

Psychological care over patients with lymphoma and lymphoma survivors

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Abstract. – Lymphomas are characterized by a relatively favorable prognosis and a good five-year survival rate, but they are associated with increased psychosocial distress. There is insufficient evidence on the efficacy of psychological interventions for lymphoma patients. This review aimed to present the research findings on currently used psychological interventions for (non-) Hodgkin lymphoma patients and survivors. A literature search on English language peer-reviewed original publications on psychological interventions for lymphoma patients published prior to December 2021 was performed in PubMed, Medline, Web of Science, Scopus and ResearchGate. Titles and abstracts were screened for the relevant terms including psychological intervention and psychological management along with (non-) Hodgkin lymphoma. The retrieved articles were evaluated by independent reviewers, the lists of eligible publications were compared, and disagreements were resolved by discussion. Of the 50 publications sought for retrieval, 8 articles were shortlisted based on their content. The papers were classified according to their content and the methodology employed. Research themes including “promoting resilience in lymphoma survivors”, “web-based self-management interventions for patients with lymphoma”, “addressing unmet needs whilst undergoing chemotherapy”, and “mind-body interactive exercise” were identified and presented in this review. As the number of lymphoma survivors is increasing, future research on evidence-based interventions addressing patients’ and survivors’ unmet psychological needs is warranted.

Key Words:

Cancer, Hematology, Intervention, Lymphoma, Lymphoma survivors, Self-management, Service needs, Lymphoma, Psychological distress, Unmet needs, Web-based intervention.

Introduction

Lymphomas comprise a diverse group of malignancies of the lymphatic and hematopoietic system. Although they make a large group of distinct diseases, they are conventionally distinguished into two broad categories i.e., Hodgkin’s lymphoma (HL) and non-Hodgkin’s lymphoma (NHL). NHL accounts for nearly 85-90% of cases, whereas 10-15% of cases can be attributed to HL^{1,2}. Lymphomas remain a common neoplasm, which may affect both men and women at any age. For instance, each year, there are approximately 7,300 new cases of Hodgkin lymphoma reported in the U.S.³⁻⁶. Furthermore, in 2021, 81,560 new cases of non-Hodgkin lymphoma were diagnosed, constituting 4.3% of all confirmed cancer diagnoses. Lymphomas vary in treatment and prognosis^{6,7}. The standard treatment of non-Hodgkin lymphoma consists of mainly chemotherapy, immunotherapy, radiotherapy, Stem Cell Transplant and, infrequently, surgery. Hodgkin’s lymphoma, in turn, is usually treated by various dosage schedules and treatment regimens of chemotherapy, often followed by radiation⁷. The five-year relative survival rates, which depend on the type and the stage of the disease, range from 81% to 91% for HL and from 57% to 73% for NHL, respectively. The number of patients who survive the disease for an extended period of time in the U.S. is expected to grow, so lymphoma can be considered a survivable cancer⁵.

Several investigations demonstrate that the diagnostic process, diagnostic disclosure, the experience of the disease progression, and subsequent aggressive oncotherapy for lymphoma, along with side effects of treatment and the uncontrollable and life-threatening nature of the disease, may have

