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Multicomponent Exercise Program (Mep^{fs}) to Maintain the Quality of Life For Chemotherapy Patients: Systematic Literature Review

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ABSTRACT

Chemotherapy is a therapy that is often used in cancer treatment, and causes many side effects of treatment symptoms and psychological stress. Various complementary therapy options can be chosen by chemotherapy patients to maintain quality of life and chemotherapy symptom management, one of which is using the Multicomponent Exercise Program (MEP^{FS}) which needs to be developed to be applied to cancer patients with chemotherapy in Indonesia. The purpose of this study was to develop MEP^{FS} therapy in cancer patients with chemotherapy. This quantitative study with the type of the review develops MEP^{FS} therapy in chemotherapy patients. This study is part of the development of MEP therapy, using the Systematic Literature Review (SLR) method to translate, accumulate and synthesize the results of previous studies on MEP therapy that affect the quality of life of chemotherapy patients. The eligible criteria for this study were articles published in the indexed journal databases Pubmed, Sage and Science Direct, English, observational and experimental studies. Journals published in the period 2019-2023. From the search results, 220 articles were obtained from 3 journal databases, of which 786 articles were excluded because they were duplicated, did not comply with the inclusion and were not relevant so that there were 7 relevant articles and further translation processes were carried out. The analysis showed that the performance scale using ECOG-PS is a valid screening used (p 0.047) before chemotherapy patients undergo MEP^{FS} exercise therapy with a minimum score of ECOG ≤1. Respondents who will undergo MEP^{FS} therapy will combine aerobic exercise and weight training with a total duration of 40 minutes. The exercise consists of 3 phases with a composition of a warm-up phase (5 minutes), a main exercise phase (30 minutes) and a cool-down phase (5 minutes). The main exercise phase is divided into aerobic exercise (can be with a treadmill, walking or jogging on the spot) for 15 minutes, and weight training using dumbbells/theraband for 15 minutes. MEP^{FS} therapy is recommended for cancer patients undergoing chemotherapy.

ABSTRAK

Kemoterapi merupakan salah satu terapi yang sering digunakan dalam pengobatan kanker, dan menimbulkan banyak efek samping gejala pengobatan dan stres psikologis. Berbagai pilihan terapi komplementer dapat dipilih oleh pasien kemoterapi untuk menjaga kualitas hidup dan manajemen gejala kemoterapi, salah satunya dengan menggunakan Multicomponent Exercise Program (MEP^{FS}) yang perlu dikembangkan untuk diaplikasikan pada pasien kanker dengan kemoterapi di Indonesia. Tujuan dari penelitian ini adalah untuk mengembangkan terapi MEP^{FS} pada pasien kanker dengan kemoterapi. Penelitian kuantitatif dengan metode SLR ini mengembangkan terapi MEP^{FS} pada pasien kemoterapi. Penelitian ini merupakan bagian dari pengembangan terapi MEP, dengan menerjemahkan, mengumpulkan dan mensintesiskan hasil penelitian sebelumnya tentang terapi MEP yang mempengaruhi kualitas hidup pasien

kemoterapi. Kriteria kelayakan penelitian adalah artikel yang dipublikasikan pada database jurnal terindeks Pubmed, Sage dan Science Direct, berbahasa Inggris, penelitian observasional dan eksperimental. Jurnal yang dipublikasikan pada periode 2019-2023. Dari hasil penelusuran diperoleh 220 artikel dari 3 database jurnal, yang mana 786 artikel dikeluarkan karena terduplikasi, tidak sesuai inklusi dan tidak relevan sehingga terdapat 7 artikel yang relevan dan dilakukan proses translasi lebih lanjut. Hasil analisis menunjukkan bahwa skala kinerja menggunakan ECOG-PS merupakan skrining yang valid digunakan (p 0,047) sebelum pasien kemoterapi menjalani terapi latihan MEP^{FS} dengan skor minimal ECOG ≤1. Responden yang akan menjalani terapi MEP^{FS} akan mengkombinasikan latihan aerobik dan latihan angkat beban dengan total durasi 40 menit. Latihan terdiri dari 3 fase dengan komposisi fase pemanasan (5 menit), fase latihan utama (30 menit) dan fase pendinginan (5 menit). Fase latihan utama dibagi menjadi latihan aerobik (dapat dengan treadmill, jalan kaki atau jogging di tempat) selama 15 menit, dan latihan angkat beban menggunakan dumbel/theraband selama 15 menit. Terapi MEP^{FS} dianjurkan bagi pasien kanker yang menjalani kemoterapi.

