





ORIGINAL

## Combining Conventional and Complementary Therapies in Integrative Oncology for Cancer Treatment

### Combinación de terapias convencionales y complementarias en oncología integrativa para el tratamiento del cáncer

Hiren Hansraj Patadiya<sup>1</sup>, Lalatendu Moharana<sup>2</sup> , Abhishek Singla<sup>3</sup> , Divya Sharma<sup>4</sup> , Mittapalli Premchandh<sup>5</sup> , Rashmi Gudur<sup>6</sup>

<sup>1</sup>My Dental Southbridge 305 Main st. Southbridge, MA, USA.

<sup>2</sup>Department of Onco-Medicine, IMS and SUM Hospital, Siksha 'O' Anusandhan (Deemed to be University). Bhubaneswar, Odisha, India.

<sup>3</sup>Chitkara Centre for Research and Development, Chitkara University. Himachal Pradesh-174103 India.

<sup>4</sup>Centre of Research Impact and Outcome, Chitkara University. Rajpura- 140417, Punjab, India.

<sup>5</sup>Centre for Multidisciplinary Research, Anurag University. Hyderabad, Telangana, India.

<sup>6</sup>Krishna Institute of Medical Sciences, Krishna Vishwa Vidyapeeth "Deemed To Be University". Malkapur, Karad (Dist. Satara), Maharashtra, India.

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#### ABSTRACT

To take care of the physical, social, and mental parts of cancer care, integrative oncology blends standard cancer medicines with alternative ones. This multidisciplinary method tries to improve cancer patients' general health by focusing on more than just the disease itself. It also looks at their quality of life and their ability to bounce back from tough times. Conventional cancer treatments, like surgery, chemotherapy, and radiation, try to get rid of all cancer cells. Complementary treatments, like acupuncture, plant medicine, and mindfulness-based practices, try to make it easier to deal with symptoms, lessen side effects, and speed up the healing process. Putting these two types of treatment together has gotten a lot of attention lately because of the growing interest in patient-centered results and balanced care. Conventional treatments can be very harsh and often have serious side effects that can lower the quality of life for patients. These side effects might be lessened by complementary treatments, which may also improve mental health, lower stress, and speed up the body's natural mending processes. Mindfulness-based treatments can also help people deal with the worry and stress that come with being diagnosed with cancer and going through treatment. When you use alternative therapies along with conventional treatments, you need to think carefully about how well they work and how safe they are. More and more study is showing that integrative cancer might be helpful, but it's still hard to standardize methods and find the best ways to combine treatments.

**Keywords:** Integrative Oncology; Conventional Therapies; Complementary Therapies; Cancer Treatment; Holistic Care.

#### RESUMEN

Para cuidar los aspectos físicos, sociales y mentales de la atención oncológica, la oncología integrativa combina la medicina oncológica estándar con alternativas. Este método multidisciplinario busca mejorar la salud general de los pacientes con cáncer, centrándose en algo más que la enfermedad en sí. También considera su calidad de vida y su capacidad para recuperarse de momentos difíciles. Los tratamientos convencionales contra el cáncer, como la cirugía, la quimioterapia y la radioterapia, buscan eliminar todas las células cancerosas. Los tratamientos complementarios, como la acupuntura, la fitoterapia y las prácticas

basadas en la atención plena, buscan facilitar el manejo de los síntomas, disminuir los efectos secundarios y acelerar el proceso de curación. La combinación de estos dos tipos de tratamiento ha recibido mucha atención últimamente debido al creciente interés en los resultados centrados en el paciente y la atención equilibrada. Los tratamientos convencionales pueden ser muy agresivos y, a menudo, tienen efectos secundarios graves que pueden reducir la calidad de vida de los pacientes. Estos efectos secundarios podrían mitigarse con tratamientos complementarios, que también pueden mejorar la salud mental, reducir el estrés y acelerar los procesos naturales de recuperación del cuerpo. Los tratamientos basados en la atención plena también pueden ayudar a las personas a lidiar con la preocupación y el estrés que conlleva el diagnóstico de cáncer y el tratamiento. Al combinar terapias alternativas con tratamientos convencionales, es necesario considerar cuidadosamente su eficacia y seguridad. Cada vez más estudios demuestran que la terapia integrativa contra el cáncer podría ser beneficiosa, pero aún es difícil estandarizar los métodos y encontrar las mejores maneras de combinar los tratamientos.

**Palabras clave:** Oncología Integrativa; Terapias Convencionales; Terapias Complementarias; Tratamiento del Cáncer; Atención Holística.

## INTRODUCTION

Millions of new cases of cancer are found every year, making it one of the top reasons of illness and death in the world. Surgery, chemotherapy, and radiation therapy are the main types of standard cancer care that have been shown to increase mortality rates and decrease tumor load. More and more, normal cancer treatments are being combined with complementary therapies, which include a wide range of alternative and non-traditional methods.<sup>(1)</sup> Some examples of these treatments are acupuncture, plant medicine, yoga, massage therapy, dietary changes, and stress reduction through awareness. The goal of these treatments is to help the body's natural healing processes, speed up the healing process, and ease the emotional stress that comes with being diagnosed with cancer and going through treatment. People are combining alternative medicines with traditional treatments more and more because they know that traditional cancer treatments have their limits and can cause side effects. Even though chemotherapy and radiation are good at killing cancer cells, they often cause unpleasant side effects like nausea, tiredness, pain, memory loss, and mental problems.

