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Life with Breast Cancer – Nutrition during the Relapse-free Stable Stage of Life

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Summary

The aim of the study was to gather and analyse information on the nutrition of breast cancer survivors in the context of tertiary prevention in order to estimate the specific demand of intervention needed for this increasing population group.

The study was conducted by surveying self-help groups, gynaecological practices and private persons in the German federal states of Baden-Württemberg, Bavaria, Hesse and Saxony. 236 questionnaires were evaluated.

44.5 % of participants were between 60 and 69 years old. 60.6 % of participants were diagnosed more than six years prior to the study. According to participants' opinion, health-related behaviour and quality of life had improved since completion of treatment. The average BMI was 26.9 ± 5.5 kg/m². 49.6 % of participants had increased their weight by 8.6 ± 6.1 kg. 47.8 % of participants who maintained a balanced diet as well as 68.4 % of women paying less attention to a balanced diet before developing breast cancer had changed their nutrition since completion of treatment. 72.5 % of participants were not offered nutritional advice during and/or after treatment.

The study indicates a high demand for nutritional advice focusing on weight management for breast cancer survivors.

Keywords: cancer survivors, breast cancer, BMI, nutrition, food choice, nutritional advice, weight management

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Introduction

According to the German Centre for Cancer Registry Data at Robert Koch Institute (RKI), breast cancer is the most common cancer in women in Germany with about 72,000 incidences per year. Although the age-specific incident rates of breast cancer have increased by about 50 % since 1980, less women die of cancer today compared to 20 years ago [1].

The number of women living with breast cancer after a completed treatment is growing continually. The significant increase in survival rates over the last few years is attributed to early-stage diagnoses and advances in therapy (surgery, radiation, chemotherapy) [1].

Nowadays, cancers such as mamma carcinoma are classified as chronic diseases because of the long-term health problems as well as the course and consequences of the diseases associated with it. These are characterised by lasting organ and body dysfunctions as well as obstacles in everyday life [2]. A retrospective cohort study carried out in elderly breast cancer patients showed that cardiovascular diseases are one of the leading causes of death in breast cancer patients [3]. Radiotherapy of breast cancer is associated with an increased risk of cardiovascular disease [4].

Persons diagnosed with cancer are termed cancer survivors. This definition covers all persons having been diagnosed with cancer, i.e. from the time of diagnosis through the rest of their lives [5]. The second phase of cancer survivorship (life after recovery, including survivors who are without disease or stabilized their disease) is becoming increasingly important to improve long-term outcomes and requires particular attention in order to promote overall health, quality of life and longevity [6].

Recommendations for nutrition and a physically active lifestyle

The report of the World Cancer Research Fund (WCRF) issued by the WCRF in collaboration with the American Institute for Cancer Research (AICR) [7] states that evidence-based nutrition recommendations cannot be provided for cancer patients because of insufficient data. Therefore, cancer survivors who completed regeneration are advised to follow the recommendations for primary prevention of cancer. This advice is supported by the American Cancer Society (ACS) [8]. The recommendations cover the following points: achieve and maintain a healthy body weight; be physically active on a regular basis; eat plenty of vegetables, fruit and whole-grain cereals; limit intake of meat and alcohol; abstain from dietary supplements [6, 7, 9].

There have been a small number of prospective cohort studies and randomised controlled trials that provide initial results about the influence of diet and lifestyle in breast cancer survivors [10, 11]. In light of this problem, the ACS published the "Guidelines on Nutrition and Physical Activity for Cancer Survivors" in 2012 (◆Table 1) although the scientific evidence is to be considered rather weak [6].

Obesity is associated with an increased risk of breast cancer recurrence [6]. Weight gain after diagnosis of breast cancer is associated with an increased cancer-specific mortality and/or overall mortality [12, 13]. Therefore, achieving and maintaining a healthy body weight, consuming a nutrient-rich diet and regular physical activity are important aims for breast cancer survivors during long-term disease-free living or stable disease. These aims are also relevant in order to reduce the risk of cardiovascular disease and second primary breast cancer [6].

Objective

The purpose of the study was to determine and analyse dietary patterns and physically-active lifestyles of breast cancer survivors in Germany. Participants provided information during the long-term disease-free or stable-disease phase in order to estimate the need for intervention in this increasingly large population group. The main emphasis of the study was the evaluation of health status and quality of life, nutritional status judged by BMI and weight changes, nutritional knowledge and dietary changes as well as the role of nutritional advice as part of the care.

