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# Survivorship Care Effects on Gynecological and Breast Cancer Survivors: A Systematic Review and Meta-Analysis

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## Abstract

Survivorship care aims to address the long-term physical and psychosocial needs of cancer survivors, yet evidence regarding its effectiveness and optimal components remains inconsistent. This study aimed to evaluate the effectiveness of survivorship care interventions on quality of life and related outcomes among gynecological and breast cancer survivors and explored intervention components associated with improved outcomes with PRISMA guidelines. Seven databases were searched for English-language studies involving adult gynecological and/or breast cancer survivors who had completed primary treatment and received survivorship care interventions compared with usual care. A random-effects model was used to estimate pooled effects. Heterogeneity was assessed using the $I^2$ statistic, and subgroup analyses and meta-regression were performed. Risk of bias was evaluated using the Cochrane Risk of Bias tool. The review was registered in PROSPERO (CRD42023402234). Eight randomized controlled trials comprising 1,464 participants were included. Survivorship care interventions significantly improved overall quality of life (SMD = 0.26; 95% CI: 0.08–0.44), physical well-being (SMD = 0.26; 95% CI: 0.12–0.41), mental well-being (SMD = 0.17; 95% CI: 0.03–0.31), and reduced depressive symptoms (SMD = 0.20; 95% CI: 0.00–0.41), with low to moderate heterogeneity across outcomes. Subgroup analyses indicated that multimodal interventions incorporating lectures, discussions, consultations, and online coaching particularly those supported by mobile health applications were associated with greater benefits, especially in physical well-being. Several studies demonstrated moderate risk of bias, mainly related to randomization and reporting. Survivorship care interventions provide small to moderate clinically meaningful improvements in quality of life and psychosocial outcomes among gynecological and breast cancer survivors. These findings support the integration of structured, multidisciplinary, and technology assisted survivorship care into routine oncology practice, while highlighting the need for higher quality, context sensitive trials.

**Keywords:** Breast Cancer, Gynecological Cancer, Survivorship Care, Survivorship, Meta-Analysis.

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## 1. INTRODUCTION

Gynecological cancer and breast cancer are the two most common non-communicable diseases in women worldwide (Sung et al., 2021; Yi et al., 2021). The number of cancer survivors is constantly rising every year (Globocan, 2020; Sung et al., 2021 ), which potentially decreases their quality of life (Molassiotis et al., 2017; Prasongvej et al., 2017; Seib et al., 2022). A survey from China and developed countries reported that the survival rate of gynecological cancer and non-metastatic breast cancer range between 84%-91% (Feuerstein & Nekhlyudov, 2018; Rodriguez & Foxhall, 2018; Zhang et al., 2019). Multidisciplinary personnel including medical practitioners, nurses, psychologists, dieticians, and spiritual leaders initiate to meet the survivors' using multimodal interventions (LaGrandeur et al., 2018; Powel & Seibert, 2017; Rodriguez & Foxhall, 2018). Those interventions focus on treatment planning for survivors, for instance, information on the disease, treatment, and other components like understanding of the disease and self-care efforts that the survivors can take while receiving outpatient care (European Society for Medical Oncology, 2020; Kementerian Kesehatan Republik Indonesia, 2018; National Comprehensive Cancer Network, 2020). However, several burdens include lack of knowledge regarding survivorship care, deficit self-care and uncertainty of the condition that potentially leads to lower quality of life, depression, and higher mortality rate (Broom & Kenny, 2021; Iyer & Ring, 2017; Nardin et al., 2020). Therefore, managing the later effects of therapy, monitoring the signs and symptoms of recurrence and providing psychosocial support may potentially improve the quality of life among gynecological and breast cancer survivors.

The survivorship care components have been developed by several associated organizations in various countries (American Society of Clinical Oncology, 2014; Koczwara et al., 2023). The goals of the survivorship care include improving the survivors' self-care and quality of life. Theoretically, survivorship care interventions are grounded in the Quality of Cancer Survivorship Care Framework, which encompasses five key domains: surveillance for recurrence, assessment and management of physical and psychosocial effects, health promotion, and care coordination. This framework posits that survivorship care improves outcomes through three primary pathways: enhancing patient activation through knowledge and self-management skills, facilitating care coordination between providers, and providing structured environmental support. For example, a quasi-experimental study showed that survivorship care can reduce unmet needs, fear of recurrence, and improve short- and long-term quality of life in breast cancer survivors (Fang et al., 2020). However, the study used a-non RCT design. Despite the importance of survivorship care, there is a lack of synthesized evidence from high-quality RCTs that systematically examines the effectiveness of survivorship care interventions on multiple health outcomes including quality of life, physical well-being, emotional well-being, and depression among gynecological and breast cancer survivors. The utilization of Randomized Controlled Trials (RCTs) is crucial in obtaining the highest level of evidence-based research (Ruzbarsky, 2021).

Recently, RCT studies have shown that survivorship care can improve the quality of life of breast cancer survivors and various outcomes such as improved healthy lifestyle (Seib et al., 2022). However, several related studies have also found opposite findings, where the survivorship care is ineffective in achieving its goals (Palmer et al., 2015; Rooij et al., 2018; Syrjala et al., 2022). These inconsistent findings across different health outcomes (quality of life, physical well-being, emotional well-being, and depression) suggest that the effectiveness of survivorship care may vary depending on specific intervention components and characteristics, yet no comprehensive meta-analysis has systematically synthesized the evidence across these multiple outcomes or identified which intervention components contribute most to improvements in each outcome domain. Furthermore, it has been suggested that the inclusion of superior evidence can enhance the precision and generalizability of the findings as well as their consistency. Conducting subgroup analysis and meta-regression is

beneficial to explore the important components in designing interventions to improve the quality of life among gynecological and breast cancer survivors. Therefore, this systematic review and meta-analysis aimed to evaluate the effectiveness of survivorship care interventions on quality of life, physical well-being, emotional well-being, and depression among gynecological and breast cancer survivors, and to identify key intervention components associated with improved outcomes through subgroup analysis and meta-regression of randomized controlled trials.

