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Breast cancer information for young women

- A project for Terveysnetti



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Breast Cancer information for young women - A project for Terveysnetti

Breast cancer is the second most common cancer in women, after skin cancer. It is most commonly diagnosed in women aged 55 to 64. It is estimated that around 1.67 million new cases of breast cancer occurred among women worldwide in 2012 (most recent data available) (WHO, 2012), but it doesn't mean that it is not common among young women.

Young women do not consider that they could get breast cancer in early age and screening program starts in Finland only at the age of 50. The purpose of this project is to provide young healthy women with the information about breast cancer and also give some hints to those who have been newly diagnosed with it.

Breast cancer treatment is changing rapidly, including chemotherapy regimens that are becoming easier to tolerate, surgical procedures that are becoming less invasive, precise radiation treatment that is avoiding healthy organs as much as possible, hormonal therapy that is fighting hormone receptor-positive disease, and biological therapies that are targeting cancer cells.

This project task is to create an informative web page for healthy women and those, diagnosed with primary breast cancer on Terveysnetti. The aim is to increase information about primary breast cancer prevention and treatment options.

Keywords: Cancer, Breast Cancer, Young Women, Information, Tumor, Cancerous disease, Woman's disease

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Tietoa rintasyövästä nuorille naisille - Projekti Terveysnettiin

Rintasyöpä on toiseksi yleisin syöpä naisilla, ihosyövän jälkeen. Se on yleisimmin diagnosoitu 55 - 64 vuotiailla naisilla. On arvioitu, että noin 1,67 miljoonaa uutta rintasyöpätapausta diagnosoitiin naisilla maailmanlaajuisesti vuonna 2012 (tuoreimmat tiedot saatavilla) (WHO, 2012), mutta se ei tarkoita, että se ei ole yleistä nuorilla naisilla.

Nuoret naiset eivät usko, että he voisivat saada rintasyövän varhaisessa iässä ja seulonta ohjelma käynnistyy Suomessa vasta 50 ikäisenä. Tämän projektin tarkoituksena on tarjota terveille nuorille naisille tietoa rintasyövästä ja myös antaa vihkkejä niille, joilla on juuri diagnosoitu se.

Rintasyövän hoito muuttuu nopeasti, kuten solunsalpaajahoito, jota on helpompi sietää, kirurgiset toimenpiteet, jotka ovat vähemmän invasiivisia, tarkemmin kohdennettua sädehoitoa, joka välttelee terveitä elimiä mahdollisimman paljon, hormonihoito, joka taistelee hormonireseptoripositiivista sairautta vastaan, ja biologiset hoidot, jotka kohdistuvat syöpäsoluihin.

Tämän projektin tehtävänä on luoda informatiivinen web-sivu terveille naisille ja niille, joilla on diagnosoitu primaarinen rintasyöpä. Tämän projektin tarkoituksena on lisätä naisten informaatiota primaarisen rintasyövän ennaltaehkäisemisestä ja hoitovaihtoehdoista.

Asiasanat: syöpä, rintasyöpä, nuoret naiset, tieto, informatio, kasvain, syöpätaudit tauti, naisten taudit

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LIST OF ABBREVIATIONS

ACS- American Cancer Society

ASCO- American Society of Clinical Oncology

BRCA1/2- Breast Cancer susceptibility gene

CNN - Cable News Network

ER – Estrogen Receptors

HER2 – Human Epidermal growth factor Receptor 2

IMRT - Intensity-Modulated Radiation Therapy

NCI – National Cancer Institute

NORDCAN- Nordic Cancer registry

PR – Progesterone Receptors

WHO – World Health Organization

1 INTRODUCTION

Healthy women do not want to think about breast cancer. This is probably due to the fact that in the past in most cases cancer was an incurable disease and its detection actually meant a notice of the impending death of a person. However, nowadays the situation has changed.

As statistics show, the rate of breast cancer incidents among women younger than 49 is 34, 5 % of all cancer cases in Nordic countries. And in Finland, it is 37, 0% of all cancer cases. (NORDCAN, 2014.) So the rate is quite high also among young women and chances of getting breast cancer grow up with the age.

At different points of life, many women notice in their breasts various frightening and unpleasant changes like compression, pain, change in shape, discharge from the nipples. (National Cancer Institute, 2015). Suspicion of breast cancer occurs in many women in connection with various symptoms and changes in the mammary glands. In such cases, doctors usually recommend further investigation. Fortunately, about 90% of women, with the further examination after 2 years show that a suspicious change in their breast is not cancer. (Løberg et al, 2015.)

In recent years there has been a lot of research in the field of breast cancer, new and more effective treatments for breast cancer have been found. In lots of cases, breast cancer is curable and the most important factor for a full recovery is an early detection.

Information collected in this thesis will help women to understand how to prevent and treat breast cancer at young age. It will also help them to get information on different existing treatment options.

2 BACKGROUND

2.1 DEFINITION

Breast cancer starts when cells in the breast begin to grow out of control. These cells usually form a tumor that can often be seen on an x-ray or felt as a lump. The tumor is malignant (cancerous) if the cells can grow into (invade) surrounding tissues or spread (metastasize) to other parts of the body. (American Cancer Society, 2016.)

