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# Effect of Implementing Continuous Care Model on the Health Promoting Lifestyle in Breast Cancer Survivors – A Quasi-Experimental Study

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## ABSTRACT:

**Background**: Breast cancer poses a severe threat to women's health worldwide as it is the most common cancer diagnosed in women and the primary cause of mortality for female patients. Aim: The current study aimed to evaluate the effect of implementing continuous care model on the health promoting lifestyle of breast cancer survivors.

**Design**: A quasi-experimental research design (intervention & control group) was used. Setting: The present study was conducted at medical clinics at Oncology Center at Mansoura University Hospital (MUH) affiliated to Mansoura University and Ministry of Higher Education, Dakahlia governorate, Egypt.

**Sampling**: A purposive sample of 80 female breast cancer survivors. Tools of data collection: A Structured Interview Questionnaire was consisted of general characteristics and clinical information of the studied women, Health Promoting Lifestyle Profile Scale, and General Health Questionnaire-28.

**Results**: The present study revealed there was a significant improvement of all domains of health promoting life style mean score of the intervention group than control group ($P < 0.001$). In which the total health promoting life style of intervention group changed from 86.10 ± 13.48 pre intervention to138.40 ± 16.84 post intervention, while control slightly elevated from 88.03 ± 8.93 pre intervention to 88.28 ± 8.71 post intervention with high statistically significant differences ($p > 0.05$).

**Conclusion and Recommendation**: Continuous Care Model had a positive and significant effect on the health-promoting lifestyle of breast cancer survivors. Women who received the intervention exhibited marked improvements in all dimensions of health-

promoting life style. So, incorporating the Continuous Care Model into routine nursing care and survivorship programs for breast cancer survivors is mandatory.

## 1. INTRODUCTION

Breast cancer is extremely upsetting and significantly affects one's quality of life. Compared to survivors of other malignancies, breast cancer survivors (BCSs) report more unmet needs. This could be because breast cancer survivors are more likely to seek adjuvant therapy, which can cause late adverse effects in certain people (Kasgri, Abazari, Badeleh, Badeleh & Peyman, 2024). Lack of energy and fear of recurrence are two examples of the many unmet physical and psychological demands caused by these late or long-term side effects of breast cancer treatment. Consequently, some cancer survivors ask medical professionals for additional information and guidance (Lustberg, Kuderer, Desai, Bergerot & Lyman, 2023)

Unfortunately, the pharmaceutical issues associated with cancer are sometimes the exclusive focus of treatment. Poor diatery habits and infrequent exercise were prevalent among cancer survivors. Additionally, within a year following their diagnosis, breast cancer survivors typically stop exercising regularly (Leske, Galanis, Koczwara & Beatty, 2025). Health promotion interventions can help breast cancer survivors adopt healthy habits and improve their physical and mental well-being. Even while health promotion initiatives have many benefits, some cancer survivors complaint that medical professionals don't support or advise them, which makes them less inclined to follow such advice (Ismail, Arafa, Tahoun, Shama & Elsaid, 2025).

A nursing and healthcare framework called the continuous care model (CCM) was created to offer continuous, proactive, and patient-centered care. It is especially helpful for managing chronic conditions like diabetes, cancer, heart failure, and COPD (Said, Gooda, Mohamed & Hassan, 2026). The CCM's primary goal is to create a program that may successfully change patients' perceptions of the illness, boost treatment acceptability, and result in appropriate performance for ongoing care. It is anticipated that this regimen will help manage the illness and any consequences that may arise (Sadeghi, Ahmadi & Rasekhi, 2022).

Public and community health nurses are essential to the protection and promotion of health in the primary healthcare system. In the holistic approach, nurses concentrate on helping BCSs, families, and communities participate in health promotion initiatives or make health-related decisions. In health promotion initiatives, nurses seek to modify the health-related behaviors of BCSs by utilizing health education and the most popular health promotion intervention (Abdelsalam & Bayomi, 2022). In order to effectively promote the health of breast cancer survivors, oncology nurses must incorporate healthy lifestyle behaviors (physical activity, diet, health responsibility, and interpersonal interactions) (Fortner et al., 2023).

### 1.1Significance of study

One of the most prevalent cancers affecting women worldwide is breast cancer. About 2.4 million women were almost diagnosed with breast cancer in 2024, and the disease claimed the lives of about 694,000 of them (Kim et al.,2025). The number of people who have survived breast cancer is increasing as a result of improvements in early identification and treatment. Even though finishing cancer treatment is a significant milestone, survivors may still face lifestyle, social, psychological, and physical difficulties that could negatively impact their general health and quality of life. Thus, long-term health management and ongoing support for good lifestyle choices should be included in survivorship care in addition to cancer treatment (Abdelsalam & Bayomi, 2022).

Living a healthy lifestyle is especially important for breast cancer survivors because it can improve their physical and mental well-being. Healthy habits include eating a balanced diet, exercising frequently, reducing stress, getting enough sleep, taking care of their health, and maintaining relationships with others. However, treatment-related symptoms, exhaustion, fear of recurrence, ignorance, psychological discomfort, and insufficient continuous support make it difficult for many survivors to sustain these behaviors (Torabi, Chouinard, Sévigny & Bilodeau, 2025).

The Continuous Care Model may offer a useful framework for dealing with these issues. The main components of continuous care are patient-provider engagement, individual needs assessment, education, follow-up, reinforcement of healthy behaviors, and active patient involvement in self-care. By applying this strategy to breast cancer survivors, care continuity may be maintained and their capacity to adopt and sustain health-promoting lifestyle behaviors may be enhanced (Chan et al.,2023).

### 1.2Aim of the present study

The present study aimed to evaluate the effect of implementing Continuous Care Model on the Health Promoting Lifestyle in Breast Cancer Survivors.

### 1.3. Research hypothesis

There will be significant improvement in health Promoting Lifestyle of Breast Cancer Survivors in intervention group than control group after implementation of continuous care model.

## 2.METHODS

### 2.1. Study design

A quasi-experimental research design (intervention & control group) was utilized to carry out this study. This design allows testing of the dependent variable (health promoting lifestyle in breast cancer survivors) before and after implementing intervention with an independent variable (continuous care model). Also, the studied women not be assigned randomly to the study (Tabrizi, Rajabzadeh & Eghtedar, 2020).

### 2.2. Study setting

The current study was conducted at medical clinics at Oncology Center at Mansoura University Hospital (MUH) affiliated to Mansoura University and Ministry of Higher Education, Dakahlia governorate, Egypt. The oncology center includes 11 floor, the second floor includes medical clinics & chemical composition. Medical clinics works at Sunday, Monday, Wednesday and Thursday from 8am to 4pm with flow rate about 300 cases per day.

### 2.3. Participants:

The study sample was included 80 female breast cancer survivors, was chosen from predetermined setting by purposive sample technique according to the following criteria:

**Inclusion criteria**

- Female patient with breast cancer of any grade.
- Age ≥20 years.
- Completion of treatment of breast cancer (mastectomy, chemotherapy, radiotherapy, and hormone therapy)
- Obtaining a score of less than 23 in the general health questionnaire for screening of breast cancer survivors's general health

**Exclusion criteria**

- Metastatic breast cancer.
- Diagnosed with other malignancies in addition to breast cancer.
- Inability to complete study questionnaire (e.g. due to dementia or other psychological disease).

**Sample size**

The sample size was calculated using Open Epi.com/calculating sample size using averages (software). The Lifestyle average score of cancer patients after intervention was 64.6 ± 8.3 while it was 57.8 ± 4.9 in control group (Hasan Shahi et al., 2024), With alpha error of 1% (significance 99%), B error 5% (study power of 95%); the calculated sample size is 36 patients in each group. We can add 10% for improving data quality, so the studied sample will be 40 patients (intervention group) and 40 patients (control group).

**2.4. Tools of data collection:** Two tools were used.

**Tool I: A Structured Interview Questionnaire:** It was consisted of two parts.

**Part one: General characteristics and clinical information of the studied women**: It was included age, marital status, level of education, economic status, living status, type of surgery and stage of disease.

**Part two: The General Health Questionnaire-28 (GHQ-28)**

It was adopted from (Goldberg, 1992) to assess studied women mental health. The GHQ-28 consists of 4 subscales including somatic symptoms (items 1-7), anxiety/insomnia (items 8-14), social dysfunction (items 15-21) and severe depression (items 22-28).

**Scoring system**

Every item was answered using a 4-point Likert scale, with the alternatives for "none," "mild," "moderate," and "severe" being 0, 1, 2, and 3, respectively. 0 was the lowest possible score, and 84 was the highest. Scores ranging from 14 to 21 indicated how extreme the circumstances were in each of the four criteria. The cut-off value for the likelihood of having a mental health problem was 23 or above. Women who scored higher than 23 were not allowed to participate in the study.