a detrimental effect on patients' and survivors' emotional well-being, cognitive functioning and quality of life^{8,9}. The emotional effects of lymphoma were examined in a population-based study in Denmark, which revealed lymphoma patients during curative treatment had an increased risk of mental health problems such as depression and anxiety as compared to matched controls¹⁰. Furthermore, lymphoma patients had a heightened risk of suicide, the risk was particularly high in the first year post-diagnosis^{11,12}. Additionally, survivors are likely to present with late psychological (both cognitive and emotional) sequels of the disease. Krull et al¹³ demonstrated that cerebral lesions such as leukoencephalopathy and cerebrovascular injury were common neuropathologic findings in Hodgkin lymphoma survivors. Furthermore, cognitive testing results revealed participants of Krull's study scored well below age-matched controls in multiple neurocognitive domains, manifesting deficits in sustained attention, short- and long-term memory, and working memory¹³. Investigations¹⁴⁻¹⁶ reported that a high number of lymphoma patients and long-term survivors experience chronic fatigue, which frequently co-occurs with depression and anxiety. Additionally, some elements of the therapies responsible for enhancing recovery rates are associated with serious complications that unfavorably affect survivors' plans for the future. Gonadotoxic chemotherapy of lymphoma alters patients' reproductive function and sexual functioning, resulting in important psychosocial consequences. Unwanted childlessness and interrupted childbearing cause significant distress among cancer survivors¹⁷⁻¹⁹. Simultaneously, patients and survivors often felt abandoned and expressed considerable unfulfilled needs for psychological care. In fact, they were likely to gain from mental health services not only at all stages across the treatment trajectory but also during the follow-up care after the treatment had been completed. Consequently, mental health interventions may help alleviate the negative psychological effects of lymphoma by improving patients' well-being and quality of life^{20,21}. Oncologists, cancer care teams, and other healthcare professionals should be provided evidence-based education training programs on how to deliver support and address unmet psychological needs of lymphoma patients from the point of diagnosis, in the course of the disease and treatment, and then across cancer survivorship. Therefore, the goal of this review was to present current trends in psychological care among lymphoma patients and survivors.

To address that goal, a literature search to identify English-language peer-reviewed original articles and reports on psychological interventions for lymphoma patients and survivors, which were published prior to December 2021, was performed in PubMed, Medline, Web of Science, Scopus, and ResearchGate databases. The search strategy was discussed and consented to by the research team. The aim of this review was to gather evidence on psychological interventions for lymphoma patients and survivors. Therefore, the need to explore the continuum of psychological care over lymphoma patients from the point of diagnosis across the treatment trajectory to post-survivorship and palliative care was carefully addressed during the selection process. The search terms included both medical subject headings and keywords such as "Hodgkin lymphoma", "non-Hodgkin lymphoma", "survivor", "patient", "psychotherapy", "therapy", "treatment", "psychology", "mind-body" and "intervention". The search terms were combined to create several potential search strategies to find pertinent results. Papers reporting on randomized, prospective, retrospective, long-term, panel, observational or cross-sectional studies of psychological interventions for lymphoma patients and survivors were included. The investigation also comprised studies that were descriptive, small in size (without the power of the test measurements) and based on qualitative interviews. Studies that assessed the outcomes of psychological interventions in various cancer patient groups but did not provide separate findings for the lymphoma subgroup or did not assess the psychological outcomes of the intervention in the relevant subgroup were excluded from the study. The following types of publications were excluded: meta-analyses, reviews, "grey literature" such as e.g., conference materials and dissertations, and material from non-peer-reviewed sources. To ensure a more complete view of the existing literature, reference lists of relevant studies were also screened for investigations relevant to the research question. The retrieved publications were evaluated by independent reviewers. Articles were selected based on the applicable titles and abstracts. Titles and abstracts of the identified papers were screened for the following terms: psychotherapy, psychological intervention, intervention, treatment, therapy, strategies, psychological management, neurorehabilitation along with lymphoma, Hodgkin lymphoma, Hodgkin disease, and non-Hodgkin lymphoma. 798 potentially relevant articles were then selected

and retrieved for more detailed information. The unmasked lists of eligible publications were compared, and any disagreement between reviewers was resolved through discussion until a final consensus was reached. To increase the accuracy of the comparison, a third author acted as arbitrator where necessary. The reviewers assessed the full text of the articles retained after the title/abstract screening. The initial search retrieved 216 articles after duplicate removal. Of these, 50 articles were sought for retrieval, while only eight articles were considered eligible for inclusion in the current review. The details of the screening process, including reasons for full-text exclusion, are reported in Table I. The methodological quality of studies included in the current review was evaluated by way of a commonly used modified Jadad scale²².