## 2. RESEARCH METHOD

This systematic review and meta-analysis was registered in the International Prospective Register of Systematic Reviews (PROSPERO; Registration Number: CRD42023402234). The study was conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021). The objective of this review was to evaluate the effectiveness of survivorship care interventions on quality of life, physical well-being, mental well-being, and depression among gynecological and breast cancer survivors.

A comprehensive literature search was conducted across seven electronic databases, including ScienceDirect, PubMed, Scopus, ProQuest, MEDLINE, Cochrane Central Register of Controlled Trials (CENTRAL), and ClinicalKey. The search covered studies published from January 2013 to February 2024 to ensure the inclusion of contemporary evidence. The search strategy employed a combination of keywords and Boolean operators, such as “survivorship care” AND (“gynecological cancer” OR “breast cancer”) AND “quality of life.” Additional relevant studies were identified through manual screening of reference lists.

Eligible studies were randomized controlled trials (RCTs) that evaluated survivorship care interventions compared with usual care among gynecological and/or breast cancer survivors who had completed primary treatment. Studies were included if they reported outcomes related to quality of life, physical well-being, mental well-being, or depression. Studies were excluded if participants had a pre-existing clinical diagnosis of mental disorders prior to the intervention, although studies assessing depressive symptoms as an outcome were retained.

Study selection was conducted independently by two reviewers (LAN and LAF) through title and abstract screening, followed by full-text assessment of potentially eligible articles. Discrepancies were resolved through discussion or consultation with a third reviewer (ID) until consensus was reached. Data extraction was performed independently by three reviewers (LAN, ID, and AP) using a standardized data extraction form. Extracted information included study characteristics (author, year, country), participant details, intervention characteristics, comparators, and outcomes of interest. Reference management and duplicate removal were conducted using EndNote software.

The methodological quality and risk of bias of the included studies were assessed using the Cochrane Risk of Bias Tool for Randomized Controlled Trials (RoB 2.0). This process was carried out independently by three reviewers (LAN, LAF, and US), with additional reviewers (AP, ID, and DD) involved in resolving any disagreements.

Data analysis was performed using Comprehensive Meta-Analysis (CMA) version 2 software. Effect sizes for continuous outcomes were calculated as standardized mean differences (SMDs) with 95% confidence intervals (CIs), and a random-effects model was applied to account for heterogeneity among studies. Statistical heterogeneity was assessed using the $I^2$ statistic. Moderator analyses were conducted to examine the influence of intervention characteristics on outcomes, including quality of life, physical well-being, mental well-being, and depression. Publication bias was evaluated using Begg and Mazumdar’s rank correlation

test and Kendall's tau statistics, while sensitivity analyses were performed to assess the robustness of the findings.

## 3. RESULTS AND DISCUSSION

There were a total of 978 articles returned from searches in seven electronic databases using specific keywords, and three papers returned from manual searches. After deleting duplicate articles, a screening was performed based on the title and abstract, with 873 articles being excluded since they did not fit the predetermined criteria. Further, 26 full-text papers were reviewed, with the final stage of the procedure including eight articles in this study (Figure 1).

