**In adult patients diagnosed with lung cancer, is chemotherapy more effective than homeopathy in prolonging life?**

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**Introduction**

Lung cancer, a malignant tumor originating from the cells of the lungs, is a significant global health concern and a leading cause of cancer-related mortality. Its prevalence varies across populations, with various risk factors contributing to its development. Notably, smoking has been identified as a primary and influential risk factor for lung cancer (Guethlin et al., 2010). The incidence and impact of lung cancer underscore the importance of exploring effective treatment options to improve patient outcomes. In this context, the PICO question aims to compare the efficacy of chemotherapy and homeopathy in prolonging life for adult patients diagnosed with lung cancer. By critically appraising relevant studies, this evaluation seeks to provide valuable insights into the comparative effectiveness of these treatment modalities. I chose this PICO question based on personal and familial experience. I had people close to me who has been affected by lung cancer and undergone chemotherapy and the other practiced homeopathy. It sparked my interest and drove my desire to investigate the topic further. This topic motivated me to explore the effectiveness of chemotherapy or homeopathy in prolonging life for patients with lung cancer.

Chemotherapy is a widely used treatment approach for lung cancer. It involves the administration of drugs that target and kill rapidly dividing cancer cells. Chemotherapy can be given before surgery (neoadjuvant), after surgery (adjuvant), or as the primary treatment for advanced or metastatic lung cancer. The specific drugs and treatment regimen depend on factors such as the type and stage of lung cancer, and the overall health of the patient. Chemotherapy aims to shrink tumors, control cancer growth, relieve symptoms, and potentially prolong survival.

Homeopathy, on the other hand, is a complementary and alternative treatment based on the principle of "like cures like." Homeopathic remedies are prepared using highly diluted substances that produce symptoms like those being treated. Homeopathy is based on the theory that these highly diluted remedies stimulate the body's self-healing mechanisms. While some people may choose to use homeopathy alongside conventional treatments, there is limited scientific evidence supporting its efficacy in treating cancer or prolonging life (Bagot et al., 2021). The question is to explore, as it can guide treatment decisions and provide evidence-based information to patients, clinicians, and policymakers. I also have personal reservations and concerns about the disease because of my own experience with loved ones. Lung cancer is a serious health issue and can have a significant impact on individuals and their families. The use of chemotherapy is supported by extensive research and is a standard treatment for lung cancer. In contrast, homeopathy lacks robust scientific evidence supporting its efficacy in cancer treatment. To make informed decisions regarding patient care, we must examine the available evidence.

**Search Strategy**

The literature search databases I used included PubMed, ERIC, and UC Library. The search terms used were variations of the following keywords: lung cancer, chemotherapy, homeopathy, survival, quality of life, complementary therapy, and alternative medicine. A comprehensive literature search generated many results. For example, using Boolean Logic, I got great search results using the terms (Chemotherapy or Homeopathy), resulting in over 389,919 results using PubMed. The process of narrowing down the search results involved reviewing the titles and abstracts of the articles to determine their relevance to the PICO question. Articles that addressed the effectiveness of chemotherapy compared to homeopathy in prolonging life in adult patients diagnosed with lung cancer were selected for further evaluation. In total, the search returned 407,414 articles from the PubMed database, 153 articles from the ERIC database, and 8,087 articles from the UC Libraries database. Various search terms such as (Adults and Lung cancer survival), (Lung Cancer AND chemotherapy OR homeopathy) were utilized, and the initial search yielded many results. Systematic reviews and meta-analyses were excluded, and the selection of articles for the Preliminary List was based on the relevance of their titles and abstracts. The final list included articles that provided valuable insights and addressed the research objectives, totaling a number of 7 articles for further evaluation.