Because of the diverse nature of the studies identified and the high variability of data in terms of type of intervention, investigation procedures, and outcome measures, the current review applied a narrative approach to data synthesis. The papers were classified according to their content and the methodology employed. Research themes including “promoting resilience in lymphoma survivors”, “web-based interventions for patients with lymphoma”, “addressing unmet needs whilst undergoing chemotherapy”, and “mind-body interactive interventions” were identified and presented in this review.

The overview of the included studies is presented in Table I, while the details on the methodological quality of studies included are presented in Table II.

Addressing Unmet Needs Whilst Undergoing Chemotherapy

Investigations indicate lymphoma treatment takes a psychological toll on patients and may cause chronic sadness and anxiety, which may persist beyond the duration of treatment^{12-15,23}. Chemotherapy-based depression and anxiety are common problems among patients with lymphoma. Music therapy interventions to alleviate anxiety and depression during chemotherapy may have a positive effect on patients’ well-being. The effects of personalized music intervention on anxiety and health-related quality of life in a sample of recently diagnosed patients with lymphoma who were submitted to chemotherapy were analyzed by a multi-center, randomized controlled study by Bro et al²⁴. Respondents were randomly allocated to two

experimental groups or to the care-as-usual control group. Respondents in the experimental groups were administered a 30-minute music intervention, either live music played by professional musicians or music recordings, during their chemotherapy sessions. The music repertoire included all genres of contemporary music and was tailored to patients’ musical preferences. The study found listening to music had a moderate anxiolytic effect only in respondents in the live performance condition.

Mind-Body Interactive Interventions

Recently, studies^{25,26} have indicated mind-body interactive practices could effectively promote well-being in health and disease. Mind-body practices such as Tibetan Yoga (TY) or Chinese martial arts may be used to improve psychosocial outcomes in individuals with malignant diseases across the treatment trajectory. The efficacy of Chinese martial arts-based interventions in combating adverse psychological consequences of chemotherapy for lymphoma was addressed by two randomized controlled trials^{27,28} carried out in Taiwan. An investigation by Yeh and Chung²⁷ assessed the fatigue and sleep quality outcomes of a 21-day Chinese martial arts (Qigong) intervention on NHL patients on active chemotherapy. Qigong is a traditional Chinese mind-body exercise focusing on a sequence of slow coordinated movement exercises accompanied by controlled breathing and dynamic meditation to foster present-moment awareness. One hundred and twenty-eight patients were randomly allocated to the experimental (a 20-minute Qigong exercise twice a day) or control group who received treatment as usual. The findings demonstrated Qigong practices had significant positive impacts on fatigue and sleep quality. Another study²⁸ by the same team applied a similar randomized controlled study design and intervention procedure in a smaller sample (n=100) of patients with non-Hodgkin Lymphoma who completed their first chemotherapy course at a hospital oncology ward. The Qigong group (n=50) participated in a three-week exercise intervention. The pre-post intervention analysis demonstrated marked improvements in fatigue and sleep quality outcomes in the experimental group. Also, significant differences in fatigue and quality of life between the Qigong group and controls were found. These findings corroborate those of previous literature on the efficacy of Qigong interventions in lymphoma patients. Cohen’s study, in turn,

Table I. The overview of the studies included in the review.