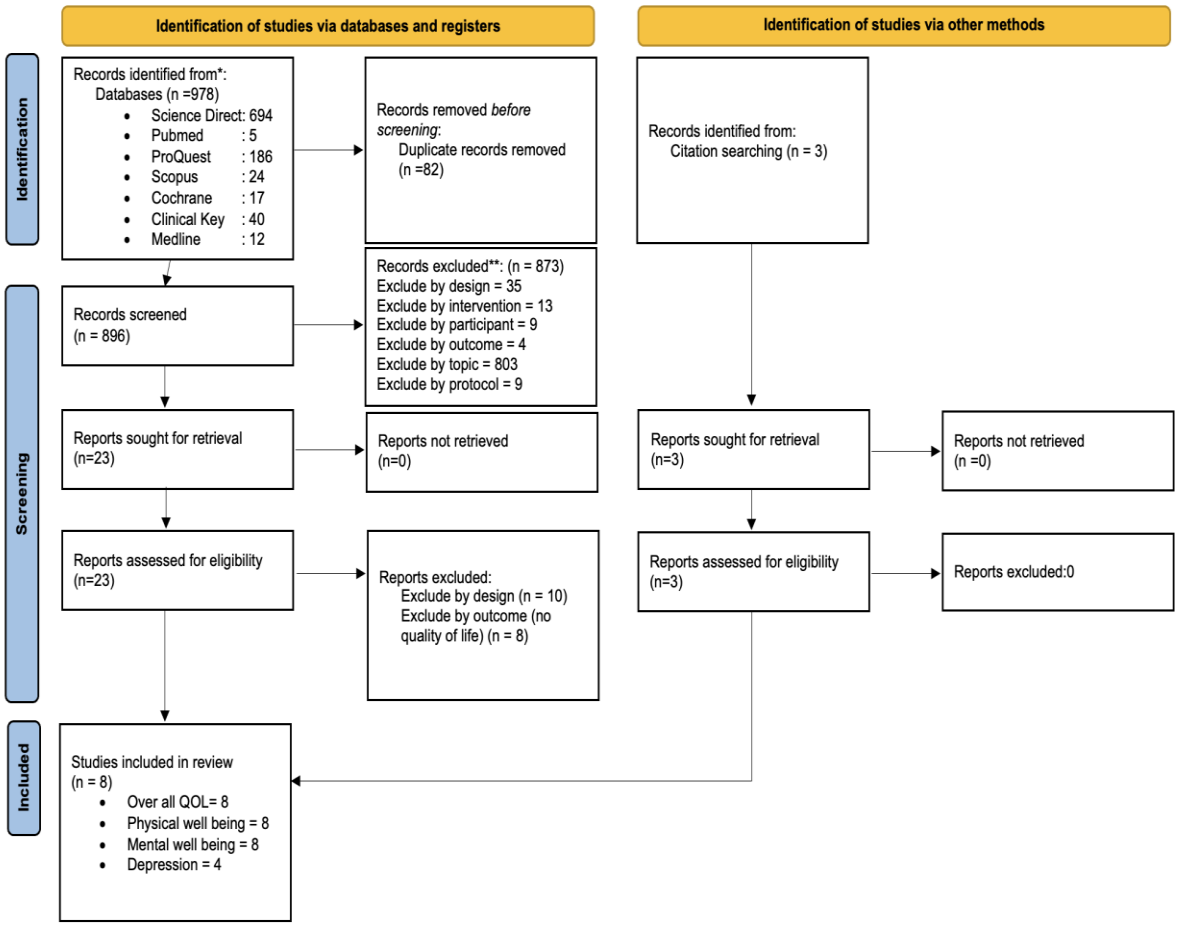



**Figure 1.** PRISMA flow diagram.

The number of participants involved in this study ranged from 79 to 351 participants (Table 1). The age range was 52-78 years. All studies had various styles, content, and characteristics of survivorship care services (Table 1). This study consisted of studies from Australia (Butow et al., 2017; Seib et al., 2022; Singleton et al., 2022) ; the United States (Hershman et al., 2013; Kvale et al., 2016; O'Hea et al., 2022; Ramirez et al., 2020); and the Netherlands (Rooij et al., 2018). Most of the delivery formats were lecture and discussion, mainly in five researches (Butow et al., 2017; Hershman et al., 2013; Kvale et al., 2016; O'Hea et al., 2022; Ramirez et al., 2020). One study used a combination of lecturing, discussion, and consulting (Rooij et al., 2018), another used online coaching (Seib et al., 2022), and one with lecturing format only (Singleton et al., 2022). All studies were carried out in the hospital setting. The content of the survivorship care intervention mostly referred to the framework developed by the Institute of Medicine, which included treatment summary, information on side effects and treatment management, relapse screening and surveillance, and promotion of a healthy

lifestyle (Butow et al., 2017; Hershman et al., 2013; Kvale et al., 2016; O'Hea et al., 2022; Rooij et al., 2018; Seib et al., 2022). However, three studies developed information in the survivorship care intervention by integrating finance and insurance information (Hershman et al., 2013; Ramirez et al., 2020; Singleton et al., 2022).

