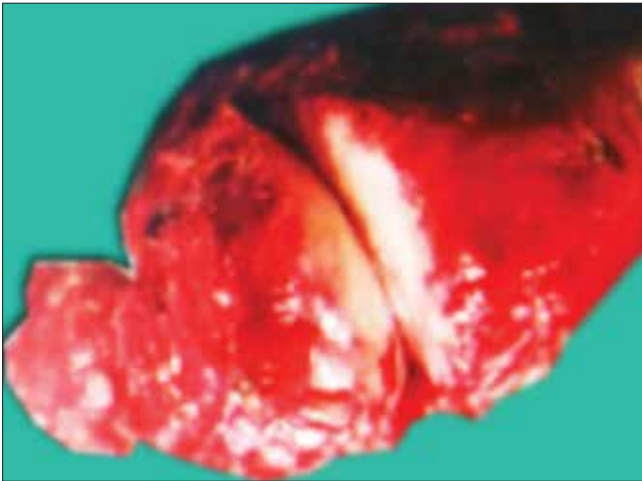


Figure 1. Excised tissue

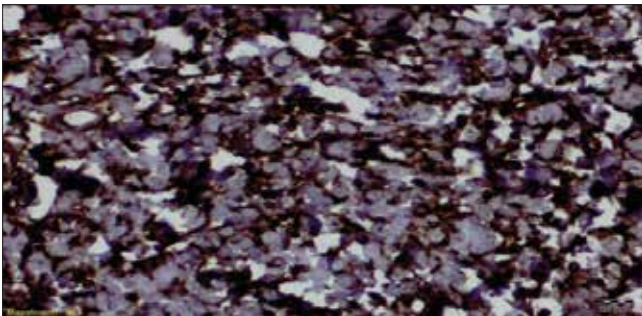


Figure 2. Diffuse and strong positive immunoreactivity for CD34 in mammary myofibroblastoma, (Immunohistochemistry-avidin biotin technique, x200)

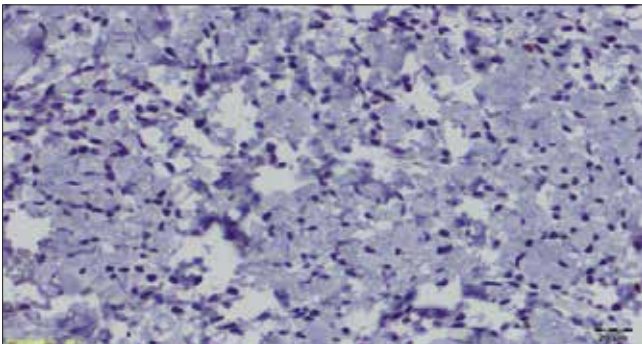


Figure 3. immunohistochemical staining for Ki67, mitotic rate is under <1%

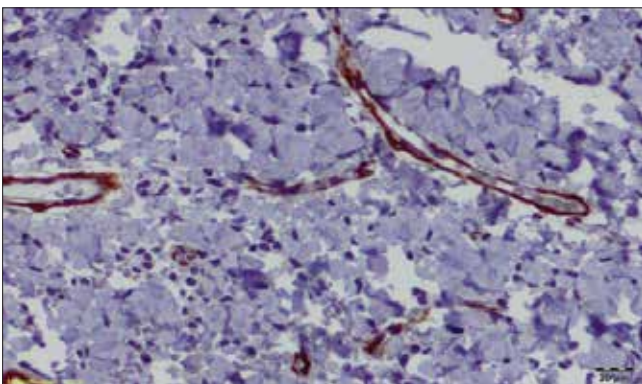


Figure 4. Negative immunoreactivity for SMA

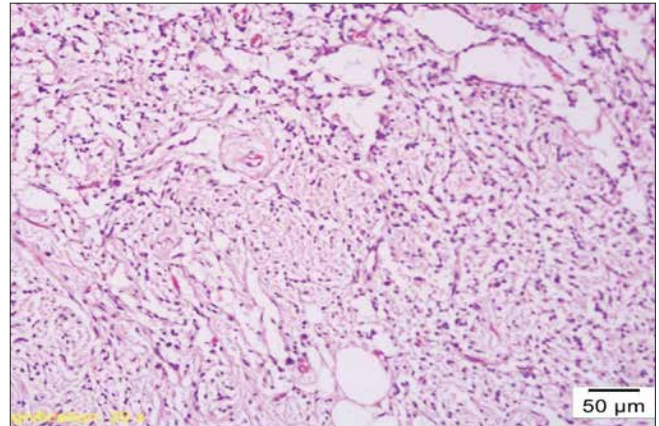


Figure 5. The lesion shows bundles of slender, uniform, spindle shaped cells typically arranged in clusters and bands of hyalinized collagen distributed throughout the tumor, HE, x200