**Tool II: Health Promoting Lifestyle Profile (HPLP) Scale**

It was adopted from **(Walker, Sechrist & Pender, 1987)** to measure health promoting lifestyle. It is an instrument with a 52-item summated behavior rating scale. It included six main domains: **the first domain**: include health responsibility (9 items), **the second domain:** physical activity (8 items), **the third domain:** nutrition (9items), **the fourth domain:** Spiritual Growth (9 items), **the fifth domain:** Interpersonal Relations (9 items), **the last domain:** Stress Management (8 items).

**Scoring system**

The frequency of self-reported health-promoting behaviors was measured by rating each item into four points: 1 (never), 2 (sometimes), 3 (often), and 4 (routinely). The questionnaire's overall score is computed after each subscale's score is determined independently. A higher score on the HPLP indicates a healthier lifestyle that promotes health. The total score ranges from 52 to 208.

The mean score of the responses to all items is used to generate the overall score; the mean of the responses to each domain's items was used to calculate the total score of each domain. Good frequency of health-promoting behavior is indicated by higher scores in each dimension, while bad frequency is indicated by lower values. When the total score was 75% or more, it was considered good; when it was 50 <75% , it was considered fair; and when it was less than 50%, it was considered poor.

**2.4.1. Validity of the study tools**

A panel of five experts in the field of midwifery nursing and women's health evaluated and improved the study tools' content validity. In order to assess how well the scores reflect the factors they were designed to evaluate, it was changed for clarity, content, item sequence, and content relevance or irrelevance. The jury members' suggestions, such as changing some terms in the questionnaire and rearranging some items, were implemented.

**2.4.2. Reliability of the study tools**

The internal consistency of the study tools was tested by means of the Cronbach's alpha coefficient test in statistical package of social science (SPSS) version 24. The Cronbach's alpha value (internal consistency) for Tool I, Part II (The General Health Questionnaire-28 (GHQ-28) was 0.801 and tool II (Health Promoting Lifestyle Profile (HPLP) Scale) 0.820 which indicate high reliability.

**2.5. Ethical Considerations**

All relevant possible aspects were considered. Ethical approval was obtained from Research Ethics Committee at the faculty of nursing, Mansoura University (no.726). A written consent was obtained from each studied women enrolled in the study after providing comprehensive information about the nature of the study, aim, benefits, risks, compensation, and alternative treatment. The researcher was emphasizing that participation is absolutely voluntary. Studied women was informed that they

have the right to refuse to participate in the study and withdrawn at any time and the refusal to participate in the study will not affect their care. Anonymity, privacy, safety, and confidentiality were assured throughout the whole study.

**2.6. Pilot study**

A pilot study was carried out on 10% (8 studied women) of the study sample to ensure the feasibility, clarity, relevance, comprehensiveness, free of mistakes and applicability of the study tools to allow necessary adjustment before conducting large scale study. Also, to estimate the time needed to fill the questionnaire sheet.

**2.7. Data Collection Process**

**The data collection procedure was divided into three phases:**

**I: Preparatory Phase:**

- An Ethical approval was obtained from the Research Scientific Ethical Committee of the Faculty of Nursing, Mansoura University.

- Official permissions to carry out the study were obtained from the director of the Oncology Center at Mansoura University Hospital to obtain the approval to conduct the study after an explanation of the purpose of the study.

- **Tools preparation: (A structured interview questionnaire)**, part one was developed by researcher and second part & tool II were adopted from **(Walker, Sechrist & Pender, 1987 & Goldberg, 1992)** based on a review of related national and international literature.

- **Preparing the educational materials:** The researcher prepared an Arabic booklet with illustrated pictures which was given to each studied women in intervention group.

**II: Implementation Phase:**

- The researcher attended the aforementioned location four times a week from 9 a.m. to 3 p.m. till the required sample size was reached as soon as the study was approved for conduct. Data collection started from the beginning of April 2025 and continued until the study sample was finished.

- Initially, women who scored less than 23 on the 28-item General Health Questionnaire (GHQ-28) were entered in the study.

- Purposive sampling was used to choose 80 women who satisfied the inclusion criteria and one of their family members who actively participated in their care. These women were then assigned to either the control or intervention group.

- To avoid bias, the control group was gathered before the intervention group.

- Forty women who only received standard hospital treatment (hormonal therapy, mammograms, routine laboratory testing, and tumor markers) made up the control group.

- After the intervention was finished, the women in the control group were given the educational booklet and had two supplementary sessions at the end of data collection for ethical reasons.

- Intervention group: The researcher divided the women under study into five groups, each consisting of eight women. Every group was given five counselling sessions to explore the continuous care model in addition to standard hospital care.

- The four phases of the study's structure were orientation, sensitization, control, and evaluation.

- **First stage (orientation)**: This phase included the first session, which was intended to serve as an introduction between the researcher, the women under study, and the family caregiver. The researcher created motivation and stressed the importance of ongoing care contact between the researcher and the studied women, clarified communication methods, set up

the necessary phone call schedules until the end of the intervention, and illustrated the study's goal and expectations to the women under study.

- **Second stage (sensitization)**: In order to create health accountability which is defined as helping studied women take responsibility for their health status, individual health care education, and consumption of food with minimal saturated fat and cholesterol, four sessions were held one week after the initial meeting. The status of breast cancer survivors and their family caregiver's stress management skills was examined at this meeting. During the sensitizing phase, the following subjects were discussed: increasing physical activity, enhancing interpersonal relationships, improving diet quality, and giving participants HPLP techniques.

- **Third stage (control):** Maintaining mutual relationships, reviewing the care process, and gathering input from earlier sessions were all parts of this phase.

**III: Evaluation phase:** Fourth stage (evaluation): Two months after the control stage, the final meeting was held to discuss the women's and families' perspectives regarding their health behaviors, including the possibility of continuing, a review of the successes and failures, consideration of suggestions, efforts to stabilize and sustain the behaviors and control, and the elimination or reduction of risk factors.

This stage sought to assess how adopting a continuous care strategy affected breast cancer survivors' lifestyles that promote health. The (HPLP) questionnaire was used to conduct a final evaluation of lifestyle variables in both the control and intervention groups after two months.

### 2.8. Statistical Analysis

All statistical analyses were performed using SPSS for windows version 24.0 (SPSS, Chicago, IL). Continuous data were normally distributed and were expressed as mean value. Categorical data were expressed in number and percentage. The significance test was calculated. Statistical significance for the comparison of different groups was compared using Chi-square test (or fisher's exact test when applicable) and a p-value $\leq 0.05$ was considered significant.

## 3. RESULTS

**Table (1)** shows that, there was no statistical significant difference among the intervention and control groups regarding demographic characteristics ($p > 0.05$). In which the mean $\pm$SD of age was ($45.05 \pm 7.60$ and $47.20 \pm 7.73$) for the intervention and control groups respectively. It is obvious that 80% in the intervention and 75% of control group were married. 45% and 40% of the intervention and control groups respectively had secondary school. 60% of the intervention group and 70% of control group had enough income. Also 85% of the intervention group and 70% of control group living with husband and children.

**Figure (1)** illustrates that there was no statistical significant difference between the intervention and control groups regarding their clinical information about the disease ($p > 0.05$). In which, 70% & 65% respectively of the intervention and control groups were diagnosed for more than 5 years. Also, 55% and 67%, respectively of the intervention and control groups were diagnosed at stage 2 of breast cancer. Moreover, 65% and 70%, respectively of the studied women in the intervention and control groups had mastectomy.

**Table (2)** shows that, there was no statistical significant difference between the intervention and control groups regarding their health responsibility pre intervention ($P > 0.05$). While, there was a significant improvement of the intervention group regarding their health responsibility post intervention compared to control group ($P \leq 0.05$). Following the intervention, women in the intervention group became more likely to report unusual signs and symptoms to healthcare professionals, seek health-related information, ask healthcare professionals to clarify their instructions, discuss their health concerns, obtain a second opinion when necessary, and seek guidance or counseling.

**Table (3)** shows that, there was no statistical significant difference between the intervention and control groups regarding their physical activity pre intervention ($P > 0.05$). While, there was a significant improvement of the intervention group regarding their physical activity post intervention compared to control group ($P \leq 0.05$). After implementing the Continuous Care Model, the studied women became more likely to follow a planned exercise program, participate in vigorous and light-to-moderate

physical activities, perform stretching exercises, incorporate exercise into their routine daily activities, and monitor their pulse and target heart rate during exercise.