**Table 1.** Participant and intervention characteristics.

| No | Author (year) Country | Participant | Education format | Content of survivorship care | Characteristic of survivorship care | Setting | Outcome measure | Measurement tools |
|---|---|---|---|---|---|---|---|---|
| 1. | Butow et al., (2017) | Sample Size:<br>I: 115<br>C: 96<br><br>Average of age (years):<br>I: 53.31<br>C: 52.27 | Lecture and discussion | Anxiety management strategies<br>Confirmation and education on incorrect anxiety information<br>Health monitoring and screening behavior<br>Education on follow-up visits, and<br>Relapse prevention strategies (nutrition and physical activity) | Providers: Nurses<br>Technology base: No<br>Psychological support: Yes<br>Relapse symptom information: Yes<br>Finance and insurance support information: No<br>Symptom management: Yes | Hospital | Physical well-being at 6 months<br>Mental well-being at 6 months | AQoL 8D |
| 2. | Hershman et al., (2013) | Sample size:<br>I: 66<br>C: 60<br><br>Average of age (years):<br>I: 53.7 (SD)<br>C: 54.9 | Lecture and discussion | Treatment summary<br>Cancer survivorship definition<br>Post-cancer life<br>Coping with recurring cancer<br>Maintaining a healthy lifestyle<br>Rehabilitation<br>Follow-up care following | Providers: Nurses, nutritionists<br>Technology base: No<br>Psychological support: Yes<br>Relapse symptom information: Yes<br>Finance and | Hospital | Physical well-being at 6 months<br>Depression at 6 months | - FACT-B<br>- CES-D |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | cancer treatment<br>Long-term side effect of cancer treatment<br>Describing second cancer<br>Living with cancer while receiving long-term treatment<br>Peer support<br>Survivorship resources<br>Treatment tips<br>Nutrition and lifestyle program | insurance support information: Yes<br>Symptom management: Yes | | | |
| 3 | Kvale et al., (2016) | Sample size:<br>I: 40<br>C: 39<br><br>Average of age (years):<br>I: 57.23<br>C: 59.51 | Lecture and discussion | Discussion on treatment experience (treatment summary)<br>Self-care management<br>Identification of treatment goals<br>Plan for return visits for screening<br>Discussion related to symptoms experienced<br>Lifestyle<br>Treatment issues | Providers: Coach (masters-level mental health professionals)<br>Technology base: No<br>Psychological support: Yes<br>Relapse symptom information: Yes<br>Finance and insurance support information: No<br>Symptom management: Yes | Hospital | Physical well-being at 3 months<br>Mental well-being at 3 months<br>Depression at 3 months | - SF-36<br>- PHQ-9 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 4. | O'Hea et al., (2022) | Sample size:<br>I: 100<br>C: 100<br><br>Average of age (years):<br>I: 61<br>C: 59 | Lecture and discussion | Diagnosis and treatment status<br>Treatment details<br>Side-effects of therapy<br>Scanning / test schedule<br>Current pharmacological therapy<br>Issues<br>Schedule for return visits / consults<br>Information and references | Providers : Nurses, research staff<br>Technology base: Web<br>Psychological support: Yes<br>Relapse symptom information: Yes<br>Finance and insurance support information: No<br>Symptom management: Yes | Hospital | Overall QoL at 6 months<br>Physical well-being at 6 months<br>Mental well-being at 6 months | QoL-BC |
| 5. | Ramirez et al., (2020) | Sample size:<br>I:60<br>C:60<br><br>Average of age (years):<br>I:56.4 (9.7)<br>C: 58.2 (9.4) | Lecture and discussion | The significance of suggested follow-up cancer screening and schedules<br>Exercise class<br>Nutrition class<br>Application of Medicaid, Mediacare<br>Information on post-therapy diseases | Providers : Nurses<br>Technology base: Phone<br>Psychological support: No<br>Relapse symptom information: Yes<br>Finance and insurance support information: Yes<br>Symptom management: Yes | Hospital | Overall QoL at 6 months<br>Physical well-being at 6 months<br>Mental well-being at 6 moths | FACT-G<br>FACT-B |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 6. | Rooij et al., (2018) | Endometrial Cancer<br>Sample size:<br>I: 119<br>C: 102<br><br>Average of age (years):<br>I: 67.4<br>C: 67.8<br>Ovarian Cancer<br>Sample size:<br>I: 61<br>C: 113<br>Average of age (years):<br>I: 63.6<br>C: 64.3 | Lecture, consultations and discussion | Information related to cancer history, stage, diagnostic tests and therapies carried out<br>Short-term and long-term effects of therapy (psychosocial and sexual)<br>Signs of relapse and secondary tumors<br>Supportive treatment | Providers: gynecologist / gynecologic oncologist, or oncology nurse provider<br>Technology base: No<br>Psychological support: Yes<br>Relapse symptom information: Yes<br>Finance and insurance support information: No<br>Symptom management: No | Hospital | Overall QoL | HRQoL |
| 7. | Seib et al., (2022) | Sample size:<br>I: 175<br>C: 176<br><br>Average of age (years):<br>I: 52.6<br>C: 53.7 | Online coaching, counselling, interactive e-Book | Physical activity<br>Nutrition<br>Information related to psychosocial and management of menopause<br>No alcohol<br>Rest / sleep | Providers: Registered nurses<br>Technology base: Web<br>Psychological support: Yes<br>Relapse symptom information: Yes<br>Finance and insurance support | Hospital | Physical well-being at 6 months<br>Mental well-being at 6 months | HRQoL |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | information: No Symptom management: No | | | |
| 8. | Singleton et al., (2022) | Sample size: Lecture I: 78 C: 78<br><br>Average of age (years): I: 53.8 C: 55.7 | Phsyical activity and nutrition Information related to psychosocial Medication adherence Side-effects of therapy General informaton regarding the course of breast cancer | Providers: Counsellor, mobile health Technology base: Text Psychological support: Yes Relapse symptom information: No Finance and insurance support information: Yes Symptom management: Yes | Hospital | Overall QoL 6 months Depression 6 months | - EORTC QLQ-C30 - DASS 21 |

***Note:*** *AQoL8D, The Assessment of Quality of Life - 8 Dimensions; FACT-B, The Functional Assessment of Cancer Therapy - Breast; CES-D, Center for Epidemiologic Studies-Depression; SF-36, The 36-Item Short Form Health Survey; PHQ-9, Patient Health Questionnaire- 9; QoL-BC, Quality Of Life – Breast Cancer; FACT-G, The Functional Assessment of Cancer Therapy - General; HRQoL, Health-related Quality of Life; EORTC QLQ-C30, European Organization for Research and Treatment of Cancer Quality of Life Questionnaire-C30; DASS 21, Depression, Anxiety and Stress Scale - 21 Items.*

Five studies evaluated the effectiveness of survivorship care on overall quality of life. The findings indicated that survivorship care had an impact on the overall quality of life among cancer survivors. The cancer survivors who received the intervention scored higher on the overall quality of life than those who received usual care (SMD = 0.26, 95% CI= 0.08-0.44) with $I^2 = 40\%$ (p = 0.155) (Table 2, Figure 2a), indicating that there was moderate heterogeneity. Moreover, the cancer survivors who received the survivorship care intervention had higher physical well-being than those who received usual care (SMD = 0.27; 95% CI = 0.12-0.41) with $I^2 = 20\%$ (p = 0.28) (Table 2, Figure 2b), indicating the lower heterogeneity. Meanwhile, the cancer survivors who received the survivorship care had higher mental well-being scores than those with usual care (SMD = 0.18, 95% CI = 0.03-0.32) with $I^2 = 0.00$ (p-value of 0.49) (Table 2, Figure 2c). Lastly, cancer survivors who received the survivorship care had lower depression scores than those with usual care (SMD = 0.21, 95% CI = 0.004-0.41) with $I^2 = 0.00$ (p-value of 0.46) (Table 2, Figure 2d).