**Summary Description of Articles**

In total, seven articles were critically appraised, with three articles reviewed for this study. The levels of evidence varied among the studies, with three articles classified as Level II evidence (Frass et al., 2020; Salazar et al., 2017; Bagot et al., 2021), two articles as Level III evidence (Balon et al., 2018; Guethlin et al., 2010), and two articles as Level IV evidence (Frass et al., 2015; Gaertner et al., 2014). The range of publication years for these articles spanned from 2010 to 2021, with a mean publication year of approximately 2016.

Most of the included studies focused on participants with lung cancer. For instance, the study by Frass et al. (2020) specifically investigated homeopathic treatment in patients with non-small cell lung cancer. Additionally, Salazar et al. (2017) conducted research on delayed adjuvant chemotherapy in patients undergoing lung cancer surgery. These studies predominantly involved participants with lung cancer. However, there were also a few studies that included participants with other types of cancer. The study by Guethlin et al. (2010) examined cancer patients using homeopathy, without specifying the types of cancer included. The study by Balon et al. (2018) focused on patients receiving chemotherapy, without specifying a particular cancer type (Frass et al., 2020; Guethlin et al., 2010; Balon et al., 2018; Salazar et al., 2017; Frass et al., 2015; Gaertner et al., 2014).

The inclusion and exclusion criteria across the studies varied in several aspects. For instance, the studies focused on different types of cancer, including lung cancer (Frass et al., 2020; Gaertner et al., 2014; Salazar et al., 2017), breast cancer (Frass et al., 2020), and non-small cell lung cancer (Frass et al., 2020). Some studies specifically targeted a particular cancer type, while others had a broader range of cancer types included. The age range of participants also varied among the studies, with some including adult participants (Bagot et al., 2021; Balon et al., 2018; Frass et al., 2015; Gaertner et al., 2014; Guethlin et al., 2010; Salazar et al., 2017) and others focusing on specific age groups such as older adults (Frass et al., 2020) or pediatric populations (Frass et al., 2015). The cancer stage at enrollment was another variable criterion, with studies including participants at different stages of cancer, such as early-stage or advanced-stage cancer (Frass et al., 2020; Gaertner et al., 2014; Salazar et al., 2017). Additionally, some studies may have included participants with specific co-morbidities (Frass et al., 2020; Guethlin et al., 2010), while others may have excluded participants with certain co-morbidities to minimize confounding factors (Frass et al., 2015).

The interventions in the articles varied in terms of duration and specific details. Balon et al. (2018) implemented a 6-week intervention consisting of 3 homeopathic consultations. Frass et al. (2020) conducted a 24-week intervention with 5 homeopathic consultations. Frass et al. (2015) and Gaertner et al. (2014) had interventions of individualized homeopathic treatment, but specific durations were not provided. Guethlin et al. (2010) did not specify the intervention duration. Bagot et al. (2021) did not specify the intervention duration either. Additionally, Salazar et al. (2017) focused on the association of delayed adjuvant chemotherapy without a specific intervention duration (Balon et al., 2018; Frass et al., 2020; Guethlin et al., 2010; Bagot et al., 2021; Gaertner et al., 2014; Salazar et al., 2017; Frass et al., 2015).

A total of seven articles were reviewed to assess the outcome measures used in the studies. The specific outcome measures within each study varied, reflecting the different objectives and research questions addressed by the authors. Bagot et al. (2021) did not specify a primary outcome measure as the study focused on assessing the perceptions of homeopathy among healthcare professionals. Balon et al. (2018) used fatigue levels as the primary outcome measure, evaluating its changes throughout the intervention period. Frass et al. (2020) had multiple primary outcome measures, including quality of life and survival in patients with non-small cell lung cancer. Frass et al. (2015) assessed the primary outcomes of global health status and subjective well-being in cancer patients. Gaertner et al. (2014) examined survival data as the primary outcome measure in cancer patients receiving additive homeopathy. Guethlin et al. (2010) compared characteristics between cancer patients using homeopathy and those in conventional care, without specifying a single primary outcome measure. Salazar et al. (2017) investigated the association of delayed adjuvant chemotherapy with survival in lung cancer patients, making survival the primary outcome measure (Bagot et al., 2021; Balon et al., 2018; Frass et al., 2020; Frass et al., 2015; Gaertner et al., 2014; Guethlin et al., 2010; Salazar et al., 2017).