2.2 STAGES OF BREAST CANCER

The process of determining breast cancer stage has several important parameters of tumor development: its size, its distribution to the surrounding tissue, whether it has spread to the lymph nodes in the breast or around it, whether it has spread to other organs. On the basis of these data, the stage is found out as well as a treatment strategy. The survival rate is always calculated based on observations of people who have been treated for cancer 5 years ago. (American Cancer Society, 2016.)

Stage Zero of breast cancer means that breast cancer cells have developed, but they did not have time to spread to any surrounding tissues, or to the lymph nodes or other organs. Usually, zero stage means the so-called ductal carcinoma in situ or lobular carcinoma in situ. (National Cancer Institute, 2016.)

At stage 0 survival rate during 5 years is almost 100%. (American Cancer Society, 2016).

The first stage of breast cancer means that tumor size is less than 2 cm. And that the tumor has not yet spread to the lymph nodes or to other organs (i.e. not metastasized) (Stage 1A) or was able to form only micrometastases in 1-3 lymph nodes in the underarm area (Stage 1B). (National Cancer Institute, 2016.)

On the 1st stage, the survival rate during 5 years is almost 100%. (American Cancer Society, 2016).

Stage 2A indicates that tumor size is less than 2 cm (or not detected) and has one or both of the following characteristics:

- Already spread to no more than 3 lymph nodes under the arm, forming metastases more than 2 mm in diameter;
- Small metastases were found in the lymph nodes in mammary glands;

OR tumor is greater than 2 cm in diameter, but less than 5 cm and has not spread to the lymph nodes or other organs. (Breastcancer.org, 2016.)

Stage 2B indicates that tumor is greater than 2 cm in diameter, but less than 5 cm and has not spread to the lymph nodes or other organs or small cancer metastases were found in no more than three lymph nodes in the axilla and / or lymph nodes in mammary gland, but not found in the internal organs;

OR the tumor is larger than 5 cm in diameter, but has not grown into the chest wall or skin and did not form metastases in the lymph nodes or internal organs.

(Breastcancer.org, 2016.)

At stage 2 the survival rate during 5 years is about 93%. (American Cancer Society, 2016).

Stage 3A indicates that tumor is not more than 5 cm across and has spread to no more than 9 lymph nodes in the axilla or formed metastases in the lymph nodes in mammary gland, but not to internal organs;

OR the tumor is greater than 5 cm in diameter, has spread to no more than 9 of the lymph nodes under the arm and formed metastases in the lymph nodes in mammary glands, however, did not grow into the breastbone or skin and has no metastasis in internal organs. (National Cancer Institute, 2016.)

Stage 3B means that the tumor had time to grow into the chest wall or skin, but did not form metastases in the internal organs and has one of the following characteristics found from NCI (2016):

- no metastases in the lymph nodes;

- has only 1-3 micrometastases in lymph nodes or axillaries lymph nodes in mammary glands;
- It does not spread to more than 9 lymph nodes in the axilla or form metastases in the lymph nodes inside the mammary gland.

Stage 3C is a tumor, regardless of its size; it has one of the following characteristics, as said in NCI (2016):

- Has metastases in more than 10 lymph nodes under the arm;
- Has metastases in the lymph nodes under or above the collarbone.

During the stage 3 survival rate during 5 years is approximately 72%. (American Cancer Society, 2016.)

The fourth stage is when the tumor, regardless of its size, was able to form metastases in other organs. In most cases, breast cancer metastases are formed in bones, liver, brain or lungs. (NCI, 2016).

Survival rate during 5 years at 4th stage is on average 22%. (ACS, 2016).

2.3 SIGNS & SYMPTOMS

The main symptoms of breast cancer collected from Cancer research UK (2014) and ACS (2016) may be:

- Presence in one or both breasts of one or more "hard masses" lumps of any size, shape, texture, with smooth or non-smooth edges.
- Inflammation (redness, swelling, increase of temperature) of the entire breast, or some part of it.
- Change of the skin of breast: noticeable depressions, redness, or thickening.
- Prolonged pain in one or both breasts, the cause of which is not clear (in many cases, breast cancer develops painlessly).
- Nipple retraction (if before the nipple was another form).
- Redness, peeling, the appearance of sores on the nipple.

- Any discharge (including bleeding or transparent fluid) from the nipple, without a known reason.
- For a long time (over 2 weeks) swollen lymph nodes under or above the clavicle or in the armpit.

2.4 MAMMOGRAPHY

There are several different treatments that can partially or completely prevent the development of breast cancer. They are: special drugs (Nazarali et al., 2014), removal of parts that develop "pre-cancerous changes" and the complete removal of the breast. (NCI, 2013). However, this kind of preventive treatment is recommended mainly for women with high risk of developing breast cancer.

For women with conventional (average) risk of developing breast cancer, such treatments should be avoided. After a certain age, they are only recommended to undergo regular special preventive screening – mammograms. In Finland, it is recommended to undergo mammography screening starting 50-69 y.o. (Finnish Cancer Registry, 2010.)