Methodology

For the data collection, a standardised questionnaire covering five theme complexes was developed. It underwent a pre-test. The five theme complexes are:

1) socio-demographic variables
2) subjective assessment of health status and quality of life after the diagnosis was made
3) nutritional status
4) nutritional knowledge and consumption behaviour
5) offer of nutritional advice.

The questionnaire included different question techniques and scale levels; mainly closed-ended questions were used. Body weight, height and changes in weight were self-reported. Long-term survivors of breast cancer were recruited supra-regionally (in the German federal states of Baden-Württemberg, Bavaria, Hesse and Saxony) during the time period May through November 2012. Collaborating partners such as self-help groups, gynaecological practices, private persons, and the national association "Frauenselbsthilfe nach

Achieve and maintain a healthy weight.
• If overweight or obese, limit consumption of high-calorie foods and beverages and increase physical activity to promote weight loss.
Engage in regular physical activity.
• Avoid inactivity and return to normal daily activities as soon as possible following diagnosis. • Aim to exercise at least 150 minutes per week. • Include strength training exercises at least 2 days per week.
Achieve a dietary pattern that is high in vegetables, fruits, and whole grains.
• Follow the American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention.

Tab. 1: **American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Survivors** [6]

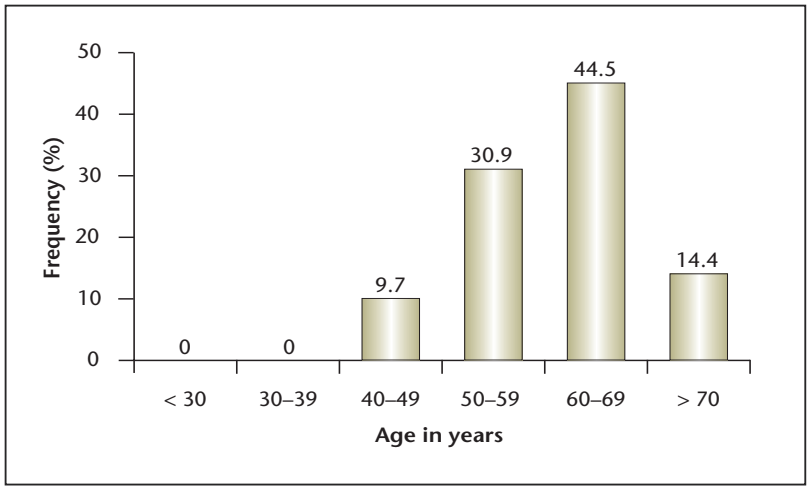

Fig. 1: **Age distribution of breast cancer survivors**

Krebs e. V." (self-help group for women after cancer) in Pforzheim served to distribute 769 survey questionnaires to subjects by personal contact, email and mail. 251 questionnaires were returned of which 236 could be evaluated. The data was evaluated by means of the evaluation software EvaSys, the statistics software SPSS, as well as by hand.

Results

Subject characteristics

◆ Figure 1 shows the age distribution of the breast cancer survivors that participated. The educational status based on multiples answers was estimated as follows: 34.8 % stated to have a general education school-leaving certificate, completion of grade 9; 46.8 % a general school-leaving certificate, completion of grade 10, and 19.7 % the general higher education entrance qualification. 53.6 % of respondents attained an apprenticeship qualification and 12.9 % a university degree. Before breast cancer developed, 34.3 % of participants were employed part-time, 33.9 % full-time, 22.6 % had been housewives or unemployed and 9.3 % had been self-employed. Owing to the disease, 47.5 % have experienced a career change; more than half of the participants reported to have been unable to work or have retired since.

Health status and quality of life

60.6 % of the participants were diagnosed more than six years prior to the study. In 14.4 % the diagnosis was 4–6 years ago, in 14.0 % 2–4 years ago and in 8.1 % less than 2 years ago. Completion of treatment was more than 6 years ago in 44.9 % of the participants. 78.0 % had not experienced a relapse whereas 14.8 % of women had had at least one relapse. 97 % of participants had undergone one or more surgeries, 61.9 % of participants had received e. g. chemotherapy and 72.0 % had received radiotherapy.