First author, year, and location	Design	Sample size (n=); survivorship status; mean age	Type and schedule of the intervention	Main psychological domains assessed	Findings
Bro et al ²⁴ (2019); Denmark	A randomized, controlled, multi-center trial; three arms: patient-selected live music (n=47); patient-selected audio-taped music (n=47); controls	Newly diagnosed (non-) Hodgkin Lymphoma patients (n=143; mean age=60 years) receiving chemotherapy.	30-minute music intervention during 3-5 chemotherapy sessions in an outpatient setting. Either live performance by professional musicians or recorded; custom repertoire.	Anxiety	Borderline significant decrease in anxiety in the live music group compared to care-as-usual controls. Null effects in the recorded music group. the association between musical skills and the effect of music intervention could not be found.
Yeh et al ²⁷ (2016) Taiwan	A randomized controlled trial; sample randomized to Chinese martial arts intervention arm (n=54) or to controls (n=54)	Non- Hodgkin (n=108) Lymphoma patients undergoing chemotherapy	A 20-minute Chan-Chuang qigong exercise twice a day for three weeks in the course of chemotherapy.	Fatigue and sleep quality	Significantly improved fatigue and sleep; outcome measures including sleep quality in the Qigong exercise group upon completion of the intervention.
Chuang et al ²⁸ (2017); Taiwan	A randomized controlled trial; sample randomized to Chinese martial arts intervention arm (n=50) or to the control arm (n=50)	Non-Hodgkin lymphoma patients (n=100) during the first chemotherapy treatment	A 20-minute Chan-Chuang qigong exercise twice a day for three weeks in the course of chemotherapy.	Fatigue, sleep quality, and health - related quality of life.	Markedly improved scores in all QoL domains (symptom burden, physical condition/fatigue, worries/fears on health and functioning, emotional impact), fatigue (fatigue intensity and interference) and sleep outcome measures in the intervention group.
Cohen et al ²⁹ (2004); USA	Randomized clinical trial; Sample randomized to homogenous TY group (n=20) or to waiting-list controls (n=19)	(Non-) Hodgkin Lymphoma patients and survivors (stage I, II, III or IV) (n=39; mean age=51years); either undergoing (n=24) or completed similar chemotherapy regimens within a year (n=15).	Tibetan yoga - based intervention (deep breathing, visual imagery, and mindfulness meditation and TY stretching exercises); seven weekly sessions; patients asked to practice at home.	Sleep, use of sleep medications, traumatic stress symptoms (intrusion or avoidance), state anxiety, depression, and fatigue	Significant improvements in sleep quality, latency duration and disturbances; significantly reduced use of sleep medications in the TY group at program completion; no association between TY participation and sleep efficiency; symptoms of intrusion or avoidance, state anxiety, depression, or fatigue.
Fischetti et al ³¹ (2019); Italy	A long - term observational single-arm study	(Non-) Hodgkin Lymphoma patients at different stages of (non-) Hodgkin Lymphoma (n=36; mean age=54 years).	The workout intervention including aerobic, resistance flexibility and posture training with progressive overload. 8x/2xweek/60-minute supervised sessions.	Perceived emotional self-efficacy and fatigue.	Marked improvements in perceived emotional self-efficacy and decreased fatigue.

Continued

Table I (continued). The overview of the studies included in the review.

First author, year, and location	Design	Sample size (n=); survivorship status; mean age	Type and schedule of the intervention	Main psychological domains assessed	Findings
Hathiramani et al ³³ (2021); UK	A randomized clinical trial; sample randomized to equal (n=23) self-management relaxation or exercise intervention groups; no control arm.	Lymphoma patients (n=46; mean age=61 years); either undergoing or completed chemotherapy within the six weeks.	The relaxation workout schedule included paced respiration (abdominal breathing), Jacobson's progressive muscle relaxation technique, guided imagery/visualization and mindfulness practices. The exercise intervention involved sequences of exercises of lower and upper body resistance, strength and flexibility. Intervention delivered via video learning technology and factsheets to be practiced at home. 50-minute sessions 3xweek for 12 weeks.	Health-related QoL at three time-points (baseline, in the middle and at completion of the intervention).	Overall beneficial effects on QoL observed in both groups. Significantly larger positive effect in pain, fatigue and physical function in the exercise group. Null differences in role, cognitive, emotional and social function.
Perez et al ³⁵ (2021); USA	An exploratory mixed methods study; single-arm non-randomized trial.	(Non-) Hodgkin Lymphoma survivors post chemotherapy treatment (n=21; mean age=52 years).	A relaxation training for stress reduction; CBT techniques for catastrophic thinking ("thought logs"). Eight weekly 90-min session with customized timeframe (either morning or evening classes) and course delivery formats (either online or in-person).	Distress, depression, anxiety, intolerance of uncertainty; coping skills, perceived fatigue.	Significant positive effects in coping skills, uncertainty tolerance and general anxiety at program completion
Starreveld et al ³⁸ (2021); the Netherlands, USA	Double-blind, randomized controlled trial; sample randomized to a bright white light (BWL) or dim white light (DWL) groups.	Long - term (mean survival time=13 years) HL or DLBCL survivors (n=166; mean age=46 years) who reported moderate to severe fatigue.	30-minute home-based light therapy every morning after arising for 25 days.	Fatigue, sleep quality, circadian rhythm, anxiety, depression, quality of life. Measurements completed at the baseline, post-intervention and at three, and nine months follow-up.	Significantly positive effect on depression, sleep quality, and QoL aspects related to physical and social functioning with some benefits persisting during the follow-up. Null differences between BWL and DWL groups.