Preventive mammography can detect breast cancer in its early stages when it may still have no symptoms but can be perfectly treated. Women who do regular mammograms have a much better chance of successful treatment and full recovery. In other words, regular mammogram screening can prevent the development of advanced cancer, for which recovery prognosis is much worse than in the beginning. (Løberg et al, 2015.)

Currently, mammography is the main cancer screening method for the breast. Due to the fact that this survey is relatively simple, affordable, safe, cheap, all the women to who it is recommended can have it. (WHO, 2016).

Mammography is a test when several X-ray images are taken of the mammary glands (breasts). Mammography is performed in a specially equipped room with mammography machine. It is a form of an x-ray machine. Before mammography, it is needed to undress from the waist up. Pictures of each

breast are done separately. The process may take about 20 minutes. (NCI, 2014.)

Finland was the first country to introduce governmental screening mammography program in 1987. The participation rate is now about 90% of the targeted age group. The invitation letter is coming by post for each woman in Finland who turns 50 y.o. The screening takes place every second year. (Finnish Cancer Registry, 2010.)

The majority of women who undergo screening mammography the examination do not show any changes. Only 5-10% of women after another preventive mammography of the breast are detected with some changes that are difficult to distinguish from cancer. In such cases, doctors recommend an additional examination: ultrasonography and biopsy. For 90% of women that are prescribed with biopsy after mammography, the survey does not show any dangerous changes. (Yankaskas et al., 2010.)

Women younger than 40 years who do not have a genetic predisposition to the development of breast cancer are not recommended to undergo preventive mammograms. Before the age of 40, the development of breast cancer is unlikely. On the other hand, it is the time (up to this age) when women develop some changes in the mammary glands, such as fibrocystic breast disease, fibroadenoma, and so forth. (Cardoso et al., 2012.)

Only with non-hazardous mammography, these changes cannot be distinguished from "cancer." For obvious reasons, to find any changes that may be a "tumor" it is recommended to do further examinations: biopsies or even surgical removal of the formation in order to finally make sure that it is not dangerous. (Cardoso et al., 2012).

Thus, if all women up to 40 years would regularly undergo preventive mammograms, many of them would have been forced to take a number of other (often unpleasant) and partly useless surveys, which only prove that their formation in the breast is not dangerous.

Another reason that mammography is not recommended for women under 40 is the fact that before this age breast tissue is quite dense, which is why in the results of mammography cannot be found a lot of information (if there are some changes, mammography could "miss" it). (Cardoso et al., 2012.)

2.5 CAUSES AND RISK FACTORS

The exact causes of breast cancer are not known. A significant role in the development of this disease may play age, genetic predisposition, female sex hormones, however, it is still not clear exactly how all of these factors contribute to the growth of the tumor. (Hashemi et al 2014.)

Development of breast cancer has nothing to do with the size of the breast, wearing a bra, using deodorants (antiperspirants), or abortion. (Breastcancer.org, 2015).

Breast implants (artificial breast) do not have a carcinogenic effect. However, in women undergoing surgery for breast augmentation or correction of breast shape, the probability of developing cancer may be slightly higher than average due to the fact that during the operation in the breast tissue may remain small scars (in scars cell growth may change). (McLaughlin at al., 2006).

Injuries of the breast (punches) also may slightly increase the likelihood of developing cancer due to scarring. (Cancer Research UK, 2014).

Receiving oral contraceptives slightly increase the risk of breast cancer, but the risk is returning to the average level after a woman stops taking the medication. (Beaber et al., 2014).

Smoking may contribute to the development of mammary gland cancer in women with long experience of heavy smoking. (Hashemi et al 2014).

One of the problems connected with breast cancer is the fact that women often do not have a proper idea of how great the risk of developing the disease they

have, and that the likelihood of developing the disease increases with age. (Mintzer et al., 2002).

Modern statistical studies in the US show that the average chance of developing breast cancer in all women throughout their life is about 12%. This means that out of 100 women breast cancer eventually develops in about 12-13 women. (Breastcancer.org, 2016.)

Obviously, this is a very high figure, but distribution by age is extremely uneven. During the research, it was found that the risk of breast cancer in young women is very small. On the other hand, older women (over 40 y.o.) and particularly in elderly women risk of developing this disease can be very high. More than 95% of all cancers are registered in women over 40 years old. (Hankey et al., 1994.)

Besides age, another factor that increases the likelihood of developing breast cancer is a woman's genetic predisposition to the disease. During research, it was found that probability of occurrence of breast cancer among women with a genetic predisposition to the development of the disease may be more than 20% and, in some cases, increases up to 80%. (Durando et al., 2013).

2.5.1 GENETICAL PREDISPOSITION

The vast majority of women do not have an increased predisposition for breast cancer. The average woman in the United States has about a 1 in 8, or about 12%, the risk of developing breast cancer in her lifetime. (Breascancer.org, 2016).

But it was found that there are two genes BRCA1 and BRCA2, a mutation (change) of which determines the development of the majority of Hereditary Breast and Ovarian Cancer (HBOC). (Antoniou et al., 2003).