**Table 2.** Effectiveness of survivorship care interventions on overall quality of life, physical well-being, mental well-being, and depression.

| Outcome | n | SMD [95% CI] | Heterogeneity | |
|---|---|---|---|---|
| | | | $I^2$ | p |
| Overall quality of life | 5 | 0.264 [0.086-0.442] ** | 39.97 | .155 |
| Physical well-being | 6 | 0.268 [0.121-0.416] *** | 19.81 | .284 |
| Mental well-being | 5 | 0.176 [0.034-0.317] ** | 0.00 | .496 |
| Depression | 3 | 0.207 [0.004-0.411]* | 0.00 | .458 |

***Note:*** *n: total participants; SMD: Standardized mean different; CI: Confident interval; I2: Heterogeneity; p: p-value; * > .01; **> 0.05; ***:> .001.*

The results of moderator analysis revealed that survivorship care provided by nurses and gynecological specialists showed a trend toward improved quality of life compared to the control group, though this effect was not statistically significant (SMD = 0.13; 95% CI = -0.18-0.44). Similarly, compared to participants receiving usual care, the SCP format, which combined lecturing, discussion, and consultation processes, demonstrated a small, non-significant effect on overall quality of life (SMD = 0.13; 95% CI = -0.18-0.44). In contrast, technologically based interventions (mobile health) demonstrated a statistically significant moderate improvement in quality of life (SMD = 0.50; 95% CI = 0.14-0.87). However, these subgroup findings should be interpreted with caution, as several subgroups contained only a single study, limiting the robustness and generalizability of these estimates. The lack of statistical significance in some subgroups, as indicated by confidence intervals crossing zero suggests that further research with larger sample sizes is needed to confirm these preliminary observations.

The survivorship care, which included the psychological support content in the form of delivering information about mental health, had been shown to increase the survivors' quality of life (SMD = 0.22; 95% CI = -0.00 - 0.44). An intriguing aspect was also demonstrated in the information material related to the finance and insurance information. The findings indicate that integrating this content in the intervention would improve the quality of life even more (SMD = 0.40; 95% CI = 0.16 - 0.64). Similar findings were reported in the physical well-being, with the survivors receiving the survivorship care that contained information on the symptom management having higher physical well-being than those who did not (SMD = 0.19; 95% CI = 0.04 - 0.35) (Table 3).

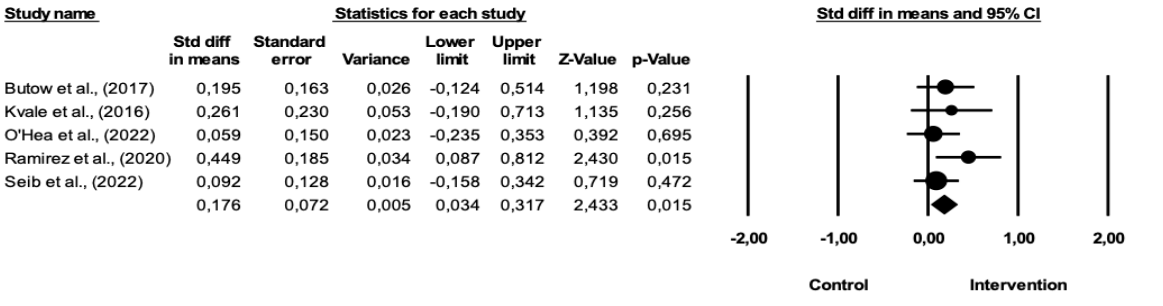
**Table 3.** Subgroup analysis and meta-regression of survivorship care on overall quality of life, physical well-being.

| Variables | Overall Quality of Life | | | Physical well-being | | |
|---|---|---|---|---|---|---|
| | *n* | SMD [95% CI] | *p* | *n* | SMD [95% CI] | p |
| Provider | | | 0.707 | | | 0.440 |
| Nurse | 2 | 0.24 [-0.25; 0.73] * | - | 2 | 0.36 [0.094; 0.64] * | - |
| Nurse + Gynecologist | 1 | 0.13 [-0.18; 0.44] * | - | 1 | 0.30 [-0.06; 0.66] * | - |
| Nurse + Nutritionist | 0 | - | - | 1 | 0,02 [-0.31; 0.35] * | - |
| Psychologist | 0 | - | - | 2 | 0.23 [-0.03; 0.49] * | - |
| Counsellor | 1 | 0.32 [0.00; 0.63] * | - | 0 | - | - |
| SCP Format | | | 0.707 | | | 0.113 |
| Lecturing | 1 | 0.31 [0.01; 0.63] * | | 1 | 0.49 [0.24; 0.75] *** | |