Overall, the studies present a mixed picture of homeopathy's effectiveness and perception of cancer care. While some studies suggest potential benefits in terms of improved quality of life and survival, others show no significant improvement or highlight confounding factors. To enhance the reliability of evidence concerning the effectiveness of homeopathy in cancer treatment, further research is needed, including studies with more rigorous study designs and standardized outcome measures.

**Evaluation of Evidence**

The studies present a mixed picture of homeopathy's effectiveness and perception of cancer care. While some studies suggest potential benefits in terms of improved quality of life and survival, others show no significant improvement or highlight confounding factors. To establish more evidence regarding the effectiveness and practicality of homeopathy in cancer treatment, further research and adaptations to study designs are required. This would contribute to a deeper understanding of the efficacy of homeopathy in the context of cancer treatment. Regarding the interventions, the studies compared chemotherapy (standard treatment) with homeopathy.

Upon evaluating the articles collectively, it is important to consider the evidence regarding homeopathic treatment in supportive cancer care. The included studies encompass a range of quantitative and qualitative methodologies, offering insights into different aspects of homeopathy's impact on cancer patients. These studies offer valuable insights but may still require larger sample sizes and more rigorous statistical analysis to strengthen their findings. The study by Bagot et al. (2021) explores the perceptions of homeopathy among healthcare professionals, providing valuable qualitative information. While it does not directly assess treatment outcomes, it offers a broader perspective on how homeopathy is viewed within supportive cancer care. While this study provides insights into healthcare professionals' perspectives, it does not directly address the effectiveness of homeopathy in prolonging life. Balon et al. (2018) and Guethlin et al. (2010) contribute Level III quantitative evidence, highlighting homeopathic treatment for specific symptoms like fatigue, and the differences in characteristics between cancer patients using homeopathy and those receiving conventional care Although the study provides some evidence of the feasibility of homeopathy, it does not specifically evaluate its impact on life prolongation. Frass et al. (2020) conducted a Level II quantitative study, a prospective, randomized, placebo-controlled, double-blind, three-arm multicenter study, investigating the impact of homeopathic treatment as an add-on therapy on quality of life and survival in patients with non-small cell lung cancer. The study suggests a potential improvement in quality of life and survival; however, further research is needed to validate these findings. Gaertner et al. (2014) conducted a retrospective study, a Level IV quantitative study, examining the survival data of cancer patients receiving additive homeopathy. The study suggests a positive association between homeopathy and survival; however, retrospective design and potential biases limit the strength of the evidence. Lastly, the study by Frass et al. (2015) presents Level V qualitative evidence, shedding light on the experiences and well-being of cancer patients receiving adjunctive classical homeopathy. This study provides valuable insights into patient perspectives but lacks statistical analysis and may not be generalizable.

Overall, the evidence from these articles indicates potential benefits of homeopathic treatment in supportive cancer care, such as improved quality of life and symptom management. However, it is important to interpret these findings cautiously, considering the limitations identified, including small sample sizes, lack of statistical analysis in some studies, and the need for further research to establish the efficacy and safety of homeopathy in this context. The studies vary in their design, level of evidence, and outcomes measured. Many of the studies suggest potential benefits in terms of quality of life and well-being, but the limitations and biases in the studies undermine confidence in the results. Therefore, further high-quality research, such as well-designed randomized controlled trials, is needed to provide a more definitive answer to the PICO question.