It was found in one Australian study that for women who get BRCA1 and BRCA2 mutated gene from parents, the overall risk of breast cancer before the age of 70 is 40% and only 6% of breast cancer can be caused by these genes before the age of 40. (Hopper et al., 1999).

3 PURPOSE AND AIM OF THE PROJECT.

This project task is to create an informative webpage for young women who are healthy or diagnosed with primary breast cancer. The aim is to increase information about primary breast cancer prevention and treatment options. The result will be published as a summary and available at Terveysnetti in English.

4 METHODS

A literature review is an account of what has been published on a topic by accredited scholars and researchers. The research question for this literature review is: “What information could be useful for young women about breast cancer?”

The author has searched literature in four different databases: CINAHL (EBSCOhost), MEDLINE (Ovid), PubMed, Elsevier: Science Direct. The search terms that were used: breast cancer, young women, treatment.

It was decided to take the years of publications of searched articles from 2000-2015. It was difficult to find recent research articles that would be with free access. This was one of the limiters for current research, the another one was language. All the publications must have been in English. That is why it was also decided to extend the country of publications from Finland first to Nordic countries and Europe and then to the whole world because it was difficult to find needed research articles published within a specific area. But this idea was also good because there are lots of new ways of treatment that were found all over the world. And one more inclusion criteria was full-text articles. Inclusion and exclusion criteria could be found from Table 1.

Table 1

Inclusion criteria	Exclusion criteria
Years of publication 2000-2015	Published before 2000
Language: English	In other language than English
Full text articles	Only abstracts available
Free in access	Access not free
Studies conducted among young women (<50y.o.) and older	Studies conducted ONLY among women >50y.o.

Country of publication: all over the World	
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After searching all the research articles there were found twenty (n=20) matching the search criteria. As you could see from the Table 2.

Table 2

Database	Search items and limiters	Results	Selected by the title	Selected by the abstract	Selected by the whole text
CINAHL (EBSCOhost)	Breast cancer and young women, years: 2000-2015, language: English	5	5	5	3
MEDLINE (Ovid)	Breast cancer and young women, years: 2000-2015, language: English	303	30	7	5
PubMed	Breast cancer and young women, years: 2000-2015, language: English	793	29	14	3
Elsevier: Science Direct	Breast cancer and young women, years: 2000-2015, language: English	629	29	8	6
Google	Breast cancer and young women, years: 1999-2016 language: English	8	5	3	3

All the rest information and articles author got from official websites of different cancer organizations, news and press releases. To get more information on the topic author used manual search from search engine Google, using the same search terms as previous and some other terms: signs and symptoms, risk factors, mammography.

The author also managed to find through Google some other related research articles with more information and free access. That is why it was decided to extend the year of publication of searched articles to 1999-2016. They are also available in different databases that were used before.

5 RESULTS OF THE LITERATURE REVIEW: TREATMENT AND PREVENTION

Fortunately, in most cases, when, after the examination or mammography, some changes are found in the mammary glands, they usually do not represent any danger. However, in order to verify this, doctors need to conduct additional tests. Often for this purpose is chosen an ultrasound test and then biopsy. For many women, the referral to a cancer clinic and appointment for biopsy is a lot of stress and anxiety. (Tosteson et al., 2014.)

On the basis of scientific materials that have been studied, the author can say that in many cases breast cancer is curable, especially if the disease was detected at an early stage of development, and if the treatment was chosen based on a number of tumor characteristics (including the extent of its distribution, and the presence of metastasis, the sensitivity of cells to estrogen and progesterone, HER 2 status, etc.).

In recent years, significant progress has been made in the treatment and diagnosis of cancer. Published in 2013, the results of one study showed that 83% of women who have been diagnosed with breast cancer, the treatment helps to reach the 5-year survival rate (the standard measure for evaluating the effectiveness of treatment of cancer).

Sensitivity of cancer cells to female sex hormones (ER and PR)

Following histological analysis, which finally allows identifying breast cancer; it is possible to determine whether the tumor cells have receptors for the female hormones estrogen and progesterone.

Like many other types of cancer, breast cancer often develops under the action of certain hormones. This means that its cells grow faster if they are affected by female hormones and slow growth if the action of hormones ceases.

Understanding of this helps for the development of a number of new methods of treatment and prevention of breast cancer. (Breastcancer.org, 2016.)

Depending on the case, cancer cells may have a sensitivity to estrogen (ER +), progesterone (PR +) or both hormones. Tumors that have receptors (sensitivity) to the female sex hormones usually are slowly growing and respond better to specific hormonal treatment. (Dunnwald et al., 2007.)

HER2 Analysis

Another significant discovery in the treatment of breast cancer is the recognition of so-called HER2 proteins and genes that encode their synthesis. HER2 are specific proteins that are present on the surface of many normal cells. These proteins maintain cell reproduction. The more there are HER2 proteins on the cell surface, the faster it grows and divides. (Cancer.net, 2013).

Development of HER2 proteins is controlled by a particular gene HER2 / neu. It was found that about 20% of cancer cells (opposite to normal cells) have a plurality of copies of HER2 / neu gene, which allows them to produce more protein HER2 and accordingly reproduce faster and more aggressive. (Carney et al., 2007.)