| | | | | | |
|---|---|---|---|---|---|
| Lecturing + Discussion | 2 | 0.24 [-0.25-0.73] | | 4 | 0.17 [0.01; 0.34] * | |
| Lecturing + Discussion + Consultation | 1 | 0.13 [-0.18; 0.44] * | | 1 | 0.30 [-0.05; 0.66] * | |
| Technology based | | | 0.160 | | | 0.425 |
| Phone | 1 | 0.50 [0.14; 0.87] ** | | 1 | 0.30 [-0.06; 0.66] * | |
| Text | 1 | 0.32 [0.01; 0.63] * | | 0 | - | |
| Web | 1 | 0.01 [-0.29; 0.29] | | 2 | 0.36 [0.09;0.64] ** | |
| Psychological support | | | 0.944 | | | **0.009** |
| Yes | 2 | 0.22 [-0.00;0.44] * | | 4 | 0.27 [0.03; 0.50] ** | |
| No | 2 | 0.24 [-0.25; 0.73] * | | 2 | 0.25 [0.02; 0.48] ** | |
| Information about sign of recurrence | | | 0.537 | | | 0.120 |
| Yes | 2 | 0.30 [-0.06; 0.67] * | | 5 | 0.28 [0.09; 0.46] ** | |
| No | 2 | 0.15 [-0.16; 0.46] * | | 1 | 0.22 [-0.08; 0.51] * | |
| Financial support | | | **0.04** | | | 0.310 |
| Yes | 2 | 0.40 [0.16; 0.64] ** | | 2 | 0.15 [-0.13; 0.43] * | |
| No | 2 | 0.06 [-0.16; 0.28] | | 4 | 0.32 [0.15; 0.14] *** | |
| Symptoms management | | | 0.55 | | | **0.047** |
| Yes | 3 | 0.26 [-0.03; 0.55] ** | | 5 | 0.19 [0.04; 0.35] ** | |
| No | 1 | 0.13 [-0.18; 0.44] * | | 1 | 0.49 [0.24; 0.75] *** | |

***Note:*** *n: total participants; SDM: Standardized mean different; CI: Confident interval; I2: Heterogeneity; p: p-value; * > .01; **> 0.05; ***: > .001.*

a

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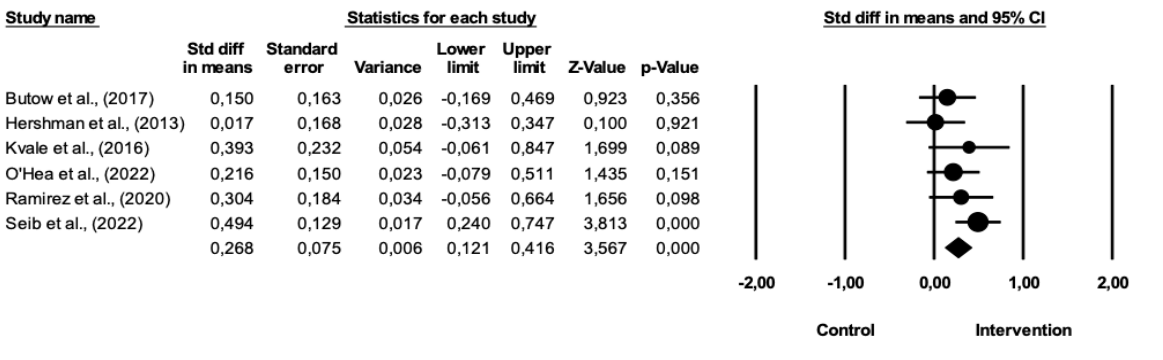
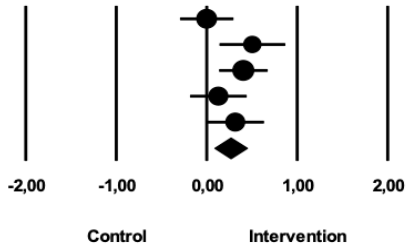


c

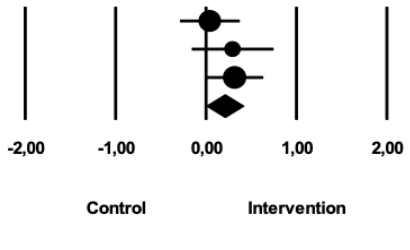
| Study name | Std diff in means | Standard error | Variance | Lower limit | Upper limit | Z-Value | p-Value |
|---|---|---|---|---|---|---|---|
| O'Hea et al., (2022) | 0,000 | 0,150 | 0,023 | -0,295 | 0,295 | 0,000 | 1,000 |
| Ramirezetal.,(2020) | 0,505 | 0,185 | 0,034 | 0,141 | 0,868 | 2,721 | 0,007 |
| Rooij et al., (2018)a | 0,405 | 0,136 | 0,019 | 0,138 | 0,672 | 2,971 | 0,003 |
| Rooij et al., (2018)b | 0,128 | 0,159 | 0,025 | -0,183 | 0,440 | 0,808 | 0,419 |
| Singleton et al., (2022) | 0,316 | 0,161 | 0,026 | 0,001 | 0,632 | 1,963 | 0,050 |
| | 0,264 | 0,091 | 0,008 | 0,086 | 0,442 | 2,909 | 0,004 |




Meta Analysis

d

| Study name | Std diff in means | Standard error | Variance | Lower limit | Upper limit | Z-Value | p-Value |
|---|---|---|---|---|---|---|---|
| Hersman et al., (2013) | 0,042 | 0,168 | 0,028 | -0,288 | 0,372 | 0,251 | 0,802 |
| Kvle et al., (2016) | 0,294 | 0,231 | 0,053 | -0,158 | 0,746 | 1,275 | 0,202 |
| Singleton et al., (2022) | 0,316 | 0,161 | 0,026 | 0,001 | 0,632 | 1,963 | 0,050 |
| | 0,207 | 0,104 | 0,011 | 0,004 | 0,411 | 1,996 | 0,046 |




Meta Analysis

**Figure 2.** Effectiveness of survivorship care: a) on overall quality of life, b) on physical well-being, c) on mental well-being, and d) on depression.