A. INTRODUCTION

Chemotherapy is one of the important therapies and is often used in the treatment of cancer patients (Neuss et al, 2016; Sari et al, 2012; Tabrizi et al, 2017). Chemotherapy uses anticancer cytotoxic drugs that aim to reduce and stop the abnormal growth of cancer cells in the body. The use of chemotherapy drugs also affects normal body cells so that it is known as the side effects of chemotherapy treatment (Indra, Rani Lisa., Saputra, Bayu, 2021). Chemotherapy, which is one of the long-term treatments for cancer patients, causes side effects of treatment that can be in the form of psychological stress (depression, anxiety, fear of recurrence, fatigue, sleep disorders), decreased physical function (pain, nausea, vomiting, immunosuppression, cardiotoxicity, decreased muscle mass) and decreased cognitive abilities (Curigliano et al., 2016; Dong et al., 2016; Kroenke, Johns, Theobald, Wu, & Tu, 2013; Naito et al., 2019; National Cancer Institute, 2017; Wu & Harden, 2015).

Globally, as many as 86% of cancer patients undergoing chemotherapy experience at least 1 side effect during the chemotherapy treatment cycle, either in the form of social, psychological or physical side effects (Kırca & Kutlutürkan, 2021; Pearce, A., Haas, M., Viney, R., Pearson, S., Haywood, P., Brown, C., Ward, R, 2017). Symptoms of side effects due to chemotherapy treatment usually appear in adult patients and result in decreased function, increased risk of disability and reduced quality of life for cancer patients (Danhauer et al., 2019). The quality of life of chemotherapy patients shows that most of the quality of life is in poor condition (Kolin, M.Y.K., Warjiman., Mahdalena, 2016). This is indicated by several aspects suffered by patients in the form of physical conditions such as nausea, vomiting, pain and decreased activity. Psychological conditions in the form of role changes, feelings of surrender, despair and resignation to death.

Social conditions such as lack of attention, information support from family and the environment (Siwi, Adiratna Sekar., Sumarni, Tri., Fadly, A Rizal., Hidayat, 2021). especially during the pandemic which has now turned into a post-COVID-19 pandemic which has an

impact on the quality of life of cancer patients (Myers, Bennett, Cahir, Savard, & Lauzier, 2025). A good quality of life is needed so that individuals can obtain good health status and maintain physical function or ability as much as possible. Individuals who have a good quality of life will have the will to be strong and recover and be able to improve their health. Conversely, if the quality of life decreases, the will to recover will also decrease (Kubra, E.T., Yilmaz, M, 2018).

The side effects and burden of symptoms due to chemotherapy that have an impact on quality of life until now there is no pharmacological treatment that can overcome it, so that various world attention has been given to complementary strategies and therapies carried out to reduce this, one of which is exercise therapy in the form of a Multicomponent Exercise Program (MEP) (Gilherrero et al., 2022a). MEP therapy is one solution to dealing with this problem. MEP therapy, also known as maximal cardiorespiratory fitness, is a collaborative action between nurses and physiotherapists. This exercise program is individual by considering the condition of chemotherapy patients. So it is necessary to adjust some exercise movements according to the physical condition of chemotherapy patients. The exercise therapy program is the most effective method in the rehabilitation of cancer patients with chemotherapy (aerobic/appropriate exercise program) and can be implemented by patients at home and has been proven to affect quality of life (Aydin, Kose, Odabas, & Bingul, 2021). However, this exercise therapy has not been developed in cancer patients with chemotherapy in Indonesia. So based on the description above, the researcher is interested in developing a Multicomponent Exercise Program for cancer patients with chemotherapy.