The treatment is selected depending on the histological type of the tumor (i.e., from what cells it is composed) from its size and degree of spread (i.e., from its stages), the sensitivity of tumor to hormones (ER and PR status) from the results of analysis for HER2 and the general state of a women.

5.1 PREVENTION

5.1.1 CHANGE OF LIFESTYLE

Calcium and vitamin D consumption

Except for mammography, there are few other preventive measures that could be taken to minimize the chance of breast cancer occurrence.

Some studies have shown that regular physical activity (e.g., at least 2.5 hours of brisk walking or jogging per week), decreasing of body weight into the normal

range and avoiding the consumption of alcoholic beverages may partly reduce the likelihood of developing cancer, even in women with a genetic predisposition to developing this disease. (Hashemi et al., 2014 and Widschwendter et al., 2015.)

Based on the results of studies it is suggested that for women who get enough calcium and vitamin D the risk of developing breast cancer may be lower than the average. (Cui and Rohan, 2006.)

5.1.2 RISK-REDUCING MASTECTOMY

Early mastectomy is the removal of both breasts that reduces the likelihood of developing cancer by more than 90%. And more women with high risk of breast cancer are opting for this operation.

Currently, such an operation is recommended for:

- Women with a proven mutation in the BRCA genes
- Women with a strong family history of breast cancer
- Women with lobular carcinoma in situ, either lobular or ductal hyperplasia

(Hartmann et al., 1999.)

5.1.3 OOPHORECTOMY

Oophorectomy is called in other words the removal of ovaries. For women who have not yet reached menopause and have mutations in the BRCA1 or BRCA2 genes for prevention of breast cancer and ovarian cancer, it is recommended to surgically remove both ovaries and fallopian tubes. After this operation, the probability of developing breast cancer is reduced by 56% and the likelihood of ovarian cancer by 79%. (Gardner, 2010.)

5.2 TREATMENT OPTIONS

5.2.1 SURGERY

In order to remove the tumor, depending on the case, surgery may be recommended, during which the mammary gland is completely removed (this is so called mastectomy) or an operation during which only the tumor is removed (lumpectomy). In cases where there is a high risk of cancer in the second breast

(or if it has already spread there), it can be recommended to remove both breasts at the same time. During surgery, lymph nodes into which a tumor has spread are also removed. In cases where only the tumor is removed, but not the breast completely, after the operation radiotherapy is almost always performed. (Cancer Research UK, 2014.)

In many cases, immediately after removal of the tumor, doctors can establish a temporary artificial implant that will correct a cosmetic defect. Such implants do not increase the likelihood of developing breast cancer, and over time it is possible to replace them with long-term implants, which completely restore breast shape. (ACS, 2016.)

5.2.2 RADIOTHERAPY

Radiation therapy is used to irradiate the area where the tumor was, and kill cancer cells with X-rays. Radiotherapy is usually prescribed in those cases when during the operation the only tumor is removed, but not the whole breast, or when the tumors could spread to the lymph nodes or other organs. (Cancer Research UK, 2014.)

Intensity Modulated Radio Therapy (IMRT) uses linear accelerators to deliver radiation to the tumor. (Radiologyinfo.org, 2015).

Tomotherapy is another approach of IMRT it uses a different treatment planning system. It is a new way of delivering radiotherapy in which 3D imaging tools (CT and MRI) are used to create a vision of tumor and decide on the strength of radiation. It helps to make the treatment more precise and keep away from lungs and heart the high dosage of radiation. (Jacob et al., 2012 and Cancer Treatment Centers of America, 2016.)

CyberKnife used in a pilot study of University Medical Center Utrecht and Philips a new kind of treatment which is called MR-guided High-Intensity Focused Ultrasound (MR-HIFU). The technology is developed in Helsinki,

Finland, by the team lead by Falko Busse, General Manager MR-Therapy at Philips Healthcare. This machine is destroying small size tumors by heating them up to 65°C without making any incisions. This procedure is performed inside the MRI so that the tumor is seen in real-time and settings could be changed. (Philips, 2012.)

5.2.3 CHEMOTHERAPY

Chemotherapy is the treatment with help of drugs capable of inhibiting the division of cancer cells or destroying them. In breast cancer, doctors may suggest taking chemotherapy drugs as tablets or as intravenous lines. Usually, chemotherapy is carried out in cycles. A full course of treatment consists of several cycles and can take several months.

When the prescribed chemotherapy is after the operation, it is called "adjuvant". Such treatment is needed to kill cancer cells that may remain in women after surgery. This treatment helps to prevent the recurrence of lumps and destroy tumor metastasis. (Burstein et al., 2014.)

When the prescribed chemotherapy is before the surgery, it is called "neoadjuvant". The main purpose of this treatment is usually to reduce tumor size and make it easier to remove it during the surgery. If doctors determine that the tumor did not decrease under the influence of this treatment, they will be able to plan the use of other medications.

5.2.4 TARGET THERAPY

Target therapy is a new method of breast cancer treatment that uses drugs blocking the protein HER2. These drugs are different from drugs that are used for chemotherapy and they tend to have fewer side effects. (Carney et al., 2007.)