Among the included studies, six studies had a low risk of bias in all categories of risk of bias, namely the randomization method, intervention variation, missing outcome data, measurement bias of research outcomes, and data selection. Two publications exhibited some concerns about the bias, but they were nonetheless included in the selected research because the bias was limited to one domain in each study. Figure 3 depicts the findings of the bias risk assessment. The Kendall test results for overall quality of life, physical well-being, and mental well-being variables are z = 0.83 and p value = 0.08; z = 0.00 and p value = 1.00. The Egger test results indicated that there was no publication bias in these three variables. After excluding one study that had a significant impact on the heterogeneity, Ramirez et al. (2020). The result revealed that the cancer survivors who received intervention had significantly higher overall quality of life and physical well-being (SMD: 0.221, 95% CI: 0.01-0.43; SMD: 0.194, 95% CI: 0.04-0.34, respectively). Therefore, it could be concluded that the analysis results were robust.

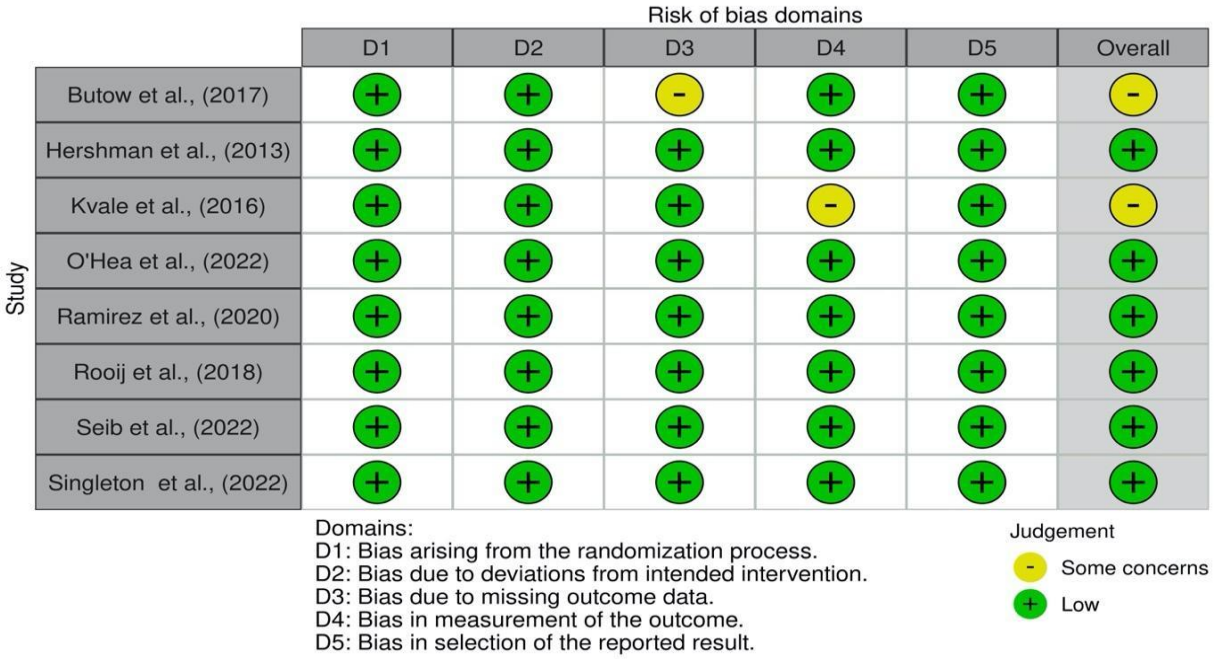



**Figure 3.** Risk of bias assessment.

This study investigated critical components in the implementation of survivorship care for distinct populations through moderator analysis. The results of this study suggest that the survivorship care for the survivors of gynecological cancer and/or breast cancer aged 52-61 years old could improve their overall quality of life. This is consistent with prior research that found the survivorship care to have an impact on the survivors' quality of life (Beesley et al., 2019; Palmer et al., 2015; Rowland et al., 2013). The survivors who received the survivorship care had a higher quality of life, because this treatment clarified their needs and strived to satisfy those needs after the therapy was completed. The presence of survivorship care influenced the survivors' knowledge, which in turn influenced the survivors' quality of life (Boekhout et al., 2015; Broom & Kenny, 2021; Feuerstein & Nekhlyudov, 2018; Rodriguez & Foxhall, 2018).

The results of this study also show that the survivorship care promoted physical and mental well-being in the survivors of gynecological and breast cancer. These findings are consistent with several prior studies (Lonneke et al., 2017; Syrjala et al., 2022). Furthermore, the survivorship care could increase the survivors' readiness for the possibility of post-therapy side effects, as well as their understanding of treatment management for these symptoms, resulting in improved physical and mental well-being and a lower incidence of depression in the survivors. This finding is also consistent with earlier research showing that the survivors who received survivorship care had lower depression scores (Boekhout et al., 2015; Brothers et al., 2013; Hill et al., 2020). Furthermore, this study found that implementing survivorship care with specialist doctors and nurses had a greater effect than implementing it with only nurses or counselors using an implementation format that included the provision of information, discussion, and consultation. According to previous research, multidisciplinary coordination in the implementation of survivorship care was more effective, because it served as a means of communication between the survivors and the healthcare team involved in their care (European Society for Medical Oncology, 2020; Knobf, 2015; Powel & Seibert, 2017).