**Table (4)** shows that, there was no statistical significant difference between the intervention and control groups regarding their nutrition pre intervention except eating breakfast (P >0.05). While, there was a significant improvement of the intervention group regarding their nutrition post intervention compared to control group (P ≤ 0.05). Following the intervention, women in the intervention group became more likely to choose a diet low in fat and cholesterol, limit sugar intake, consume appropriate servings of carbohydrates, fruits, vegetables, dairy products, and protein-rich foods, and regularly eat breakfast. In contrast, women in the control group demonstrated little or no improvement in these nutritional practices.

**Table (5)** shows that, there was no statistical significant difference between the intervention and control groups regarding their spiritual growth pre intervention (P > 0.05). While, there was a significant improvement of the intervention group regarding their spiritual growth post intervention compared to control group (P ≤ 0.05). Following the intervention, women in the intervention group became more likely to feel that they were growing and changing positively, believe that their lives had purpose, look forward to the future, work toward long-term goals, recognize what was important in their lives, and feel connected with a power greater than themselves.

**Table (6)** shows that, there was no statistical significant difference between the intervention and control groups regarding their interpersonal relations pre intervention (P > 0.05). While, there was a significant improvement of the intervention group regarding their interpersonal relations post intervention compared to control group (P ≤ 0.05). Following the intervention, women in the intervention group became more likely to discuss their problems and concerns with close people, praise others for their achievements, maintain meaningful relationships, spend time with close friends, express love and concern, accept affection from others, obtain support from a caring social network, and resolve conflicts through discussion and compromise.

**Table (7)** presents that, there was no statistical significant difference between the intervention and control groups regarding their stress management pre intervention (P > 0.05). While, there was a significant improvement of the intervention group regarding their stress management post intervention compared to control group (P ≤ 0.05). Following the intervention, women in the intervention group became more likely to obtain adequate sleep, allocate time for daily relaxation, accept situations that could not be changed, concentrate on pleasant thoughts before bedtime, use specific stress-control methods, balance work and leisure, practice relaxation or meditation, and pace their activities to prevent exhaustion. In contrast, women in the control group demonstrated little or no improvement in these practices.

**Figure (2)** illustrates that, the intervention group's overall health-promoting lifestyle improved from 86.1 to 138.4 after the intervention, while the control group's overall health-promoting lifestyle stayed constant from 88.03 to 88.23.

**Table 1:** Distribution of the studied women according to their demographic characteristics (No.=80)

| **Demographic Characteristics** | **Intervention group (No.=40)** | | **Control group (No.=40)** | | **Significant test** |
|---|---|---|---|---|---|
| | **Frequency** | **Percentage (%)** | **Frequency** | **Percentage (%)** | |
| **Age (years)** | | | | | |
| 20 – 40 | 10 | 25.0 | 9 | 22.5 | |
| > 40 – 60 | 28 | **70.0** | 27 | **67.5** | $X^2$= 0.74 |
| > 60 | 2 | 5.0 | 4 | 10.0 | P = 0.69 |
| Mean ± SD | 45.05 ± 7.60 | | 47.20 ± 7.73 | | |
| **Marital Status** | | | | | |
| Single | 0 | 0.0 | 2 | 5.0 | $X^2$= 3.13 |

| | | | | | |
|---|---|---|---|---|---|
| Married | 32 | **80.0** | 30 | **75.0** | P = 0.37 |
| Widow | 2 | 5.0 | 4 | 10.0 | |
| Divorced | 6 | 15.0 | 4 | 10.0 | |
| **Number of children** | | | | | |
| None | 0 | 0 | 2 | 5.0 | |
| 1 | 2 | 5.0 | 0 | 0.0 | $X^2$= 4.26 |
| 2 | 12 | 30.0 | 10 | 25.0 | P = 0.24 |
| ≥ 3 | 26 | **65.0** | 28 | **70.0** | |
| **Educational level** | | | | | |
| Not read and write | 6 | 15 | 6 | 15.0 | |
| Basic education | 12 | 30.0 | 16 | **40.0** | $X^2$= 1.36 |
| Secondary education | 18 | **45.0** | 16 | **40.0** | P = 0.72 |
| University degree &above | 4 | 10.0 | 2 | 5.0 | |
| **Income level** | | | | | |
| Not Enough | 14 | 35.0 | 12 | 30.0 | $X^2$= 2.46 |
| Enough | 24 | **60.0** | 28 | **70.0** | P = 0.29 |
| Enough and save | 2 | 5.0 | 0 | 0.0 | |
| **Living status** | | | | | |
| With husband and children | 34 | **85.0** | 28 | **70.0** | $X^2$= 4.18 |
| Parents | 4 | 10.0 | 4 | 10.0 | P = 0.12 |
| Alone | 2 | 5.0 | 8 | 20.0 | |

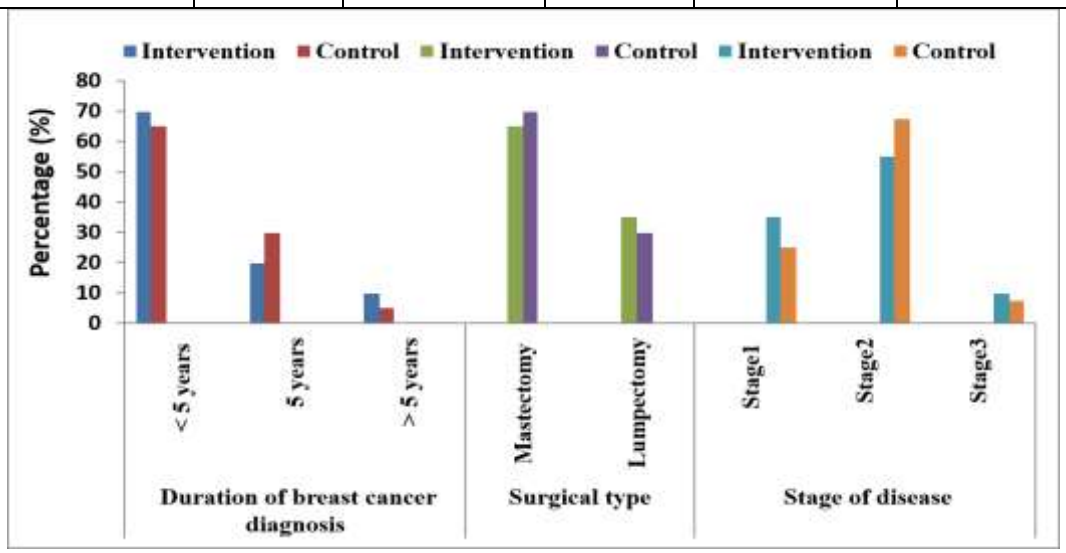



**Figure (1):** Distribution of the studied women according to their clinical information about the disease (n=80)

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| Health responsibility | Time | Intervention group (No.=40) | | | | Control group (No.=40) | | | | Significance test |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Never | Sometimes | Often | Routinely | Never | Sometimes | Often | Routinely | $\chi^2$ (P) |
| | | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | χ2 (P) |
| Inform the doctor of any unusual symptoms or indicators | **Pre** | 6 (15.0) | 30 (75.0) | 4 (10.0) | 0 (0.0) | 4 (10.0) | 34 (85.0) | 2 (5.0) | 0 (0.0) | 1.317 (0.518) |
| | **Post** | 0 (0.0) | 2 (5.0) | 24 (60.0) | 14 (35.0) | 4 (10.0) | 33 (82.5) | 3 (7.5) | 0 (0.0) | **61.790 (<0.001)**** |
| watch or read TV programs about health enhancement | **Pre** | 24(60.0)ccccv ))))))) (60.0) | 14(35.0) (((35.0) | 2 (5.0) | 0 (0.0) | 20 (50.0) | 20 (50.0) | 0 (0.0) | 0 (0.0) | 3.422 (0.181) |
| | **Post** | 2 (5.0) | 14 (35.0) | 18 (45.0) | 6 (15.0) | 20 (50.0) | 20 (50.0) | 0 (0.0) | 0 (0.0) | **39.786 (<0.001)**** |
| Inquire with medical specialists to comprehend their directions | **Pre** | 12 (30.0) | 26 (65.0) | 2 (5.0) | 0 (0.0) | 6 (15.0) | 30 (75.0) | 4 (10.0) | 0 (0.0) | 2.952 (0.229) |
| | **Post** | 0 (0.0) | 2 (5.0) | 30 (75.0) | 8 (20.0) | 2 (5.0) | 34 (85.0) | 4 (10.0) | 0 (0.0) | **58.327 (<0.001)**** |
| When seeking guidance from a healthcare expert, get a second opinion | **Pre** | 14 (35.0) | 26 (65.0) | 0 (0.0) | 0 (0.0) | 8 (20.0) | 32 (80.0) | 0 (0.0) | 0 (0.0) | 2.257 (0.133) |
| | **Post** | 0 (0.0) | 8 (20.0) | 26 (65.0) | 6 (15.0) | 8 (20.0) | 32 (80.0) | 0 (0.0) | 0 (0.0) | **54.400 (<0.001)**** |
| Talk to medical professionals about your health problems | **Pre** | 8 (20.0) | 26 (65.0) | 6 (15.0) | 0 (0.0) | 4 (10.0) | 34 (85.0) | 2 (5.0) | 0 (0.0) | 4.400 (0.111) |
| | **Post** | 0 (0.0) | 0 (0.0) | 28 (70.0) | 12 (30.0) | 4 (10.0) | 34 (85.0) | 2 (5.0) | 0 (0.0) | **72.533 (<0.001)**** |