Essential drugs, which are used for Target therapy, are trastuzumab (Trastuzumab) and pertuzumab (Pertuzumab). They are proved to be a better

combination of medication for breast cancer and have efficacy and safety profile (Managala et al., 2011.) They are attached to the protein HER2, blocking its work and thereby reduce the rate of growth of cancer cells. It is assumed that these drugs also help the cells of the immune system to destroy cancer cells. (Cancer.net, 2016.)

Trastuzumab is administered by intravenous injection (1 time per week or 1 every 3 weeks). The course of treatment lasts 1 year. Depending on the case, the treatment can be commenced preoperatively or postoperatively and may be combined with chemotherapy. This treatment increases the effectiveness of treatment for breast cancer and reduces the likelihood of the recurrence of the tumor. (Lin and Rugo, 2007.)

5.2.5 HORMONE THERAPY

If the tests show that cancer cells have receptors for the female sex hormones estrogen (ER +) and progesterone (PR +), after the completion of the basic course of treatment, the treatment with special drugs is offered for the patient, which block these hormones. This is called hormonal treatment of breast cancer. There are two types: estradiol-only (ET) and estrogen-progesterone (EPT). Hormonal therapy helps to reduce the risk of mortality and risk of reoccurrence of breast cancer. (Mikkola et al., 2016 and Cancer.net, 2016.)

Tamoxifen is one example of the most common drugs used for chemotherapy. It blocks the action of female sex hormones on breast tissue. It is used in both ways for prevention and treatment.

This drug blocks estrogen receptors in breast cells, including cancer cells, but stimulates the estrogen receptors in the uterus and in bones. During the research, it was found that in women with a high risk of developing cancer who take tamoxifen for 5 years, the probability of developing tumors can be reduced by 45% or even more. Unfortunately, tamoxifen may cause unpleasant and very serious side effects. Therefore, this drug should be surely checked with the doctor. (Nazarali and Narod, 2014.)

Another example of drugs used in chemotherapy is aromatase inhibitors (letrozole, anastrozole, exemestane). These drugs block estrogen production in fatty tissue and are used only for the treatment of women during menopause. Like tamoxifen, they reduce the likelihood of the recurrence of cancer. They can be used in conjunction with tamoxifen and this improves the efficiency of treatment. (Breastcancer.org, 2016.)

6 CASE EXAMPLE

This case example is created by the author and based on the literature. It would help readers to understand better how the treatment process works.

A woman 35 y.o. was diagnosed with breast cancer. After different analysis it was found that tumor has stage 2A. This means that tumor is greater than 2 cm but less than 5 cm in diameter and has not spread to lymph nodes or other organs. Tumor has also receptors to the female sex hormones (ER+) and has HER2/neu genes, which means the cancer is aggressive.

After consultation with the doctor it was decided to save the breast. This means patient has made a choice for lumpectomy (only tumor removal). There for the treatment process starts with chemotherapy, which is called “neoadjuvant”. This means it is done before the operation. The purpose of it is to reduce the size of tumor to make it easier to reduce during the surgery. One cycle of chemotherapy would take a couple of months.

Following chemotherapy is the surgery (lumpectomy). During which the tumor is removed. During the same surgery doctor establishes temporary artificial implant that will correct a cosmetic defect. This was agreed with the patient before the operation during consultation. Surgery is done during one day.

After surgery again course of chemotherapy starts but now it is called “adjuvant”, because it is used after surgery. It also helps to prevent reoccurrence of lumps. It is advised to have some breaks between the courses, so it will take several months. Together with chemotherapy is used target therapy. Combination of drugs (trastuzumab and pertuzumab) is used. They block protein HER2 and prevent growth of cancer cells and reduce the likelihood of reoccurrence of tumor. The course of this treatment lasts 1 year.

When course of chemotherapy is finished, radiotherapy starts. When there is a possibility that not all cancer cells were removed during surgery it helps to “kill” those cancerous cells. Radiotherapy course takes about couple of months.

Hormonal treatment is used in patients who have cancer with hormonal sensitivity, when the main course of treatment is finished. So now, the patient is proposed to start hormonal treatment, because previously it was known that tumor has receptors for estrogen only ER+. She will use estradion-only hormonal treatment. The most common drug for this treatment which blocks estrogen receptors in breast cells is Tamoxifen. It should be taken during 5 years, and then the risk of developing new tumors in breast will be reduced by 45%.

Treatment process and full recovery takes a long time and a very important role has personal attitude of the patient towards this disease. Positive thinking, intention for positive results and faster recovery helps to ease the main process of treatment and achieve better results.

7 EMPIRICAL IMPLICATION

This project task was to create an informative web page about breast cancer treatment and prevention options. The page is ready and could be found on Terveysnetti. It was decided to put information there, so that it could be also printed out as a paper version. There are all the important aspects of breast cancer and for more information there is also a reference to self-palpation video instructions from YouTube.

The process of this thesis started in January 2016. The topic was chosen and the search of articles started. Few related articles were found and then the project plan was done by February. After a long gap in writing process, author started the search of articles again in August 2016. Then the writing process started. Presentation of this thesis was on 12 December 2016. The web page was also created by this time and is available in Terveysnetti pages online.