Compared to the manual, web, and text techniques, the results of this systematic review and meta-analysis suggest that the use of technology through the mobile health application had been beneficial in implementing the survivorship care. These findings are consistent with

previous researches which found that using the mobile health application could help the survivors and the healthcare team implement the survivorship care without being limited by space or time, maximizing the provision of information, as it could be accessed repeatedly and used as a means of consultation (Broom & Kenny, 2021; Cassileth & Yarett, 2014; Foxhall & Rodriguez, 2015).

In addition, the results of this study indicate that survivorship care incorporating financial and insurance information was particularly effective in improving survivors' quality of life, while symptom management information was more strongly associated with improvements in physical well-being. In low and middle-income country (LMIC) settings, including Indonesia, cancer survivorship is frequently accompanied by substantial financial toxicity, driven by high out-of-pocket expenditures, indirect costs such as transportation and income loss, and limited access to comprehensive post-treatment support (Pangestu & Karnadi, 2018). Although Indonesia has implemented a national health insurance system (Jaminan Kesehatan Nasional), survivors often face challenges related to coverage limitations, administrative complexity, and gaps in understanding benefit entitlements, which may exacerbate financial stress during the post-therapy phase. Providing structured financial and insurance information within survivorship care can therefore reduce uncertainty, improve navigation of health and social protection systems, and mitigate economic strain, ultimately enhancing overall quality of life. These findings are consistent with prior studies that identify key survivorship care domains, including surveillance for cancer recurrence and new cancers, risk reduction and health promotion, and long-term management of treatment-related side effects (Australian Cancer Survivorship Centre, 2014; Kunthur et al., 2015; Livestrong Foundation, 2013; Salz et al., 2012). Furthermore, education on risk reduction, health promotion, and management of therapy-related symptoms and side effects delivered to survivors and their families or caregivers following treatment completion may be particularly impactful in LMIC contexts, where informal caregiving plays a central role in sustaining physical functioning and long-term survivorship outcomes (Cassileth & Yarett, 2014; Knobf, 2015; Salz et al., 2012).

When interpreting the findings from this study, there were several limitations that should be considered when generalizing the findings. First, there was heterogeneity among the included studies, however, we conducted a subgroup analysis and meta-regression to identify the underlying reason for heterogeneity. Second, it was discovered that each study had a higher probability of bias because of the random method, deviation from the intervention, and selective reporting bias. Third, our search strategy was limited to English-language publications, which may have introduced language bias and potentially excluded relevant studies published in other languages, particularly those from non-English speaking regions where important survivorship care research may have been conducted. Fourth, many of the included studies excluded cancer survivors with pre-existing depression or severe psychological comorbidities, which limits the generalizability of our findings to the broader population of cancer survivors who may present with these conditions in real-world clinical settings. Fifth, the majority of included studies had relatively short follow-up periods, predominantly ranging from 3 to 6 months, which limits our ability to assess the long-term sustainability and durability of the observed improvements in quality of life. The lack of extended follow-up data prevents conclusions about whether the benefits of survivorship care interventions are maintained over time or diminish after the intervention period ends. Future research should incorporate longer follow-up periods (12 months or more) to better understand the long-term effectiveness of survivorship care interventions."

As a result, future RCT studies may need to give specific details on the randomization procedure. Third, a significant limitation of this review is the geographical distribution of the included studies, with the majority originating from high-income countries, particularly those in North America, Europe, and developed regions of Asia. This geographical concentration limits the generalizability of our findings to low- and middle-income countries (LMICs), where

healthcare infrastructure, resource availability, cultural contexts, and cancer survivorship needs may differ substantially. The underrepresentation of studies from LMICs suggests that the effectiveness of survivorship care interventions observed in our meta-analysis may not be directly applicable to these settings. Future research should prioritize conducting rigorous trials in diverse geographical and socioeconomic contexts to better understand how survivorship care interventions can be adapted and implemented effectively across different healthcare systems and resource settings.

Overall, these findings support current survivorship care guidelines that emphasize multidisciplinary coordination, symptom management, psychosocial support, and financial navigation as essential components of post-treatment cancer care (Hopewood & Milroy, 2018; Vaz-Luis et al., 2022). From a clinical and policy perspective, survivorship care should be systematically integrated into routine oncology services, with particular attention to scalable digital platforms that can improve access and continuity of care in resource-constrained settings. The demonstrated effectiveness of mobile health–based survivorship care highlights its potential to reduce disparities and address equity gaps, especially in low- and middle-income countries such as Indonesia. Future research should prioritize the development and evaluation of culture-sensitive, technology-enabled survivorship care models that account for socioeconomic context, health literacy, and informal caregiving structures, as well as assess long-term effectiveness, implementation feasibility, and sustainability within national health systems.

## 4. CONCLUSION

This systematic review and meta-analysis demonstrates that survivorship care interventions significantly improve quality of life, physical and emotional well-being, and reduce depressive symptoms among gynecological and breast cancer survivors. Structured interventions incorporating educational formats with financial information and symptom management components, delivered by healthcare professionals particularly oncology nurses, show promise for integration into routine post-treatment care. However, the modest effect sizes observed and heterogeneity among studies necessitate cautious interpretation, highlighting the need for further high-quality randomized controlled trials to establish clinical meaningfulness and guide implementation in diverse healthcare settings.

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