**Clinical Bottom line**

I would answer "uncertain" regarding whether there is enough evidence to answer the PICO question. The evidence obtained from the critical appraisal consists of a limited number of studies with varying levels of evidence. The evidence consists of a small number of studies with varying levels of evidence. For example, Frass et al. (2020), Salazar et al. (2017), and Bagot et al. (2021) were Level II studies, Balon et al. (2018) and Guethlin et al. (2010) were Level III studies, and Frass et al. (2015) and Gaertner et al. (2014) were Level IV studies. The presence of different study designs and levels of evidence indicates a lack of consistency in the available evidence. While Level II studies generally provide a higher level of confidence in the results, the inclusion of lower-level studies reduces the overall strength of the evidence. The quality and strength of the evidence are moderate at best. While the studies provide some insights into the effectiveness of chemotherapy and homeopathy in prolonging life in adult patients with lung cancer, the limitations and biases present in the studies reduce the confidence in the results and conclusions. These limitations include small sample sizes, lack of blinding, potential selection biases, and variations in outcome measures and treatment protocols. These factors make it challenging to draw definitive conclusions and reduce the overall confidence in the evidence.

Considering the inclusion and exclusion criteria previously listed, it is important to recognize that the studied populations in clinical trials may not fully represent the diversity of "real" patients. Real-world patients often have comorbidities, cognitive impairments, and other behavioral or chronic conditions that may impact treatment outcomes differently. The results from the critical appraisal are applicable specifically to the diagnosis of lung cancer. The studies focused on adult patients with lung cancer and investigated the effectiveness of chemotherapy and homeopathy in this population. Therefore, the findings may not directly translate to patients with different diagnoses. It is important to consider the specific characteristics and needs of the patient population in question and evaluate the evidence accordingly. As a result, based on the available evidence and its limitations, it would be appropriate to implement a selective approach in using chemotherapy or homeopathy in adult patients with lung cancer. Individual patient factors, preferences, and a shared decision-making process should guide treatment choices. Regular monitoring and evaluation of treatment response and adverse events are crucial to ensure patient safety and optimize outcomes. As for working with those patients with different cancer diagnoses, it would depend on the healthcare professional's specific expertise and practice. If the healthcare professional works primarily with patients diagnosed with lung cancer, the results may be more applicable to their practice. However, if the healthcare professional works with different diagnoses, they should consider the specific characteristics and needs of their patient population before applying the findings to other diagnoses.

**Next Steps**

To better answer the PICO question, further research is needed in several areas. Firstly, conducting large-scale randomized controlled trials (RCTs) with rigorous methodology would provide more evidence on the effectiveness of homeopathic interventions in supportive cancer care. Additionally, long-term follow-up studies assessing survival outcomes, quality of life, symptom management, and treatment-related side effects would contribute to a comprehensive understanding of the impact of homeopathy in this context. Comparative studies comparing homeopathy with conventional care interventions would also be valuable in determining the relative efficacy and safety of homeopathic therapies. Finally, qualitative research exploring patients' perspectives, experiences, and preferences regarding homeopathic treatments could provide insights into the acceptability and patient-centeredness of such interventions. None of the articles specified the involvement of a rehabilitation professional (OT/A, PT/A, SLP/A) in conducting the research. Involving a rehabilitation professional in the research process could bring valuable expertise and insights specific to the rehabilitation field. They could contribute to the study design, outcome selection, interpretation of results, and implications for rehabilitation practice. Their understanding of the functional limitations, symptom management, and holistic care approach in cancer patients could enhance the relevance and applicability of the research findings to the rehabilitation setting.

One aspect that stood out from the critical appraisal was the variation in the levels of evidence among the studies. While some studies were categorized as Level II (Frass et al., 2020) and Level III (Balon et al., 2018; Guethlin et al., 2010), others were categorized as Level IV (Bagot et al., 2021; Gaertner et al., 2014; Salazar et al., 2017) and Level V (Frass et al., 2015). This variation highlights the need for more high-quality research, particularly RCTs, to establish stronger evidence in the field of homeopathic interventions in supportive cancer care. Relying on studies with lower levels of evidence may limit the reliability and generalizability of the findings.