B. METHODS

The study design was a Systematic Literature Review (SLR). The subjects of the study were cancer patients undergoing chemotherapy from 7 international articles related to exercise therapy for cancer patients with chemotherapy, which were in accordance with the inclusion and exclusion criteria of the study. The inclusion criteria used were articles from the Pubmed, Sage and Science Direct databases with samples aged ≥18 years, undergoing first chemotherapy with an ECOG score of ≤1, nursing studies, and exercise therapy. The keywords used were: "cancer patient with chemotherapy OR oncology patients AND nursing AND exercise therapy AND quality of life". The filtered articles were published in the period 2019-2025 (last 7 years, up to date), can be fully accessed, in English, observational studies/quasy experiments and pass critical appraisal JBI (Joanna Briggs Institute). The exclusion criteria in this study did not comply with the eligibility and duplication criteria. There were 786 articles that passed the keyword inclusion criteria, later the articles entered data extraction templates used Excel tables, then only 7 articles were further Framework synthetize analyzed and in accordance with the research objectives.

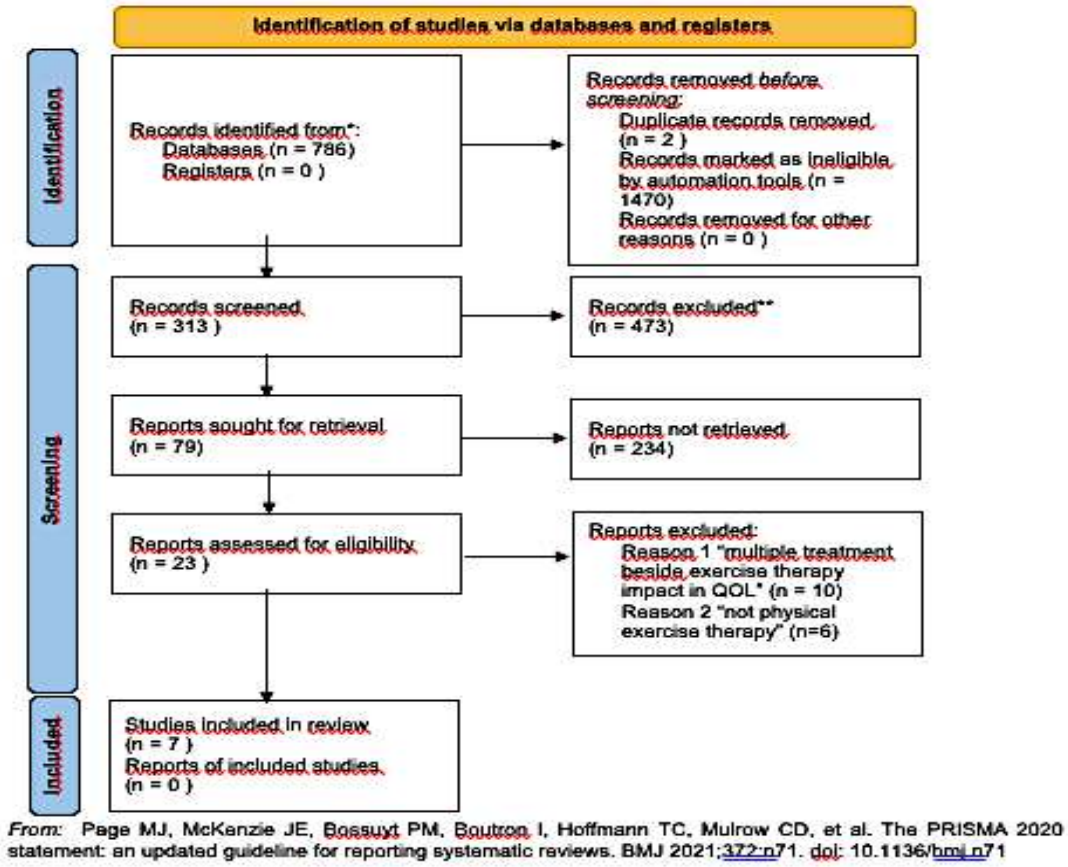

Figure 1. Prisma flow Diagram

C. RESULT AND DISCUSSION

1. Result

The results of the study obtained 7 articles that were experimental studies discussing physical exercise therapy for chemotherapy patients with the primary outcome being quality of life. The patient indicators used were the ECOG score ≤1 to assess the performance scale of chemotherapy patients who would undergo exercise therapy and muscle strength assessment with 1 RM (Repeticy Maximum) measurements. The details of the including articles are as follows:

Table 1. Study Included

No	References	Exercise type	Exercise review
1	(Aydin et al., 2021)	Aerobic exercise & home-based resistance exercise	This study combines Aerobic Exercise (AE) with Home-based Resistance Exercise (HRE) for 12 weeks. AE is done 3 times a week, for 50 minutes with treadmills / exercise bikes at the fitness center. AE has a composition of 10 minutes warming up, 30 minutes walking / cycling and 10 minutes cooling down. While HRE is done 2 times a week with a duration of 60 minutes. The composition is 10 minutes warming up, 40 minutes leg and back exercises, using rubber bands and balls, and 10 minutes cooling down.
2	(Yen, Hung,	Multicomponent exercise	This study was conducted for 8 weeks, 3x per week,