Table II. Quality of the studies as demonstrated by a modified Jadad scale.

	[1] Bro et al ²⁴ (2019)	[2] Yeh et al ²⁷ (2016)	[3] Chuang et al ²⁸ (2017)	[4] Cohen et al ²⁹ (2003)	[5] Fischetti et al ³¹ (2017)	[6] Hathi- ramani et al ³³ (2021)	[7] Perez et al ³⁵ (2021)	[8] Starre- veld et al ³⁸ (2021)
1. Was the study described as randomized?	1	1	1	1	0	1	0	1
2. Was the method of randomization appropriate?	1	1	1	1	0	1	0	1
3. Was the study described as blinding? ^a	0	0	0	0	0	0	0	1
4. Was the method of blinding appropriate?	0	0	0	0	0	0	0	1
5. Was there a description of withdrawals and dropouts?	1	1	1	1	1	1	1	1
6. Was there a clear description of the inclusion/exclusion criteria?	1	1	1	1	1	1	1	1
7. Was the method used to assess adverse effects described?	0	1	1	1	0	0	1	1
8. Was the method of statistical analysis described?	1	1	1	1	1	1	1	1
Score	5	6	6	6	3	5	4	8

1 point for criterion present, 0 point when not addressed; ^a: double-blind got 1 score, single-blind got 0.5 score, no blinding got 0 score.

assessed the effects of Tibetan yoga intervention in adult (non-) Hodgkin lymphoma patients in various stages of survivorship²⁹.

The sample included 38 patients in various stages of lymphoma who were undergoing chemotherapy treatment or survivors who were within one-year post-treatment. Study participants were allocated to the TY intervention or wait-list control group by way of a computer-generated minimization-adaptive assignment procedure. Subjects in the intervention group participated in seven weekly Tibetan yoga sessions, which were taught and supervised by a trained instructor, and received written information on the practices. The practices combined aspects of TY such as relaxation breathing, visualization, mindfulness, and traditional yoga poses. The analysis revealed the majority of the intervention group participants completed at least five TY sessions. The results indicated yoga

group participation was significantly associated with better subjective sleep rating reflected by e.g., improved sleep length and quality and reduced sleep medication usage. However, significant beneficial effects of TY intervention on traumatic stress symptoms (intrusion/avoidance), state anxiety (transient intense sense of tension, worry, or apprehension triggered by the present situation), depression, or fatigue could not be demonstrated. However, both the session attendance rates, which were used as a proxy measure of the feasibility of the TY intervention and follow-up post-intervention assessment, demonstrated respondents favorably assessed the feasibility and efficiency of the intervention and continued some elements of TY during the follow-up.