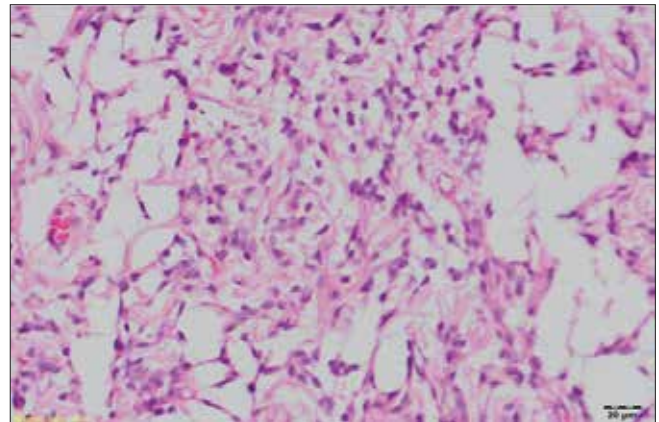


Figure 6. Mammary myofibroblastoma with admixed lipocyte groups tumor composed of a homogeneous population of spindle-shaped cells with ovoid nuclei and pale cytoplasm, HE, 400x

Discussion

Myofibroblastoma was first identified by Wagortz in 1987. This tumor is a rare benign mesenchymal lesion (2).

Myofibroblastoma can be confused with leiomyoma, benign fibrous histiocytoma, solitary fibrous tumor and spindle cell lipoma. It is most commonly seen in women and men aged 40 to 87 years. Myofibroblastoma is usually identified as an asymptomatic, slow growing mass, more commonly in females. It is a solid, palpable and mobile mass on clinical examination. The lesion diameter is usually between 1 and 3 cm but masses with a diameter up to 13 cm have been reported (2, 3). Although it is commonly seen in the breast, it has also been reported in the axilla, tonsil, lung, testis, popliteal space, rectum and meninges (2, 3). A mobile, painless mass 8 cm in size was found on physical examination in our case. Rare benign masses of the breast are being detected with the increased use of mammography and ultrasonography in diagnosis of breast cancer (2, 3, 5). Myofibroblastoma is a heterogeneous round tumor with a well-defined border but without calcification on mammography images. These lesions can be confused with other benign lesions of the breast such as leiomyoma, hematoma, abscess, neurofibroma, lymphangioma and cystic fibroadenoma on mammography. The lesions can also mimic malignant tumors of the breast such as sarcoma, lymphoma, malignant fibrous histiocytoma, phyllodes tumor, and breast cancer on mammography (3, 6). Ultrasono-

nography is another important imaging method for breast lesions and can differentiate between solid and cystic masses. Distal acoustic attenuation can sometimes be expected on ultrasonographic imaging due to the combination of fat tissue and other tissue types in these lesions. Although a mixed echo pattern is seen, the tumor has well-defined borders. Finding a cyst in the male patient breast on ultrasonographic investigation is rare. Ultrasonographic evaluation of the male patient breast is a limited imaging method (5). There can be confusion with other masses such as hamartoma, fibroadenoma, or lipoma on imaging (3, 7). Radiological imaging is nonspecific in myofibroblastoma and needle biopsy is necessary for the diagnosis. Excisional biopsy also enables both diagnosis and treatment of the lesion (8). Our patient was informed regarding excisional biopsy and imaging methods. The patient asked for an excisional biopsy so that the diagnosis could be made as quickly as possible and underwent the excisional biopsy the next day, following hospitalization. Spindle cells that appear round in short, strong, irregularly divided fascicles and separated by thick eosinophilic collagen bands are among the pathologic characteristics of myofibroblastoma. Spindle cells, nuclear polymorphism, high mitotic activity and atypical mitotic figures are present in malignant tumors. When the diagnosis of myofibroblastoma cannot be made with microscopic examination, immunohistochemical investigation can be conducted with antibody panels for differentiation from other lesions of the breast (3, 7). Actin, desmin, vimentin, CD34, CD99, CD10, estrogen, progesterone receptors and bcl-2 protein positivity is variable in smooth muscle cells in myofibroblastoma while hcal desmon, S protein, pancytokeratin and c-Kit are negative (4, 6, 7). CD34 is positive at a rate of 89% and desmin at a rate of 91% while both are negative in 3% of the cases. Rb expression loss occurs at a rate of 92% (9). Various immunohistochemical investigations were conducted in our case and SMA, HMB-45, Ki-67, Pancytokeratin, and Protein S-100 were found to be negative. Treatment is by excision of the lesion. Excisional biopsy was performed in our case. No recurrence was found during the 3-year follow-up.

In conclusion, myofibroblastoma is an encapsulated lesion with a good cleavage plane. Surgery is recommended in the treatment. The resection margin is free. Recurrence is not possible after surgical treatment. Additionally, malignant transformation has not been reported yet. However, patients should be followed-up for a minimum of 24 months (4).

Informed Consent: Informed consent was obtained from patients.

Peer-review: Externally peer-reviewed.

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