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| Health responsibility | Time | Intervention group (No.=40) | | | | Control group (No.=40) | | | | Significance test |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Never | Sometimes | Often | Routinely | Never | Sometimes | Often | Routinely | $\chi^2$ (P) |
| | | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | χ2 (P) |
| Check the body for physical changes at least once a month | Pre | 26 (65.0) | 14 (35.0) | 0 (0.0) | 0 (0.0) | 28 (70.0) | 12 (30.0) | 0 (0.0) | 0 (0.0) | 0.228 (0.633) |
| | Post | 2 (5.0) | 14 (35.0) | 22 (55.0) | 2 (5.0) | 26 (65.0) | 14 (35.0) | 0 (0.0) | 0 (0.0) | **44.571 (<0.001)**** |
| Seek advice from medical specialists regarding self-care | Pre | 36 (90.0) | 4 (10.0) | 0 (0.0) | 0 (0.0) | 38 (95.0) | 2 (5.0) | 0 (0.0) | 0 (0.0) | 0.721 (0.396) |
| | Post | 4 (10.0) | 22 (55.0) | 14 (35.0) | 0 (0.0) | 37 (92.5) | 3 (7.5) | 0 (0.0) | 0 (0.0) | **55.001 (<0.001)**** |
| Participate in personal health care education programs | Pre | 36 (90.0) | 4 (10.0) | 0 (0.0) | 0 (0.0) | 31 (77.5) | 7 (17.5) | 2 (5.0) | 0 (0.0) | 3.191 (0.203) |
| | Post | 14 (35.0) | 24 (60.0) | 2 (5.0) | 0 (0.0) | 30 (75.0) | 8 (20.0) | 2 (5.0) | 0 (0.0) | 13.818 (0.001) |
| When needed, seek advice or counselling | Pre | 8 (20.0) | 26 (65.0) | 6 (15.0) | 0 (0.0) | 7 (17.5) | 23 (57.5) | 10 (25.0) | 0 (0.0) | 1.250 (0.535) |
| | Post | 0 (0.0) | 0 (0.0) | 30 (75.0) | 10 (25.0) | 2 (5.0) | 28 (70.0) | 10 (25.0) | 0 (0.0) | **50.000 (<0.001)**** |
| **Total Mean ±SD** | Pre | **14.25 ± 3.07** | | | | 14.85 ± 1.86 | | | | t 607.000,(p0.060) |
| | Post | **25.20 ± 4.05** | | | | 15.00 ± 1.87 | | | | **t 6.000 (p<0.001)**** |

**Table 2:** Distribution of the studied breast cancer survivors according to Health Responsibility pre- and post-intervention

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**Table 3:** Distribution of the studied breast cancer survivors according to Physical Activity pre- and post-intervention

| Physical activity | Time | Intervention group (No.=40) | | | | Control group (No.=40) | | | | Significance test |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Never | Sometimes | Often | Routinely | Never | Sometimes | Often | Routinely | $\chi^2$ (P) |
| | | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | χ2 (P) |
| Adhere to a scheduled exercise regimen | **Pre** | 34 (85.0) | 6 (15.0) | 0 (0.0) | 0 (0.0) | 36 (90.0) | 4 (10.0) | 0 (0.0) | 0 (0.0) | 0.457 (0.499) |
| | **Post** | 6 (15.0) | 22 (55.0) | 10 (25.0) | 2 (5.0) | 35 (87.5) | 5 (12.5) | 0 (0.0) | 0 (0.0) | **51.214 (<0.001)**** |
| At least three times a week, engage in intense exercise for 20 minutes | **Pre** | 38 (95.0) | 2 (5.0) | 0 (0.0) | 0 (0.0) | 39 (97.5) | 1 (2.5) | 0 (0.0) | 0 (0.0) | 0.346 (0.556) |
| | **Post** | 12 (30.0) | 18 (45.0) | 8 (20.0) | 2 (5.0) | 38 (95.0) | 2 (5.0) | 0 (0.0) | 0 (0.0) | **63.118 (<0.001)**** |
| Engage in mild to moderate exercise | **Pre** | 30 (75.0) | 10 (25.0) | 0 (0.0) | 0 (0.0) | 32 (80.0) | 8 (20.0) | 0 (0.0) | 0 (0.0) | 0.287 (0.592) |
| | **Post** | 4 (10.0) | 20 (50.0) | 14 (35.0) | 2 (5.0) | 30 (75.0) | 10 (25.0) | 0 (0.0) | 0 (0.0) | **46.667** (<0.001)** |
| Engage in physical activity during free time. | **Pre** | 20 (50.0) | 16 (40.0) | 4 (10.0) | 0 (0.0) | 18 (45.0) | 20 (50.0) | 2 (5.0) | 0 (0.0) | 1.239 (0.538) |
| | **Post** | 2 (5.0) | 12 (30.0) | 20 (50.0) | 6 (15.0) | 18 (45.0) | 20 (50.0) | 2 (5.0) | 0 (0.0) | **41.333 (<0.001)**** |
| Stretch at least three times a week | **Pre** | 28 (70.0) | 10 (25.0) | 2 (5.0) | 0 (0.0) | 30 (75.0) | 10 (25.0) | 0 (0.0) | 0 (0.0) | 0.615 (0.735) |
| | **Post** | 4 (10.0) | 16 (40.0) | 16 (40.0) | 4 (10.0) | 29 (72.5) | 11 (27.5) | 0 (0.0) | 0 (0.0) | **44.857 (<0.001)**** |
| Exercise while doing normal | **Pre** | 35 (87.5) | 5 (12.5) | 0 (0.0) | 0 (0.0) | 37 (92.5) | 3 (7.5) | 0 (0.0) | 0 (0.0) | 0.556 (0.456) |
| | **Post** | 8 (20.0) | 20 (50.0) | 10 (25.0) | 2 (5.0) | 36 (90.0) | 4 (10.0) | 0 (0.0) | 0 (0.0) | **56.250 (<0.001)**** |

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| Physical activity | Time | Intervention group (No.=40) | | | | Control group (No.=40) | | | | Significance test |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Never | Sometimes | Often | Routinely | Never | Sometimes | Often | Routinely | $\chi^2$ (P) |
| | | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | **χ2 (P)** |
| daily activities | | | | | | | | | | |
| When exercising, checking your pulse | **Pre** | 40 (100) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 40 (100) | 0 (0.0) | 0 (0.0) | 0 (0.0) | —[a] |
| | **Post** | 18 (45.0) | 14 (35.0) | 6 (15.0) | 2 (5.0) | 40 (100) | 0 (0.0) | 0 (0.0) | 0 (0.0) | **48.889 (<0.001)**** |
| When exercising, reach your target heart rate | **Pre** | 32 (80.0) | 8 (20.0) | 0 (0.0) | 0 (0.0) | 34 (85.0) | 6 (15.0) | 0 (0.0) | 0 (0.0) | 0.346 (0.556) |
| | **Post** | 4 (10.0) | 18 (45.0) | 14 (35.0) | 4 (10.0) | 33 (82.5) | 7 (17.5) | 0 (0.0) | 0 (0.0) | **48.571 (<0.001)**** |
| **Total Mean ±SD** | **Pre** | **9.10 ± 1.15** | | | | 9.05 ± 1.08 | | | | t 792.000 (p0.935) |
| | **Post** | **15.85 ± 3.85** | | | | 9.08 ± 1.10 | | | | **t62.000 (p<0.001)**** |

Note: a. No statistics are computed because the variable is a constant.