	Tsai, Cheng, & Yang, 2020)	(combine aerobic & resistance exercise)	conducted in a fitness center and supervised by a physiotherapist. The training time was 40-50 minutes with the composition: 5 minutes of warm-up, 30 minutes of aerobic exercise, and 5 minutes of cooling down. In addition, the use of Theraband equipment was carried out for resistance training in the study.
3	(Hong, Wu, & Wu, 2020)	Resistance exercise	The study was conducted over 12 weeks, with a duration of 2x per week under the supervision of experienced therapists. It was carried out for 60 minutes and was carried out in a hospital. Resistance exercises included leg extension, leg curl, leg press, shoulder internal and external rotation, seated row, latissimus pull down, shoulder flexion and extension, and butterfly and butterfly reverse.
4	(Park et al., 2023)	Multicomponent exercise (combine aerobic & resistance exercise)	EIP (Exercise Intervention Program) exercise therapy is carried out for the first 6 weeks as the main exercise, and 6 additional weeks. The duration of exercise is 5 days per week. EIP is carried out with 3 levels of exercise intensity according to the respondent's ability, including: a. Low intensity exercise: total exercise time 30 minutes (5 minutes warm-up exercise, 20 minutes main exercise, 5 minutes cool-down exercise). b. Medium-high intensity exercise: total exercise time 40 minutes (5 minutes warm-up exercise, 30 minutes main exercise, 5 minutes cool-down exercise). The main exercise consists of aerobic exercise such as walking on a treadmill, flat walking, or running for 15 minutes and resistance training using dumbbells, isotonic resistance bands or an ergometer bicycle for 15 minutes.
5	(Gilherrero et al., 2022)	Multicomponent exercise (combine aerobic & resistance exercise)	Exercise therapy was performed for 12 weeks, given 2x per week. The total exercise time was 55-65 minutes with the following composition: 5 minutes warm up, 40-50 minutes main exercise phase, 5 minutes cool-down and 5 minutes stretching. Aerobic exercise was performed with an elliptical, stationary bicycle, treadmill, or rowing machine. Resistance exercise including chest press, leg press and a multifunctional crossover machine. Resistance exercise was performed with increasing intensity based on the patient's goals as follows: a. a. Focus on muscle mass gain: increasing the intensity of endurance is done every 3 weeks, starting with 2 sets of 12 repetitions at 70% RM (Maximum Repetition) and increasing to 3 sets of 10 repetitions at 75% RM (week 3), 4 sets of 8 repetitions at 80% RM (week 6), and 4 sets of 8 repetitions at 85% RM (week 9). Regarding the