An abundant amount of data has been published concerning the benefits of physical exercise on the emotional status of individuals with

an illness³⁰. In line with these findings, Fischetti et al³¹ investigated the effectiveness of a supervised fitness workout intervention, including aerobic, resistance flexibility, and posture training in a group of 36 adult patients at different stages of (non-) Hodgkin Lymphoma. The eight-week intervention, which was preceded by a pilot study, included 60-minute biweekly workout classes held in groups of five people. The exercises were implemented with progressive overload. Along with physical fitness measurements, respondents were administered psychological tests to assess pre-post changes in perceived regulatory emotional self-efficacy and cancer-related fatigue. The analysis demonstrated significant pre-post intervention differences in cancer-related fatigue and in the ability to express emotions, indicating the intervention was associated with improvements in patient well-being.

Web-Based Self-Management Interventions

The potential advantages of web-based interventions to improve psychological well-being, such as easy access and cost-effectiveness, are well known, but the evidence on the efficacy of Internet-based self-management interventions in various patient populations is limited³². This topic was addressed by the investigation of Hathiramani et al³³, who compared the outcomes of at-home relaxation and physical exercise interventions on lymphoma survivors' quality of life. The sample included 46 adult survivors who recently completed chemotherapy for lymphoma and were in remission. Respondents were randomly placed in equal (n=23) groups, which included either exercise or relaxation training schedules to be practiced in the home environment. The relaxation workout schedule included paced respiration (abdominal breathing), Jacobson's progressive muscle relaxation technique, guided imagery/visualization and mindfulness practices whereas the exercise intervention involved sequences of exercises to improve lower and upper body resistance, strength and flexibility. The learning scheme was delivered to both groups *via* video learning technology and factsheets. Respondents engaged in a 12-week program that included 50-minute tri-weekly exercises. Respondents' quality of life was evaluated at three time time-points: at the baseline, in the middle and then at the end of the program. The findings demonstrated physical work-out was significantly

more beneficial than relaxation training for several aspects of respondents' quality of life, such as physical functioning, fatigue, and pain. However, significant group differences in emotional, cognitive, or social functioning could not be found.

Promoting Resilience in Lymphoma Survivors

Publications on psychological response to malignant disease such as lymphoma emphasize the role of coping skills training to promote optimal coping styles and alter non-constructive thought patterns, which may adversely affect adherence to treatment and quality of life of patients with a malignant disease³⁴. An exploratory mixed methods study by Perez et al³⁵ assessed the efficacy of stress adaptation and resilience promoting program for a sample of 26 adult lymphoma survivors who completed treatment in the previous two years. The procedure consisted of two phases. Phase 1 included an initial short interview with study participants. The semi-structured interview was composed of predetermined questions on respondents' causes of distress, psychological help-seeking attitudes, and unmet psychological needs following the completion of treatment. Patients were also asked about their preferred course timeframe (either morning or evening classes) and course delivery formats (either online or in person). Their quality of life was affected by both side effects of treatment, such as pain and fatigue. Respondents reported they intended to overcome anxiety and to shift away from catastrophic thoughts on cancer recurrence and uncertainty, which markedly influenced their daily lives and both short-term and long-term life goals. Overall, survivors participating in the study expressed their need for holistic programs, including wellness-oriented mind-body practices aimed at improving the skills necessary to strengthen respondents' social networks and connections to others. The second phase included an eight-week intervention. The intervention, which consisted of 90-minute weekly sessions, included commonly used guided imagery and autogenic relaxation training practices along with cognitive-behavioral techniques ("thought logs") to alter maladaptive thinking patterns. The analysis demonstrated there was a good match between the learning path and patient demand at the early survivorship stage. Significant differences between respondent baseline and post-treatment outcomes in several domains, such as depressed mood, anxiety, and fatigue, could not be determined. However, respondents noted marked

improvements in their tolerance of uncertainty, assertiveness, and coping and relaxation skills.