State of health, quality of life as well as physical condition after the completion of treatment were mostly rated as good or very good (◆ Figure 2 a–c). 58.5 % of respondents, however, stated to having had difficulties being physically active in daily life. Nevertheless, 81.4 % of women stated an improved attitude towards life since the completion of treatment. 81.4 % had taken more time for themselves and 69.1 % had maintained a higher regular level of con-

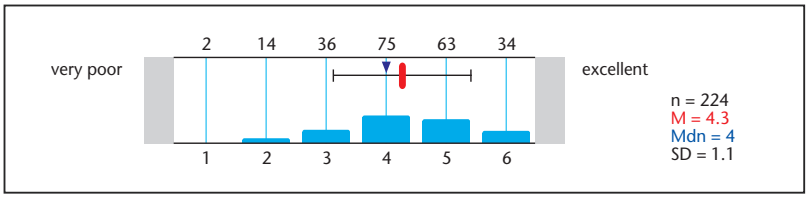

Fig. 2a: **State of health after end of treatment**

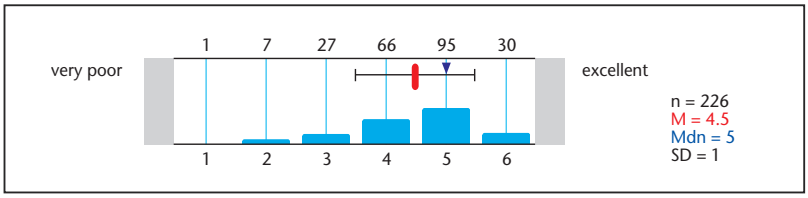

Fig. 2b: **Quality of life since end of treatment**

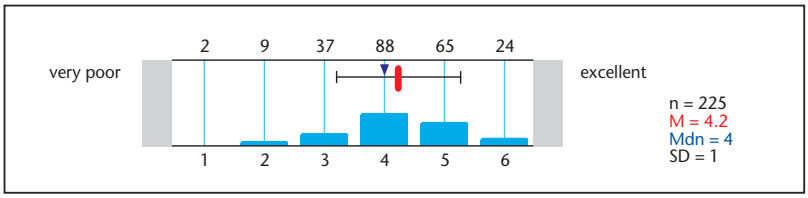

Fig. 2c: **Physical condition since end of treatment**
n = sample, M = mean, Mdn = median, SD = standard deviation

tact with family members, friends and acquaintances.

Nutritional status and physical activity

The average BMI was 26.9 ± 5.5 kg/m². 45.3 % of women were overweight and 17.8 % were obese. 35.6 % of participants had a normal BMI. One woman was underweight. Among the women aged 60–69 years, 49.0 % were overweight and 16.3 % obese. The proportion of obese women was less than half in each age group. The proportion of overweight women increased with age (◆ Figure 3).

64.4 % of participants had changed weight after active treatment. 49.6 % of women had experienced a mean weight gain of 8.6 ± 6.1 kg and 14.8 % had experienced a mean weight loss of 8.5 ± 4.8 kg. Among the 116 women who had gained weight, 69.0 % considered it a problem. Among the 33 women who had lost weight, 97.0 % considered it non-problematic. 44.9 % of participants exercised 0.5–2 hours, 24.6 % 2–3 hours and 19.5 % more than 3 hours per week. 8.9 % of participants exercised less than 30 min. per week (◆ Figure 4).