The author succeeded to get as much as possible needed information for young women of breast cancer. She also managed to put information in easy and understandable words. The gap in writing was not a good idea; it was difficult to get back to work after it.

8 DISCUSSION

The focus of this thesis is based on theoretical framework collected from research articles.

Lack of information could influence patient's decision making about the treatment of breast cancer. The importance is based on the need of information for young women diagnosed with primary breast cancer on different treatment options and also information for healthy women. It also includes different new ways of treatment, survival rates, and explanation. All these aspects of the disease can affect on patients' decision making about the treatment process and explain the importance of the role of healthcare professionals' participation.

Reliability and limitations

The author tried to find the most recent research articles and recommendations for this thesis. All the sources are official, recommendations that were found are from official governmental and non-governmental organizations that specify on cancer in general and breast cancer specifically. So, information gathered from the articles used for this review is reliable.

But this project is done without any funding, so the limitation was the fact that most recent articles do not have free access, due to this fact information collected from articles could be a little bit old and actual figures about statics and survival rate could be even higher at the moment.

The other limitation could be the fact that this review was written only by one author, and there is no another view presented on this topic. As well as, there is no conflict of interest.

This is not a new topic for research. The author has found some earlier research articles that have similar kind of topic but with different aspects.

Information from research articles was collected and critically appraised to the research question. Some of the studies about new treatment options that were found do not have conclusion data because they are still in process.

Critical appraisal questions that were used are taken from the article "How to Critically Appraise an Article" written by Young and Solomon (2009). These are ten important questions which were used:

1. Is the study question relevant?
2. Does the study add anything new?
3. What type of research question is being asked?
4. Was the study design appropriate for the research question?
5. Did the study methods address the most important potential sources of bias?
6. Was the study performed according to the original protocol?
7. Does the study test a stated hypothesis?
8. Were the statistical analyses performed correctly?
9. Do the data justify the conclusions?
10. Are there any conflicts of interest?

9 CONCLUSION

Frightening messages about breast cancer, especially about how many women die annually from the disease and about how insidious it can be does not always motivate women to action. Sometimes it makes a person to give up and accept the challenge that can actually be solved. Therefore, the focus of this thesis is on what women can do to take care of their health.

Preventive measures may be part of a natural concern about health and well-being of loved ones, a simple but effective way to avoid serious problems in the future and live a happy life.

Improving Breast screening service is an important area of women's health, as the prevalence of breast cancer and increased mortality define extreme urgency of early detection of this disease. In most cases, it relates to women of childbearing age, occupying the most active vital position in social production. Conducted earlier surveys, which were limited to inspection and palpation of the mammary glands, were associated with significant rate (up to 39%) diagnostic errors. The frequency of detection at stage I did not exceed 23-29% of all cases, resulting in unnecessarily a large number of surgical interventions for diagnostic purposes.

Despite the fact that mammography screening can give false-positive results it is still very useful and important for breast cancer detection. Because the earlier it is detected the better chances there are for rehabilitation and returning back to normal life for women.

Of course, it is a big issue when somebody gets a diagnosis of breast cancer. It affects women state in general; anxiety and stress are very common in this situation. This can be caused also because of lack of information about breast cancer and its treatment process. It can also cause difficulty with decision making and choose the better treatment option. That's why the author of this literature review collected information on different treatment options available

and also some new treatments that are in process of study for breast cancer, and described some difficult terms and gathered general information known about this disease.

This information would be also useful for healthy women, who don't even think they could have breast cancer.

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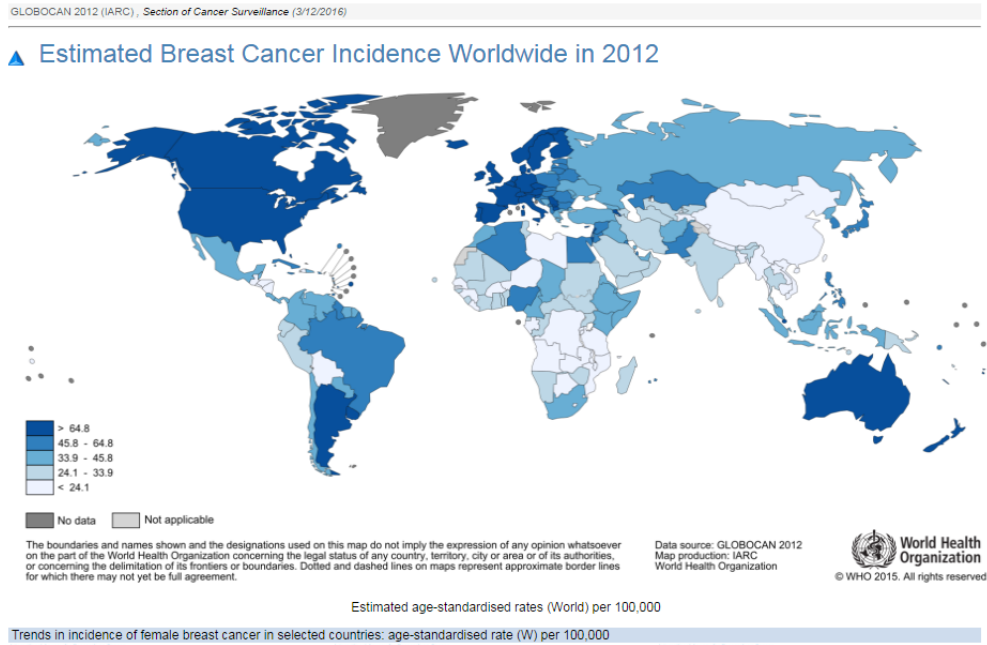
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APPENDIX