Addressing Survivors' Unmet Needs

Phototherapy continues to gain increased ground as a treatment for psychological conditions and symptoms, including fatigue and depression^{36,37}. In this line of research, Starreveld et al³⁸ used a double-blind randomized controlled study procedure with two follow-up assessments to examine the effects of home-based phototherapy on cancer-related fatigue, sleep quality, depression, and quality of life in a sample of long-term lymphoma survivors who reported symptoms of moderate to severe chronic fatigue. The sample included 166 long-term adult survivors of Hodgkin lymphoma and Diffuse large B cell lymphoma (DLBCL) (a subtype of Non-Hodgkin lymphoma), who were allocated to two equal subgroups that applied exposure either to artificial bright white light (BWL) or to dim white light (DWL). The 25-day light treatment consisted of one 30-minute light therapy session every morning after arising. The investigators found the intervention had a significant beneficial influence on fatigue and sleep outcomes by enhancing sleep quality and efficiency and reducing the negative impact of fatigue. The analysis also demonstrated the positive effects of phototherapy on depression measures and health-related quality of life domains related to physical and social functioning. Furthermore, the follow-up assessments at three- and nine-months post-treatment indicated these positive effects persisted after intervention completion. However, the effect of light therapy on anxiety could not be demonstrated. Of note, the analysis could not find any statistical differences between the effects of bright and dim white light treatment.

In spite of the fact that lymphoma is often perceived as a treatable disease, in the literature it has been indicated that the experience of this illness and subsequent aggressive anti-cancer treatment may have a deleterious impact on patients' and survivors' psychological status. Psychological interventions to manage psychosomatic aspects of the disease and its treatment, for individuals with lymphoma are coming increasingly into focus. This review presented the findings on the efficacy of currently used interventions for (non-) Hodgkin lymphoma patients and survivors.

Bro et al²⁴ assessed the benefits of personalized music intervention on anxiety and health-re-

lated quality of life in a sample of lymphoma patients during chemotherapy sessions. They found listening to live music performances with custom repertoire arrangements decreased anxiety in the experimental group. The effect of listening to music to improve psychological outcomes during medical procedures has been analyzed in a number of studies^{39,40}. For example, audio-taped music intervention has been used as an adjunctive treatment option to distract and decrease dental anxiety both in children and adults. Although the findings on the effect of music in pediatric patients seem indeterminate, music interventions may effectively reduce dental fear in adult patients.

Additionally, the results of this review indicate mind-body practices such as Qigong training may improve fatigue, sleep quality, and quality of life in patients during active treatment of lymphoma^{27,28}. Similarly, investigations have demonstrated that Qigong may reduce symptoms of anxiety and improve mood in various patient populations²⁶.

One of the identified studies analyzed the effects of Tibetan Yoga practice in a sample of patients undergoing active treatment of lymphoma and lymphoma survivors²⁹. The study found TY positively influenced respondents' sleep outcomes by decreasing sleep medication usage no association between TY practice and post-traumatic stress symptoms (intrusion/avoidance), anxiety, depression, or fatigue could be demonstrated. These results are fairly concordant with the outcomes of Felbel et al's systematic review⁴¹. Felbel et al⁴¹ could not demonstrate the positive effects of yoga practice on sleep, fatigue, anxiety, and depression in individuals with blood cancers.

The publication by Perez et al³⁵, in turn, focused on increasing patients' and survivors' stress management skills and maladaptive thinking patterns. Perez found that eight-week therapy, which combined elements of relaxation practices and cognitive-behavioral techniques, significantly improved respondents' tolerance of uncertainty, assertiveness, coping self-efficacy, and relaxation skills. Similarly, Nairn and Merluzzi⁴²'s study indicated coping skills training (Mastery Enhancement Therapy) might lead to immediate improvements in self-efficacy for coping in various cancer cohorts, including patients with lung, breast, kidney, and ovarian cancer.