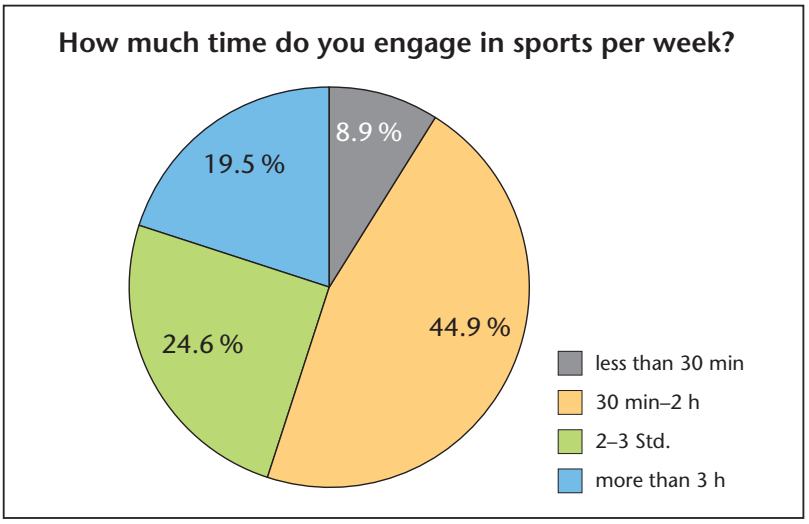

Fig. 4: **Physical activity per week**

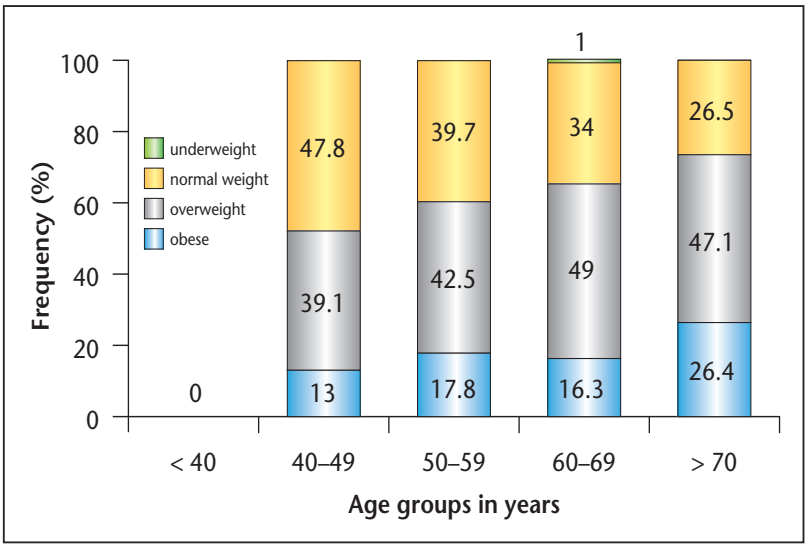

Fig. 3: **Distribution of BMI by age group**

Nutritional knowledge and consumption behaviour

80.0 % of women knew the food pyramid. The response to questions on beverage consumption was as follows: 66.5 % of participants drank more than 1–2 L a day, 29.7 % more than 2 L as day. The beverages were mainly water (91.1 %), tea (55.5 %), coffee (41.5 %) and fruit juices (22.9 %). Alcohol was consumed once to several times per week by 44.5 % of women, 43.2 % rarely or never drank alcohol.

Retrospective data about food consumption before cancer developed showed that fried foods and convenience foods had been consumed least frequently whereas weekly consumption of fruit, vegetables and dairy products had been most frequently (◆ Figure 5).

Among the women who reported to having had a balanced diet before the disease, 47.8 % had continued to change their diet since the completion of treatment. Among the women who stated that they had not maintained a balanced diet before breast cancer, 68.4 % adapted their diet afterwards (◆ Table 2) and their consumption of vegetables (25.4 %), fruit (22.5 %), fish (7.2 %) and whole grain products (6.4 %) increased. The consumption of meat and sausage has declined by 16.9 %, sweets by 5.9 %, alcohol by 3.4 % and fat by 3.4 %. Furthermore, 62.7 % of women have reduced their consumption of foods rich in fat.

Offer of and interest in nutritional advice

72.5 % of participants had not been offered nutritional advice. Only 27.1 % (64 women) had been offered nutritional advice. Among these

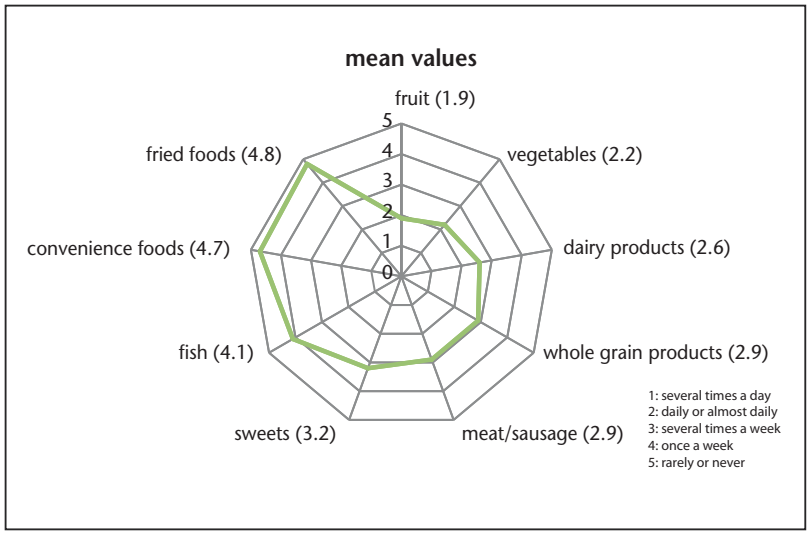

Fig. 5: **Food consumption before disease**

women, 87.5 % had made use of this offer.