**Table 4:** Distribution of the studied breast cancer survivors according to Nutrition pre- and post-intervention

| Nutrition | Time | Intervention group (No.=40) | | | | Control group (No.=40) | | | | Significance test |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Never | Sometimes | Often | Routinely | Never | Sometimes | Often | Routinely | $\chi^2$ (P) |
| | | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | **χ2 (P)** |
| Select a diet with little fat, cholesterol, and saturated fat | **Pre** | 18 (45.0) | 20 (50.0) | 2 (5.0) | 0 (0.0) | 20 (50.0) | 18 (45.0) | 2 (5.0) | 0 (0.0) | 0.202 (0.904) |
| | **Post** | 2 (5.0) | 10 (25.0) | 20 (50.0) | 8 (20.0) | 19 (47.5) | 19 (47.5) | 2 (5.0) | 0 (0.0) | **42.667 (<0.001)**** |

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| Nutrition | Time | Intervention group (No.=40) | | | | Control group (No.=40) | | | | Significance test |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Never | Sometimes | Often | Routinely | Never | Sometimes | Often | Routinely | $\chi^2$ (P) |
| | | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | **χ2 (P)** |
| Restrict your sugar intake | **Pre** | 30 (75.0) | 8 (20.0) | 2 (5.0) | 0 (0.0) | 32 (80.0) | 8 (20.0) | 0 (0.0) | 0 (0.0) | 0.615 (0.735) |
| | **Post** | 6 (15.0) | 18 (45.0) | 12 (30.0) | 4 (10.0) | 30 (75.0) | 10 (25.0) | 0 (0.0) | 0 (0.0) | **44.800 (<0.001)**** |
| Consume six to eleven servings of carbohydrates every day | **Pre** | 26 (65.0) | 12 (30.0) | 2 (5.0) | 0 (0.0) | 24 (60.0) | 14 (35.0) | 2 (5.0) | 0 (0.0) | 0.202 (0.904) |
| | **Post** | 4 (10.0) | 10 (25.0) | 18 (45.0) | 8 (20.0) | 23 (57.5) | 15 (37.5) | 2 (5.0) | 0 (0.0) | **38.857 (<0.001)**** |
| Consume two to four servings of fruit every day | **Pre** | 28 (70.0) | 10 (25.0) | 2 (5.0) | 0 (0.0) | 30 (75.0) | 8 (20.0) | 2 (5.0) | 0 (0.0) | 0.615 (0.735) |
| | **Post** | 4 (10.0) | 12 (30.0) | 18 (45.0) | 6 (15.0) | 29 (72.5) | 9 (22.5) | 2 (5.0) | 0 (0.0) | **41.905 (<0.001)**** |
| Consume three to five servings of veggies every day | **Pre** | 30 (75.0) | 8 (20.0) | 2 (5.0) | 0 (0.0) | 32 (80.0) | 6 (15.0) | 2 (5.0) | 0 (0.0) | 0.430 (0.807) |
| | **Post** | 6 (15.0) | 14 (35.0) | 16 (40.0) | 4 (10.0) | 31 (77.5) | 7 (17.5) | 2 (5.0) | 0 (0.0) | **39.333 (<0.001)**** |
| Consume two to three servings of dairy products per day | **Pre** | 24 (60.0) | 14 (35.0) | 2 (5.0) | 0 (0.0) | 26 (65.0) | 12 (30.0) | 2 (5.0) | 0 (0.0) | 0.233 (0.890) |
| | **Post** | 4 (10.0) | 10 (25.0) | 20 (50.0) | 6 (15.0) | 25 (62.5) | 13 (32.5) | 2 (5.0) | 0 (0.0) | **42.381 (<0.001)**** |
| Consume just two | **Pre** | 18(45.0) | 16(40.0) | 6(15.0) | 0 (0.0) | 20(50.0) | 16(40.0) | 4(10.0) | 0 (0.0) | 0.430 (0.807) |

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| Nutrition | Time | Intervention group (No.=40) | | | | Control group (No.=40) | | | | Significance test |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Never | Sometimes | Often | Routinely | Never | Sometimes | Often | Routinely | $\chi^2$ (P) |
| | | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | **χ2 (P)** |
| to three servings of protein each day | | | | | | (50.0) | | | | |
| | **Post** | 2 (5.0) | 8 (20.0) | 20 (50.0) | 10(25.0) (25.0) | 19 (47.5) | 17 (42.5) | 4 (10.0) | 0 (0.0) | **44.190 (<0.001)**** |
| To determine the nutrients in packaged food, read the labels | **Pre** | 26 (65.0) | 12 (30.0) | 2 (5.0) | 0 (0.0) | 24 (60.0) | 14 (35.0) | 2 (5.0) | 0 (0.0) | 0.202 (0.904) |
| | **Post** | 4 (10.0) | 12 (30.0) | 18 (45.0) | 6 (15.0) | 23 (57.5) | 15 (37.5) | 2 (5.0) | 0 (0.0) | **37.905 (<0.001)**** |
| Consume breakfast | **Pre** | 22 (55.0) | 16 (40.0) | 2 (5.0) | 0 (0.0) | 24 (60.0) | 14 (35.0) | 2 (5.0) | 0 (0.0) | 0.233 (0.890) |
| | **Post** | 2 (5.0) | 10 (25.0) | 18 (45.0) | 10(25.0) (25.0) | 23 (57.5) | 15 (37.5) | 2 (5.0) | 0 (0.0) | **46.667 (<0.001)**** |
| **Total Mean ±SD** | **Pre** | **17.55 ± 2.86** | | | | 17.63 ± 2.51 | | | | t 718.500(p0.426) |
| | **Post** | **26.25 ± 3.48** | | | | 17.68 ± 2.54 | | | | **t52.000(p<0.001)**** (<0.001)**(<0.001)****(<0.001)**** |

**Table5:** Distribution of the studied breast cancer survivors according to Spiritual Growth pre- and post-intervention

| Spiritual growth | Time | Intervention group (No.=40) | | | | Control group (No.=40) | | | | Significance test |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Never | Sometimes | Often | Routinely | Never | Sometimes | Often | Routinely | $\chi^2$ (P) |
| | | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | **χ2 (P)** |
| I feel like I'm developing and changing for the better | **Pre** | 6 (15.0) | 24 (60.0) | 10(25.0) | 0 (0.0) | 8 (20.0) | 22(55.0) | 10(25.0) | 0 (0.0) | 0.430 (0.807) |
| | **Post** | 0 (0.0) | 4 (10.0) | 22 (55.0) | 14 (35.0) | 8 (20.0) | 22 (55.0) | 10 (25.0) | 0 (0.0) | **39.111 (<0.001)**** |

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| Spiritual growth | Time | Intervention group (No.=40) | | | | Control group (No.=40) | | | | Significance test |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Never | Sometimes | Often | Routinely | Never | Sometimes | Often | Routinely | $\chi^2$ (P) |
| | | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | χ2 (P) |
| | | | | | | | | | | |
| Have faith in the meaning of my life | **Pre** | 4 (10.0) | 26 (65.0) | 10 (25.0) | 0 (0.0) | 6 (15.0) | 24 (60.0) | 10 (25.0) | 0 (0.0) | 0.430 (0.807) |
| | **Post** | 0 (0.0) | 2 (5.0) | 24 (60.0) | 14 (35.0) | 6 (15.0) | 24 (60.0) | 10 (25.0) | 0 (0.0) | **41.905 (<0.001)**** |
| Anticipate the future | **Pre** | 8 (20.0) | 20 (50.0) | 12 (30.0) | 0 (0.0) | 6 (15.0) | 22 (55.0) | 12 (30.0) | 0 (0.0) | 0.287 (0.866) |
| | **Post** | 0 (0.0) | 6 (15.0) | 20(50.0) | 14 (35.0) | 6 (15.0) | 22 (55.0) | 12 (30.0) | 0 (0.0) | **37.333 (<0.001)**** |
| Feel satisfied and at ease with yourself | **Pre** | 10 (25.0) | 24 (60.0) | 6 (15.0) | 0 (0.0) | 12 (30.0) | 22 (55.0) | 6 (15.0) | 0 (0.0) | 0.287 (0.866) |
| | **Post** | 0 (0.0) | 6 (15.0) | 22 (55.0) | 12 (30.0) | 10 (25.0) | 24 (60.0) | 6 (15.0) | 0 (0.0) | **40.000 (<0.001)**** |
| Work toward your long-term objectives | **Pre** | 8 (20.0) | 24 (60.0) | 8 (20.0) | 0 (0.0) | 10 (25.0) | 22 (55.0) | 8 (20.0) | 0 (0.0) | 0.287 (0.866) |
| | **Post** | 0 (0.0) | 4 (10.0) | 20 (50.0) | 16 (40.0) | 10 (25.0) | 22 (55.0) | 8 (20.0) | 0 (0.0) | **44.444 (<0.001)**** |
| Consider every day to be challenging and fascinating. | **Pre** | 6 (15.0) | 26 (65.0) | 8 (20.0) | 0 (0.0) | 8 (20.0) | 24 (60.0) | 8 (20.0) | 0 (0.0) | 0.430 (0.807) |
| | **Post** | 0 (0.0) | 4 (10.0) | 22 (55.0) | 14 (35.0) | 8 (20.0) | 24 (60.0) | 8 (20.0) | 0 (0.0) | **42.000 (<0.001)**** |
| Conscious of my priorities in life | **Pre** | 4 (10.0) | 22 (55.0) | 14 (35.0) | 0 (0.0) | 6 (15.0) | 20 (50.0) | 14 (35.0) | 0 (0.0) | 0.430 (0.807) |
| | **Post** | 0 (0.0) | 2 (5.0) | 20 (50.0) | 18 (45.0) | 6 (15.0) | 22 (55.0) | 12 (30.0) | 0 (0.0) | **46.667 (<0.001)**** |