**Implementation**

To implement a treatment protocol comparing chemotherapy and homeopathy in adult lung cancer patients, the information learned from the critical appraisal can be shared through educational sessions, discussions, and the distribution of research articles. The information shared from the critical appraisal includes a summary of the evidence, methodological strengths and limitations, comparative analysis of findings, implications for practice, and recommendations for treatment implementation. This information helps guide treatment decisions, patient selection, monitoring of treatment response and adverse events, and emphasizes the importance of shared decision-making and ongoing evaluation of treatment outcomes. The implementation would involve various staff members, including oncologists, nurses, and research coordinators. Additional resources may be required for funding research personnel, data collection tools, and patient consultations. The administration may be willing to invest in this new treatment due to the potential to advance knowledge, attract funding, enhance the institution's reputation, and improve patient outcomes. Prior to implementation, questions related to patient eligibility, treatment protocols, data collection, adverse event monitoring, and logistics would need to be addressed in collaboration with management and ethics committees. Additionally, if the study findings demonstrate a significant difference between chemotherapy and homeopathy in terms of prolonging life, it may impact treatment guidelines and reimbursement policies, potentially leading to increased patient referrals and billing for the recommended treatment.

Keep in mind a new treatment protocol should be guided by evidence-based practice, local regulations, ethical considerations, and institutional policies. The specific details of implementation may vary depending on the healthcare setting, available resources, and clinical expertise.

**Coursework Integration**

The integration of knowledge from coursework I have taken at the University of Cincinnati into practice involves leveraging the insights gained from specific courses to enhance patient care. In this case, two relevant courses are pathophysiology and introductory pharmacology.

Pathophysiology: Understanding the pathophysiological processes of a specific condition, such as lung cancer, can inform treatment decisions and interventions. For instance, in the context of the PICO question related to lung cancer treatment, pathophysiology knowledge can be applied to identify potential complications, disease progression, and the impact on various body systems. This understanding enables healthcare professionals to tailor interventions to address the specific needs of patients with lung cancer. They can anticipate the functional limitations and impairments associated with the disease, such as decreased lung function, compromised respiratory status, or musculoskeletal changes, and develop appropriate rehabilitation plans. For example, a patient with lung cancer may experience decreased exercise tolerance and respiratory difficulties. Drawing on pathophysiological knowledge, healthcare professionals can design targeted exercise programs that consider the limitations imposed by the disease. Understanding the impact of tumor growth on lung function can guide the selection of appropriate exercises, such as breathing exercises or pulmonary rehabilitation, to improve respiratory function and enhance the patient's overall quality of life.

Introductory Pharmacology: Knowledge of pharmacology is crucial for understanding the medications used in the treatment of lung cancer and their potential effects on treatment outcomes. By considering the pharmacological properties of specific medications, healthcare professionals can identify potential interactions, contraindications, and side effects that may impact the success or failure of treatment. In the case of lung cancer, pharmacology knowledge can inform decisions regarding chemotherapy regimens, supportive medications, and adjunctive therapies. It can help identify potential drug-drug interactions, such as interactions between chemotherapy drugs and other medications the patient may be taking, which could affect treatment effectiveness or increase the risk of adverse reactions. Pharmacological knowledge also helps in understanding the appropriate dosing, administration routes, and monitoring requirements for specific medications used in lung cancer treatment. For instance, in the context of the PICO question, understanding the pharmacological properties of chemotherapy drugs and homeopathic treatments can help healthcare professionals assess the compatibility and safety of combining these interventions. They can consider potential interactions, such as altered drug metabolism or increased toxicity, and make informed decisions regarding the use of homeopathy alongside conventional chemotherapy.

Overall, integrating knowledge from pathophysiology and introductory pharmacology courses enables healthcare professionals to have a comprehensive understanding of the underlying disease processes and the impact of medications on treatment outcomes. This knowledge enhances clinical decision-making, facilitates patient-centered care, and promotes optimal treatment strategies for patients with lung cancer.

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