83.0 % of respondents gathered information on the topic of nutrition and breast cancer on their own, particularly via literature, information events and internet. 64.8 % of women showed interest and willingness to attend a qualified workshop. They preferred to participate in an information event, a cooking course or e. g. creating a guidebook.

Discussion

The present cross-sectional study contributes to the research of the nutrition and lifestyle of breast cancer survivors even though it cannot be considered representative due to limitations in study design.

It was challenging to get access to the group of breast cancer survivors during the long-term disease-free or stable phase since there is no classical setting for this target group. In contacting rehabilitation centres, the majority of breast cancer survivors that are registered are in the phase of recovery after treatment. For life during the long-term disease-free or stable disease, which is the second general phase of cancer survivorship, the central approach of personal contact by means of a written survey (conducted in self-help groups, gynaecological practices, private persons and through a national meeting of the self-help group for women after cancer) proved to be successful.

The initial diagnosis of breast cancer was at least 4 years ago in 75.0 % of the participants, in 60.6 % even more than 6 years. The observed age distribution and rate of breast cancer relapses are characteristic of breast cancer survivors. The age distribution corresponds to the 5- and 10-year-prevalence-rates by age groups between 1990 and 2004 calculated by the Robert Koch Institute (RKI) [14, 15]. The group older than 70 years-of-age, however, is slightly underrepresented. A selection bias can be assumed because particularly dedicated breast cancer survivors might have been more likely to participate in the study.

The risk for local relapse, which means a second breast cancer incidence, is estimated to be 4.2–12.0 % according to literature [16]. With 19.5 %, the present study showed a considerably higher percentage than expected.

Half of the respondents claimed that cancer has had an influence on their career, although detailed information was lacking. This number is much higher compared to the number ascertained in the analysis of the cases of inability to work in Germany in 2001 [15].

Health status and quality of life

Using a scale ranging from "very poor" to "excellent", participants estimated their health status and physical condition predominantly as "good". Subjective assessment of participants' quality of life turned out to be rated as predominantly "very good". This result was better than their health status, wherein more than half of the respondents declared that they had suffered from physical limitations. Zebrack and collaborators [17] also reported that subjective quality of life improved but physical condition worsened in cancer survivors including breast cancer survivors. Cancer survivors regard their quality of life better than healthy persons, partly due to a modified standard of quality of life's evaluation [18]. Beside the negative physical and psycho-social consequences, several cancer survivors experience post-traumatic growth, which means subjective advances and positive changes in life as a consequence of cancer. These positive impacts of cancer (IOC) were significantly associated to mental but not to physical condition. Yet, respondents indicating a poor physical function can experience positive IOC on their lives [17]. In view of the aforementioned, the results of more than 80.0 % declaring an improved post-treatment attitude towards life and approximately 70.0 % declaring a higher focus on cultivating social contacts are consistent. The responses might reflect an increased participation of women being members of a self-help group. Social contacts play a major role for long-term cancer survivors. Multiple prospec-

tive cohort studies in breast cancer survivors consistently demonstrate that larger social networks are associated with a longer survival after the diagnosis of breast cancer. However, the quality of the relationship is vital [19].

Nutritional status and physical activity

Investigation of nutritional status was based on self-reported body weight and height which tend to differ from direct measurements. In 63.1 % of participants, nutritional status was characterised by overweight or obesity whereas underweight was rare. According to data of the DEGS1 study conducted by the RKI from 2008 to 2011 in Germany's adult population [20], 23.9 % of women of the general population are obese. In the present study, 17.8 % of women are obese but prevalence of overweight is higher compared to data of the DEGS1 study. The US prospective cohort examined in the Cancer and Menopause Study (CAMS) also showed a lower prevalence of obesity compared to the general population [21].

Due to breast cancer, 64.4 % of the women experienced weight changes. 14.8 % declared themselves as having lost weight but half of the participants increased their weight considerably. Also, 51.0 % of women aged 50 ≤ 60 years participating in the Life after Cancer Epidemiology Study (LACE), a prospective cohort study conducted in the US, increased weight after diagnosis of breast cancer. In this study, weight gain was remarkably high in younger breast cancer survivors [22]. Among the participants who gained weight, 69.0 % found it to be problematic. This might be an important connecting factor in order to explain the meaning of a healthy body weight as well as to support and accompany their implementation.

The amount of physical activity in the surveyed breast cancer survivors is regarded as low. However, the question "How much time do you engage in sports per week?" might be considered to restrict various types of physical activity by using the term "sports". Meta-analyses of randomised controlled trials and prospective cohort studies point out a significant improvement of quality of life, a lower mamma carcinoma recurrence rate of 24.0 % and a lower mortality of 34.0 % because of physical activity [23, 24].