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| Spiritual growth | Time | Intervention group (No.=40) | | | | Control group (No.=40) | | | | Significance test |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Never | Sometimes | Often | Routinely | Never | Sometimes | Often | Routinely | $\chi^2$ (P) |
| | | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | χ2 (P) |
| Feel a connection to something greater than self | Pre | 6 (15.0) | 24 (60.0) | 10 (25.0) | 0 (0.0) | 8 (20.0) | 22 (55.0) | 10 (25.0) | 0 (0.0) | 0.430 (0.807) |
| | Post | 0 (0.0) | 6 (15.0) | 20 (50.0) | 14 (35.0) | 8 (20.0) | 22 (55.0) | 10 (25.0) | 0 (0.0) | **37.905 (<0.001)**** |
| Take up new challenges and experiences | Pre | 6 (15.0) | 22 (55.0) | 12 (30.0) | 0 (0.0) | 8 (20.0) | 20 (50.0) | 12 (30.0) | 0 (0.0) | 0.287 (0.866) |
| | Post | 0 (0.0) | 4 (10.0) | 18 (45.0) | 18 (45.0) | 8 (20.0) | 20 (50.0) | 12 (30.0) | 0 (0.0) | **44.000 (<0.001)**** |
| **Total Mean ±SD** | Pre | **15.20 ± 3.41** | | | | 15.78 ± 2.65 | | | | t 677.000 (p 0.234) |
| | Post | **24.15 ± 4.10** | | | | 15.88 ± 2.60 | | | | **t82.000 (p<0.001)*** |

**Table 6:** Distribution of the studied breast cancer survivors according to Interpersonal Relations pre- and post-intervention

| Interpersonal relations | Time | Intervention group (No.=40) | | | | Control group (No.=40) | | | | Significance test |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Never | Sometimes | Often | Routinely | Never | Sometimes | Often | Routinely | $\chi^2$ (P) |
| | | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | χ2 (P) |
| Talk up issues and worries with those you are close to | Pre | 10 (25.0) | 24 (60.0) | 6 (15.0) | 0 (0.0) | 12 (30.0) | 22 (55.0) | 6 (15.0) | 0 (0.0) | 0.287 (0.866) |
| | Post | 0 (0.0) | 6 (15.0) | 22 (55.0) | 12 (30.0) | 12 (30.0) | 22 (55.0) | 6 (15.0) | 0 (0.0) | **40.000 (<0.001)**** |
| Easily commend others for | Pre | 12 (30.0) | 22 (55.0) | 6 (15.0) | 0 (0.0) | 14 (35.0) | 20 (50.0) | 6 (15.0) | 0 (0.0) | 0.287 (0.866) |

| Interpersonal relations | Time | Intervention group (No.=40) | | | | Control group (No.=40) | | | | Significance test |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Never | Sometimes | Often | Routinely | Never | Sometimes | Often | Routinely | $\chi^2$ (P) |
| | | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | **χ2 (P)** |
| their accomplishments | **Post** | 2 (5.0) | 8 (20.0) | 20 (50.0) | 10 (25.0) | 14 (35.0) | 20 (50.0) | 6 (15.0) | 0 (0.0) | **37.333 (<0.001)**** |
| Continue to have deep and satisfying connections | **Pre** | 14 (35.0) | 20 (50.0) | 6 (15.0) | 0 (0.0) | 16 (40.0) | 18 (45.0) | 6 (15.0) | 0 (0.0) | 0.287 (0.866) |
| | **Post** | 2 (5.0) | 10 (25.0) | 18 (45.0) | 10 (25.0) | 16 (40.0) | 18 (45.0) | 6 (15.0) | 0 (0.0) | **34.667 (<0.001)**** |
| Spend time with your close companions | **Pre** | 8 (20.0) | 24 (60.0) | 8 (20.0) | 0 (0.0) | 10 (25.0) | 22 (55.0) | 8 (20.0) | 0 (0.0) | 0.287 (0.866) |
| | **Post** | 0 (0.0) | 4 (10.0) | 20 (50.0) | 16 (40.0) | 10 (25.0) | 22 (55.0) | 8 (20.0) | 0 (0.0) | **46.667 (<0.001)**** |
| Show others warmth, compassion, and concern with ease. | **Pre** | 6 (15.0) | 24 (60.0) | 10 (25.0) | 0 (0.0) | 8 (20.0) | 22 (55.0) | 10 (25.0) | 0 (0.0) | 0.430 (0.807) |
| | **Post** | 0 (0.0) | 2 (5.0) | 18 (45.0) | 20 (50.0) | 8 (20.0) | 22 (55.0) | 10 (25.0) | 0 (0.0) | **50.000 (<0.001)**** |
| Touch and be touched by those that care about you | **Pre** | 16 (40.0) | 18 (45.0) | 6 (15.0) | 0 (0.0) | 18 (45.0) | 16 (40.0) | 6 (15.0) | 0 (0.0) | 0.287 (0.866) |
| | **Post** | 2 (5.0) | 8 (20.0) | 20 (50.0) | 10 (25.0) | 18 (45.0) | 16 (40.0) | 6 (15.0) | 0 (0.0) | **36.000 (<0.001)**** |
| Look for strategies to satisfy | **Pre** | 8 (20.0) | 22 (55.0) | 10 (25.0) | 0 (0.0) | 10 (25.0) | 20 (50.0) | 10 (25.0) | 0 (0.0) | 0.287 (0.866) |

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| Interpersonal relations | Time | Intervention group (No.=40) | | | | Control group (No.=40) | | | | Significance test |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Never | Sometimes | Often | Routinely | Never | Sometimes | Often | Routinely | $\chi^2$ (P) |
| | | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | **χ2 (P)** |
| intimate demands | **Post** | 0 (0.0) | 4 (10.0) | 18 (45.0) | 18 (45.0) | 10 (25.0) | 20 (50.0) | 10 (25.0) | 0 (0.0) | **44.444 (<0.001)**** |
| Obtain assistance from a network of kind individuals | **Pre** | 4 (10.0) | 20 (50.0) | 16 (40.0) | 0 (0.0) | 6 (15.0) | 18 (45.0) | 16 (40.0) | 0 (0.0) | 0.430 (0.807) |
| | **Post** | 0 (0.0) | 2 (5.0) | 16 (40.0) | 22 (55.0) | 6 (15.0) | 18 (45.0) | 16 (40.0) | 0 (0.0) | **48.889 (<0.001)**** |
| Resolve disputes with others by compromise and dialog | **Pre** | 6 (15.0) | 24 (60.0) | 10 (25.0) | 0 (0.0) | 8 (20.0) | 22 (55.0) | 10 (25.0) | 0 (0.0) | 0.430 (0.807) |
| | **Post** | 0 (0.0) | 4 (10.0) | 18 (45.0) | 18 (45.0) | 8 (20.0) | 22 (55.0) | 10 (25.0) | 0 (0.0) | **44.444 (<0.001)**** |
| **Total Mean ±SD** | **Pre** | **18.90 ± 3.92** | | | | 19.13 ± 2.75 | | | | t 790.000 (p0.922) |
| | **Post** | **26.40 ± 3.32** | | | | 19.18 ± 2.73 | | | | **t 63.000 (p<0.001)**** (<0.001)** (<0.001)**0.001)**(<0.001)**(<0.001)****(<0.001)**** |