The review has some limitations. For example, only some interventions described in this review applied methods that are typical for psychotherapy, such as regular interaction with a therapist and talking therapy to foster behavioral change,

increase happiness, and overcome difficulties^{43,44}. Interestingly, the definition of psychological intervention is an important issue that continues to receive attention in the literature. The term “psychological intervention” is used here to describe interventions that are intended to improve various aspects of patients’ and survivors’ psychological well-being and health-related quality of life^{43,44}. Additionally, the analysis indicated the data analyzed were remarkably diverse in terms of the type of intervention, investigation procedures, and outcome measures. However, therapies are mainstays of the cancer care system and valuable adjuncts to medical treatment. Moreover, several findings of this review are of direct significance for research on the psychological care of individuals with lymphoma and highlight several possibilities for continued research on the topic.

Firstly, the methodological aspects related to sample size and power of the test calculations were carefully considered in the publications included in this review. However, the effect of psychological intervention may be associated with a plethora of factors, including study participants’ age and sex, educational status, cultural background, or urban/rural background. Also, the role of these factors as obstacles or facilitators to participation in psychological interventions should be carefully investigated because of the stigma toward mental health services. Moreover, future trials should include not only standard care controls but also placebo groups because the intervention-placebo interaction could bias the interpretation of findings²⁶⁻²⁸.

Secondly, the reviewed studies described the results of psychological interventions on various quality-of-life domains in middle-aged individuals (mean age ~54 years). Nevertheless, epidemiological data indicate lymphoma, particularly Hodgkin lymphoma, is relatively common among teenagers and young adults (ages 15 to 39 years)³⁻⁵. Although psychological issues are inherent in lymphoma, the impact of cancer is age-specific because of behavioral or physical checkpoints in human development (developmental milestones) or concerns that are often age-specific. Emerging adults obtain their diagnosis and are submitted to treatment in a critical moment of their life. This early stage of life is full of psychosocial challenges, such as developing relationships and forming personal and professional commitments. Moreover, many treatment regimens often complicate their plans for the life ahead as they often cause infertility⁴⁵. Psychological interventions may mit-

igate the negative effects of the life-threatening disease on young individuals to let them live a happy and productive life. Thirdly, lymphoma and the treatment for lymphoma may have an adverse effect on patients’ and survivors’ intellectual status²³. Moreover, not only may cognitive deficits complicate psychological issues, but also they may become an obstacle to returning to normalcy. Therefore, continued research needs to be directed toward developing neuro-rehabilitation procedures to ameliorate the negative effects of the disease and fulfill patients’ and survivors’ cognitive, social, and vocational skills.

Conclusions

The effect of psychological interventions may be confounded or facilitated by a number of factors, such as study participants’ cultural background, sex, educational status, and urban/rural background. As these factors may also mediate the mechanism of psychological change, they should be carefully considered while developing interventions for patients and survivors.

Evidence-based research should fill the gap in the knowledge on effective psychological interventions for adolescents and young adults (AYA). Interventions for AYA should consider the fact that the impact of cancer is age-specific.

More research is needed on neurorehabilitation to improve patients’ and survivors’ cognitive functioning and push the limits of their recovery.

A multidisciplinary team (MDT) comprising a variety of specialized professionals such as oncologists, nurses, physiotherapists, and psychologists will support the patient from the point of diagnosis across all important time points on the treatment trajectory (the diagnostic process, diagnostic disclosure, and subsequent therapy for lymphoma) and then during survivorship and post-survivorship stage is likely to improve health and quality of life outcomes of individuals with lymphoma.

Conflict of Interest

The authors have no conflicts of interest to declare.

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K.W.-B. contributed to the design and implementation of the research, acquisition of data, analysis, and interpretation of the results, drafted the manuscript, and contributed to the writing of the manuscript. E.M. contributed to the design and implementation of the research, to the analysis of the results, and to the writing of the manuscript, and critically revised the manuscript. P.K. and W.S. contributed to the conception and design, acquisition of data, and analysis of the results.

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