			cardiovascular training program, the intensity is increased every 4 weeks from 45% to 65% Maximal Heart Rate (MHR) (weeks 1-4), from 65% to 85% MHR (weeks 5-8), and from 85 to 100% MHR (weeks 9-12). b. Focus on fat loss: resistance intensity increases every 3 weeks, starting with 2 sets of 12 repetitions at 65% RM and increasing to 3 sets of 10 repetitions at 70% RM (week 3), 4 sets of 8 repetitions at 75% RM (week 6), and 4 sets of 8 repetitions at 80% RM (week 9).
6	(Stuecher et al., 2019)	Aerobic exercise	Exercise was performed for 12 weeks with home walking, 150 minutes at moderate intensity per week. Initially, 3 sessions of moderate walking of 20 minutes each were recommended per week. If tolerated for 2 or 3 consecutive weeks, participants were asked to increase the frequency and duration of exercise until 150 minutes per week of moderate walking was achieved. Patients who were already physically active at study enrollment were encouraged to start with five sessions of 30 minutes or three sessions of 50 minutes per week.
7	(Bahar-ozdemir, Akyuz, Kalkandelen, & Yumuk, 2020)	Therapeutic exercise	The exercises were performed for 10 weeks, 5 times per week. This therapeutic exercise is a muscle strengthening and body balance exercise with the following composition: a. A 2-minute period is allocated for each balance exercise parameter (eg, sideways walking, tandem walking, backward walking, cross walking, maintaining balance on one leg). b. Lower limb progressive endurance exercises (eg, hip and knee muscle strengthening, ankle pumping, and tiptoe walking) are programmed as 2 sets of 10 repetitions. The duration of each intervention program is planned for 20 minutes in total, involving 10 minutes of strengthening exercises and 10 minutes of balance exercises, and this is done 5 days a week, for a total period of 10 weeks.

2. Discussion

Based on Li et al (2023) report that exercise therapy is categorized into 2, namely short-term exercise, with a duration of <12 weeks; and long-term exercise, with a duration of more than ≥12 weeks. Based on these categories, the article that includes long-term exercise therapy interventions is the study by Aydin et al (2021), Hong et al (2020), Stuecher et al (2019) and Gilherrero et al (2022) with each study lasting a total of 12 weeks. Meanwhile, the study that falls into the short-term exercise category is Chia-Jul Yen et al.'s research (2020) with a training duration of 8 weeks, Park et al (2023) report with a main exercise therapy duration of 6 weeks, and Bahar-Ozdemir, et al (2020) explain with a total therapy duration of 10 weeks. With the classification of exercise therapy, it is necessary to see which duration of

exercise is effective in improving the quality of life of cancer patients with chemotherapy. The combination of aerobic exercise with short-term resistance training turned out to be the most significant in improving quality of life and relieving symptoms in several types of cancer. Aerobic exercise itself significantly improves general health. Aerobic exercise and or without resistance training can reduce the trend of cancer-related symptoms (Li et al., 2023). So there are 3 including articles, namely Chia-Jul Yen et al (2020), Park et al (2023) and Bahar-Ozdemir, et al (2020) Further analysis can be carried out using the Brislin method for translation and back translation in formulating Standard Operating Procedures (SOP) for exercise therapy that are appropriate for cancer patients undergoing chemotherapy to maintain their quality of life. The limitation of this study is that because this is still an early stage in the development of the MEP^{FS} exercise instrument, it is necessary to take further steps using the Brislin method in developing the instrument, namely an expert panel and pilot study in order to produce valid and reliable standard operating procedures for MEP^{FS} therapy.

D. CONCLUSION AND SUGGESTIONS

MEP^{FS} therapy is prompted for cancer patients undergoing chemotherapy, in accordance with the required inclusion criteria. Providing complementary therapy that completes a series of cancer patient treatment actions, especially chemotherapy, can maintain the quality of life of cancer patients.

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