*******A highly statistically significant difference **(P ≤ 0.001)** **X²:** Chi square

**Table 7:** Distribution of the studied breast cancer survivors according to Stress Management pre- and post-intervention

| Stress management | Time | Intervention group (No.=40) | | | | Control group (No.=40) | | | | Significance test |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Never | Sometimes | Often | Routinely | Never | Sometimes | Often | Routinely | $\chi^2$ (P) |
| | | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | **χ2 (P)** |
| Make sure you get enough rest | **Pre** | 30 (75.0) | 8 (20.0) | 2 (5.0) | 0 (0.0) | 32 (80.0) | 6 (15.0) | 2 (5.0) | 0 (0.0) | 0.430 (0.807) |
| | **Post** | 4 (10.0) | 12 (30.0) | 18 (45.0) | 6 (15.0) | 31 (77.5) | 7 (17.5) | 2 (5.0) | 0 (0.0) | **40.000 (<0.001)**** |

| Stress management | Time | Intervention group (No.=40) | | | | Control group (No.=40) | | | | Significance test |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Never | Sometimes | Often | Routinely | Never | Sometimes | Often | Routinely | $\chi^2$ (P) |
| | | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | χ2 (P) |
| Spend some time relaxing every day | **Pre** | 24 (60.0) | 14 (35.0) | 2 (5.0) | 0 (0.0) | 26 (65.0) | 12 (30.0) | 2 (5.0) | 0 (0.0) | 0.233 (0.890) |
| | **Post** | 2 (5.0) | 10 (25.0) | 20 (50.0) | 8 (20.0) | 25 (62.5) | 13 (32.5) | 2 (5.0) | 0 (0.0) | **42.381 (<0.001)**** |
| Accept the things in life that are unchangeable | **Pre** | 20 (50.0) | 16 (40.0) | 4 (10.0) | 0 (0.0) | 22 (55.0) | 14 (35.0) | 4 (10.0) | 0 (0.0) | 0.287 (0.866) |
| | **Post** | 2 (5.0) | 8 (20.0) | 20 (50.0) | 10 (25.0) | 21 (52.5) | 15 (37.5) | 4 (10.0) | 0 (0.0) | **39.619 (<0.001)**** |
| Before going to bed, focus on happy thoughts | **Pre** | 22 (55.0) | 14 (35.0) | 4 (10.0) | 0 (0.0) | 24 (60.0) | 12 (30.0) | 4 (10.0) | 0 (0.0) | 0.287 (0.866) |
| | **Post** | 2 (5.0) | 10 (25.0) | 18 (45.0) | 10 (25.0) | 23 (57.5) | 13 (32.5) | 4 (10.0) | 0 (0.0) | **41.905 (<0.001)**** |
| Employ particular techniques to manage stress | **Pre** | 32 (80.0) | 6 (15.0) | 2 (5.0) | 0 (0.0) | 34 (85.0) | 4 (10.0) | 2 (5.0) | 0 (0.0) | 0.430 (0.807) |
| | **Post** | 6 (15.0) | 14 (35.0) | 16 (40.0) | 4 (10.0) | 33 (82.5) | 5 (12.5) | 2 (5.0) | 0 (0.0) | **41.143 (<0.001)**** |
| Make time for both work and play | **Pre** | 26 (65.0) | 12 (30.0) | 2 (5.0) | 0 (0.0) | 28 (70.0) | 10 (25.0) | 2 (5.0) | 0 (0.0) | 0.233 (0.890) |
| | **Post** | 4 (10.0) | 10 (25.0) | 20 (50.0) | 6 (15.0) | 27 (67.5) | 11 (27.5) | 2 (5.0) | 0 (0.0) | **39.619 (<0.001)**** |
| Every day, spend 15 to 20 minutes relaxing. | **Pre** | 18 (45.0) | 18 (45.0) | 4 (10.0) | 0 (0.0) | 20 (50.0) | 16 (40.0) | 4 (10.0) | 0 (0.0) | 0.287 (0.866) |
| | **Post** | 2 (5.0) | 8 (20.0) | 18 (45.0) | 12 (30.0) | 19 (47.5) | 17 (42.5) | 4 (10.0) | 0 (0.0) | **42.286 (<0.001)**** |

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| Stress management | Time | Intervention group (No.=40) | | | | Control group (No.=40) | | | | Significance test |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Never | Sometimes | Often | Routinely | Never | Sometimes | Often | Routinely | $\chi^2$ (P) |
| | | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | N (%) | χ2 (P) |
| To avoid becoming fatigued, pace yourself | **Pre** | 20 (50.0) | 16 (40.0) | 4 (10.0) | 0 (0.0) | 22 (55.0) | 14 (35.0) | 4 (10.0) | 0 (0.0) | 0.287 (0.866) |
| | **Post** | 0 (0.0) | 6 (15.0) | 20 (50.0) | 14 (35.0) | 21 (52.5) | 15 (37.5) | 4 (10.0) | 0 (0.0) | **44.000 (<0.001)**** |
| **Total Mean ±SD** | **Pre** | **11.10 ± 2.19** | | | | 11.60 ± 1.79 | | | | t 644.000 (p0.126) |
| | **Post** | **20.55 ± 1.68** | | | | 11.48 ± 1.65 | | | | **t 0.000 (p<0.001)*** |

***A highly statistically significant difference **(P ≤ 0.001)** **X²:** Chi square

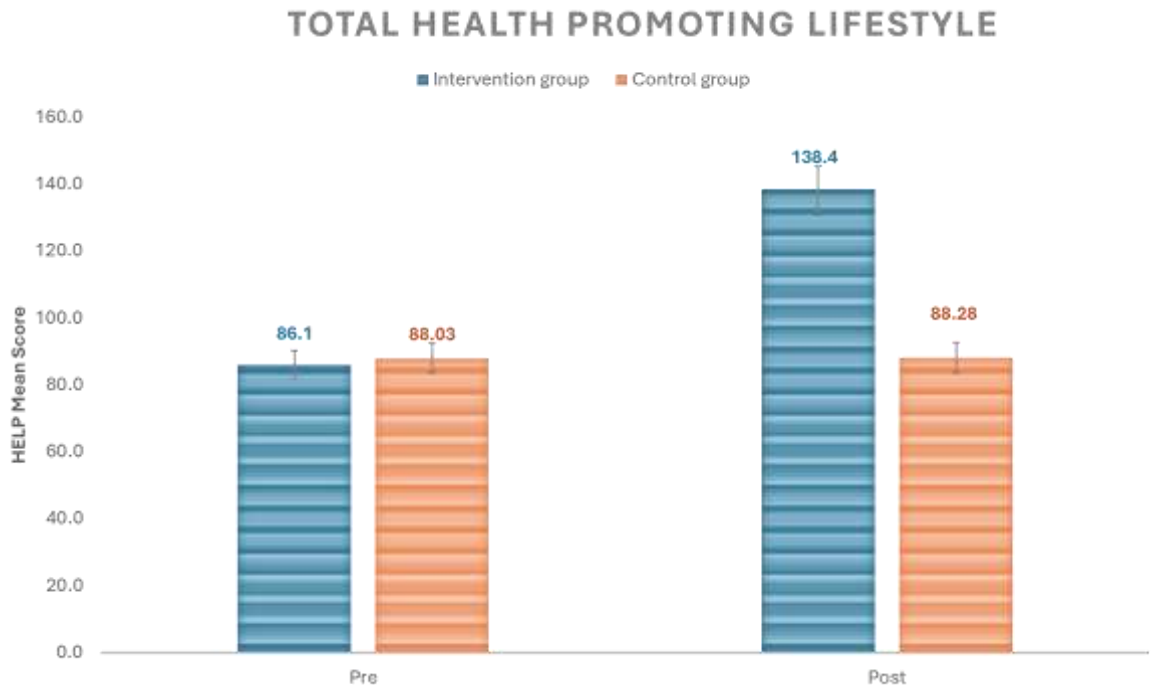



**Figure (2):** Mean scores of health promoting lifestyle in the intervention and control groups pre and post the intervention (N = 80)

## 4.DISCUSSION

The current study's objective was to assess how adopting the model of continuous care affected breast cancer survivors' health-promoting lifestyles. The results of the study demonstrated a highly statistically significant difference in health-promoting lifestyle between the intervention and control groups, with a considerable improvement in the intervention group, supporting the study hypothesis.

The results of the current study showed that, when the model of continuous care was applied, the health responsibility of survivors of breast cancer in the intervention group improved statistically significantly as compared to the control group. This outcome was consistent with the findings of Hsia et al. (2024), who highlighted the significance of health-behavior self-efficacy in encouraging healthy lifestyles between female survivors of breast cancer and found that increased confidence in carrying out health-related behaviors may motivate survivors to consult professionals, interact with healthcare providers more successfully, and become active in managing their health.