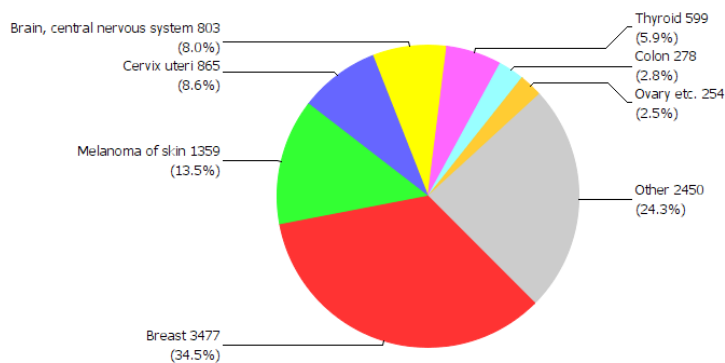
Statistics from WHO: http://globocan.iarc.fr/Pages/fact_sheets_cancer.aspx



The NORDCAN project group is:

G. Engholm, H.H. Storm, J. Ferlay, N. Christensen and the Nordic Cancer Registries, on behalf of the Association of Nordic Cancer Registries (ANCR), sponsored by the Nordic Cancer Union (NCU). National representatives are Maya C. Milner (Denmark), Terji Petersen (Faroe Islands), Henrik Trykker (Greenland), Maarit Leinonen (Finland), Elínborg Ólafsdóttir (Iceland), Tom Børge Johannesen (Norway), and Staffan Khan (Sweden). http://www-dep.iarc.fr/NORDCAN/English/graph8.asp?registry=0&period=2014&type=0&age_from=1&age_to=10&sex=2&skin=1&join=1&submit=Execute

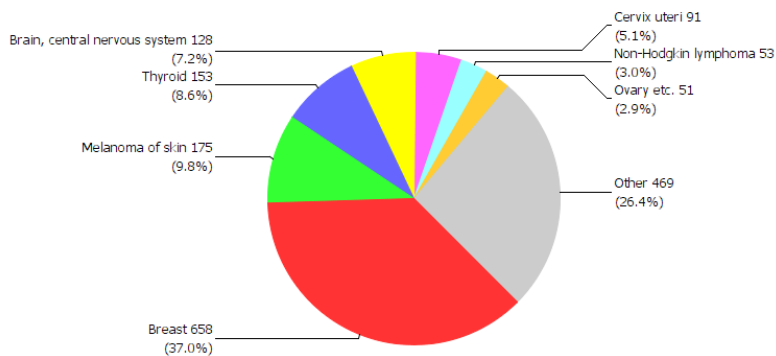
Nordic countries (2014)
Number of cancer cases - Female, age 0-49



NORDCAN © Association of the Nordic Cancer Registries (3.12.2016)

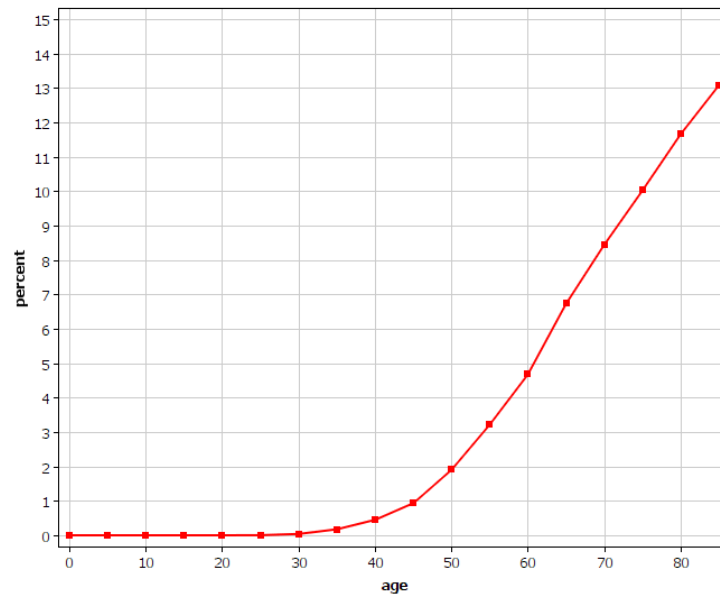
http://www-dep.iarc.fr/NORDCAN/English/graph8.asp?registry=246&period=2014&type=0&age_from=1&age_to=10&sex=2&skin=1&join=1&submit=Execute

Finland (2014)
Number of cancer cases - Female, age 0-49



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Finland-Cumulative incidence from age 0 (2014)
Breast: Female



NORDCAN statistics, 2014