The study demonstrates the need for more attention to be placed on weight management concerning survivors of breast cancer during follow-up care.

Nutritional knowledge and consumption behaviour

Most of the surveyed breast cancer survivors knew the food pyramid so that knowledge of dietary recommendations can be assumed. Statements on current beverage consumption largely correspond with the recommendations of the German Nutrition Society (DGE). Before breast cancer diagnosis, the consumption of fruit and vegetables was not five times a day but predominantly only daily or almost daily, of whole grain products not daily but only several times per week. Breast cancer patients who underwent a rehabilitation programme showed a comparable dietary pattern [25].

These results are not surprising since DGE's recommendations for consumption of fruit and vegetables are not met by most of Germany's population, as demonstrated by the National Nutrition Survey II (NVS II) [26]. They were confirmed by a representative sample of the residential population in Germany (DEGS1) conducted from 2008 to 2011 [27]. With probable evidence, the risk of cancer is inversely associated with the consumption of vegetables and fruit. A high daily intake of vegetables and fruit has positive effects on health and a high potential for the prevention of various chronic diseases including cancer [28].

			Have you changed your diet since completion of treatment?		total
			yes	no	
Had you maintained a balanced diet before diagnosis?	yes	number	64	70	134
		%	47.8	52.2	100.0
	no	number	67	31	98
		%	68.4	31.6	100.0
total		number	131	101	232
		%	56.5	43.5	100.0

Tab. 2: **Importance of diet and diet modification**

However, it is unclear whether the responses considering the rather low frequency of consumption of meat, sausage, fish, convenience foods and fried foods reflected a certain degree of social desirability.
Generally, breast cancer is seen as a critical experience in life [11]. 56.0 % of participants changed their diet according to their own statement as a response to the disease, especially those who previously had not paid attention to a balanced diet. In each case, about 30.0 % stated that diet modification was towards a higher intake of vegetables and fruit. It is also uncertain whether the participants' statements were a matter of social desirability. Nevertheless, the available data suggest that consumption of vegetables and whole grain products should be increased and quality of fat optimised.

Because of the created categories in the questionnaire, the data for alcohol consumption of participants were not directly comparable to the surveys' results of the Epidemiological Survey on Substance Abuse (ESA) from 1995–2009, in which the trends of alcohol consumption were investigated in persons aged 18 to 59 years-of-age in Germany. 43.2 % of participants indicated to rarely or not at all consume alcohol in the present study. This rate was much higher than the 29.8 % indicating being abstinent in the ESA study. On the other hand, 22.9 % of respondents stated to drink alcohol several times a week or daily. It remains unclear whether this is a low-risk or hazardous alcohol consumption which was established in 56.1 % or 12.8 % of women in the ESA study in 2009 [29]. Therefore, it cannot be judged, whether the recommendation of the WCRF report to limit alcohol consumption, was applied.

Alcohol consumption is a thoroughly examined risk factor for breast cancer, but little is known about the influence of alcohol on survival of breast cancer patients [30]. Compared to abstainers, women with moderate alcohol consumption were found to show an improved cardiovascular and overall survival before and after diagnosis of breast cancer [31].

Offer of nutritional advice

Currently, nutritional advice is of little significance in the aftercare of breast cancer patients. Only 27.1 % of participants were offered nutritional advice. Thus, breast cancer survivors can be viewed as a neglected group in the field of nutritional advice. In case of breast cancer survivors being offered nutritional advice, it was found to be accepted at a rate of 87.5 %. This clearly shows that interest and motivation of breast cancer survivors to deal with nutrition and lifestyle are high. This potential should be exploited.

Even if there are no specific evidence-based recommendations on nutrition and lifestyle for long-term cancer survivors [8], and there is a high demand for research, the currently issued recommendations provide a great opportunity for tertiary prevention.

Conclusions

Comparing the available data on nutritional status and food consumption in breast cancer survivors with the recommendations for tertiary prevention of cancer indicates an enormous gap between recommendations and their implementation. However, surveyed breast cancer survivors are highly motivated to deal with their nutrition and lifestyle. This potential should be exploited in nutritional advice in order to use the opportunities for health promotion. It is vital to develop appropriate strategies and concepts for the practical implementation of recommendations.

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Conflict of Interest
The authors declare no conflict of interest according to the guidelines of the International Committee of Medical Journal Editors.

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