Additionally, this outcome was consistent with the findings of Çol et al. (2024), who assessed a health-promotion training program among breast cancer survivors and found that all aspects of healthy lifestyle behavior, including health responsibility, significantly increased after the intervention. Positive interpersonal interactions with the women under study, interactive education, and social involvement in supporting more personal health responsibility and the adoption of proper self-care behaviors could all contribute to this agreement.

However, the results of Alanazi et al. (2025), who tracked women with early-stage breast cancer from the start of chemotherapy for two years, were in contrary with the current findings. They discovered that health-responsibility behaviors did not show significant improvement with time and stayed at the "sometimes" level. This discrepancy could be explained by the lack of a focused health-promotion intervention in their observational trial, as well as variations in treatment status, length of follow-up, sample characteristics, and the psychological and physical load that chemotherapy takes.

After applying the model of continuous care, the intervention group of breast cancer survivors showed a statistically significant increase in physical activity when compared to the control group, according to the study's findings. The results of this study were in line with those of Lévai et al. (2025), who assess how health promotion interventions affect women recuperating from breast cancer's health-promoting habits. In terms of physical activity, the results indicated a substantial interaction between group and time, with physical activity rising in the intervention group and falling or staying the same in the control group.

Additionally, a study by Lam et al. (2025) to evaluate the impact of yoga on shoulder range of motion in women recovering from breast cancer surgery found that the yoga group significantly improved right hand up back scratch test scores and the scores of shoulder rotation flexibility at every time points, suggesting that upper-extremity mobility in women with breast cancer can be improved through yoga intervention. The Continuous Care Model improved the participants' awareness, motivation, and capacity to adopt a more physically active lifestyle, which may account for the agreement between the current study and prior studies.

Goldschmidt et al. (2023) found that exercise interventions produced a moderately significant improvement in moderate-to-vigorous physical activity for up to six months; however, the effects on total physical activity were small and statistically nonsignificant, and the benefits tended to decline over longer follow-up periods. The current study's findings, however, disagreed with their findings. This discrepancy could be caused by differences in the length and intensity of therapies, how physical activity is measured, the health conditions of survivors, and the availability of ongoing professional care following the intervention.

When the model of continuous care was used with the intervention group of breast cancer survivors, the results showed a statistically significant improvement in nutritional behaviors when compared to the control group. This result suggests that the survivors breast cancer were encouraged to cultivate healthier and more balanced eating habits through ongoing education and follow-up.

The results of the current study were corroborated by Miao et al. (2026), who assessed the impact of dietary quality-focused nutrition education on cancer-related fatigue in breast cancer patients. They discovered that a 12-week dietary quality-based nutrition education significantly reduced cancer-related fatigue (CRF) and enhanced breast cancer patients' other health-related

outcomes, indicating that nutrition education may be a useful approach for managing CRF and promoting recovery during treatment of breast cancer.

Additionally, Qyaty et al. (2026) found that after six months of the educational program's implementation, there was a statistically significant improvement in the nutritional status of the two groups. The applied educational program significantly improved the study group's nutritional status when compared to the control group, with highly significant differences. The agreement with the current study highlights the critical role that nurses play in providing clear dietary advice, tailored counseling, and ongoing support.

The current results were also in line with those of Guðjónsdóttir et al. (2026), who assessed the impact of dietary guidance during cancer treatment on quality of life and found statistically significant correlations between higher post-treatment quality of life and patient-reported adequate discussions about dietary habits and/or nutrition-related issues during cancer treatment. This agreement might result from the application of motivational communication, practical teaching, and frequent follow-up, all of which can help turn dietary advice into regular eating habits.

However, the current result did not match with that of Lévai et al. (2026), whose multidisciplinary health-promotion program did not show a significant group-by-time improvement in the nutrition dimension but produced significant improvements in the overall health-promoting lifestyle, physical activity, spiritual growth, and emotional well-being. This discrepancy could be explained by variations in the nutritional content and intensity of the intervention, baseline dietary habits of the participants, cultural food patterns, timing of surgery and therapy, sample size, and length of follow-up.

The results of this study showed that, in comparison with the control group, breast cancer survivors in the intervention group exhibited a statistically significant improvement in spiritual growth following the implementation of the Continuous Care Model. This result suggests that the intervention improved the survivors' sense of purpose, hope, personal growth, and inner strength in addition to their physical health.

The results of Lévai et al. (2026), who found a significant interaction between group and time for spiritual growth with more positive improvements among participants who received the intervention than among those in the control group, corroborated the current conclusion. The potential of structured therapies to help women find purpose in their cancer experience, boost hope, engage in relaxation and meditation, and discern between situations they can control and those they must accept may be the reason for this consensus.

In comparison to the control group, the results of this study showed a statistically significant improvement in interpersonal relationships among breast cancer survivors in the intervention group following the implementation of the model of continuous care. These results show that the intervention improved the survivors' capacity for social interaction, emotional expression, communication, and asking for and accepting help from others.

This outcome was consistent with Tabrizi et al. (2020), who discovered that women in the intervention group significantly improved their interpersonal relationships after using the Continuous Care Model, while the control group did not exhibit any statistically significant improvement. The similarity of the population under study and the application of group discussions, ongoing communication, education, and follow-up to enhance survivors' lifestyle practices may contribute to the agreement between the two research.

Guan et al. (2021), who investigated the function of social support in encouraging participation of patient in health care among women with breast cancer. In the same way, Wang et al. (2022) found that a supportive expressive group intervention lead by a nurse greatly enhanced post-traumatic growth in breast cancer survivors, especially in the area of relating to others. The interactive and encouraging nature of the interventions employed in both research may be the reason for this agreement.

Compared to the control group, the results of the current study showed a statistically significant improvement in stress management between survivors of breast cancer in the intervention group following the implementation of the continuous care model. Stress management interventions (SMIs) teach skills to help cancer patients and survivors manage and diminish stress and lessen its detrimental impact on emotional well-being and health, according to Antoni et al. (2023), who evaluated the interventions of stress management to support cancer patients' and survivors' physical and mental adjustment and best possible health outcomes. This agreement can be the result of the intervention strengthening the survivors' capacity to identify stressors and implement suitable coping and relaxing techniques.

Svendsen et al. (2025) evaluated the coping after breast cancer trial, which assessed two digital interventions of stress-management based on cognitive-behavioral and mindfulness techniques. They found no statistically significant differences between the intervention group and the ordinary care group in the selected outcomes after six months of having access to the interventions. This finding, however, was inconsistent with the current findings. Variations in intervention delivery, participant engagement, professional contact, adherence, follow-up time, and outcome-measurement techniques may be the cause of this discrepancy.

After applying the model of continuous care, the intervention group's mean score considerably improved in every dimension when compared to the control group, according to the study's findings. The results of the current study were corroborated by Hasanshahi et al. (2024), who looked at how the continuous care model affected cancer patients' lifestyles and found that it had a big influence.

Additionally, Shahraki et al. (2024), who assessed the impact of the continuous care model on cancer patients' self-efficacy, discovered that the model increases cancer patients' self-efficacy and suggested that nursing models and theories, in particular the continuous care model can be integrated into organized and planned educational programs to provide nursing care, particularly supportive care.

Additionally, Moafi et al. (2025), who assessed the influence of a continuous care design on breast cancer patients' self-efficacy, found that the program is successful in raising the self-efficacy of Iranian women with breast cancer. The teaching, counseling, ongoing follow-up, support, and feedback given throughout the different phases of the continuous care model may be responsible for the agreement between the study's findings. It's possible that ongoing communication with the survivors enhanced their understanding, cleared up misunderstandings, and inspired them to speak honestly with medical professionals.

## 5.Conclusion and Recommendations

Based on the current study's findings, it was determined that, when compared to the control group, breast cancer survivors who received the continuous care model showed significant improvements in all aspects of health-promoting lifestyle behaviors, including health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management.

**In light of the study findings, the following recommendations are suggested:**

- Integrating the Continuous Care Model into routine nursing care and programs of survivorship for breast cancer survivors.
- Creating organized educational and counselling programs to encourage breast cancer survivors to lead healthy lifestyles.
- Promoting interdisciplinary cooperation between doctors, nurses, dietitians, psychologists, and physiotherapists in order to offer complete survivorship care.

**Further research:**

- Examining long-term research to assess the sustainability and long-term impacts of the Continuous Care Model on behaviors that promote health.
- Organizing workshops and training courses to improve nurses' abilities to provide ongoing, patient-centered care.
- Conducting training programs and workshops to enhance nurses' competencies in delivering continuous and patient-centred care.

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## 7.Declaration of Conflicting Interests

The authors declared that this work has no conflicts of interest.

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