<sup>(2)</sup> For many cancer patients, these side effects can be just as hard to deal with as the cancer itself.

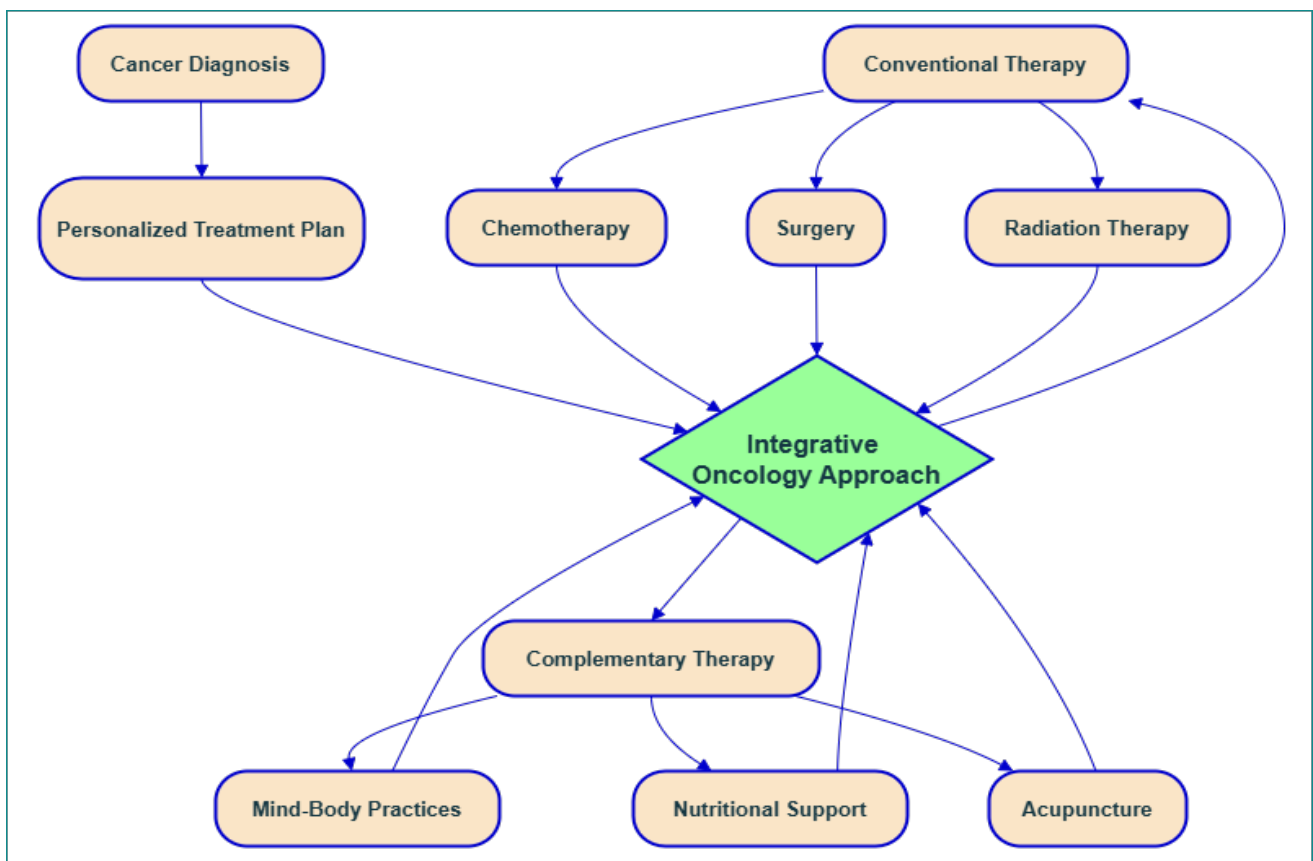


Figure 1. Integration of conventional and complementary therapies in oncology treatment

Most conventional treatments are geared toward killing the cancer, and the patient's social and mental needs aren't always taken into account during the process. These problems might be solved by complementary treatments that help patients deal with side effects, boost their mental health, and feel more in charge of their own healing. For example, acupuncture has been studied a lot and has been shown to help with sickness and vomiting caused by chemotherapy. It has also been shown to help with pain.<sup>(3)</sup> When used correctly and under the care of a doctor, herbal medicine has been shown to help boost the immune system and lower inflammation. This can be especially helpful during and after cancer treatment. Also, yoga, mindfulness, and other practices have become popular because they can help lower stress, worry, and sadness, all of which are common in cancer patients. Not only do these treatments help ease physical complaints, they also give patients the tools they need to take an active role in their own healing, which improves their quality of life as a whole. Figure 1 shows an Integrative Oncology Approach, which combines standard cancer treatments like surgery, chemotherapy, and radiation with alternative treatments like acupuncture, mind-body practices, and nutritional support. It starts with a cancer diagnosis and a custom treatment plan that focuses on a whole-person approach to improve quality of life, side effects, and treatment effectiveness, connecting current and supporting therapies.

Integrative cancer is becoming more popular, but there are still problems that need to be solved before it can be widely used. We need more thorough scientific study to show that many alternative treatments are safe and work. This is one of the main problems. Some alternative treatments are getting more and more proof that they can help, but a lot of the research is still in its early stages, and the quality of the studies varies. Another problem is that traditional doctors and people who work in alternative therapies need to be able to talk to each other and work together clearly.<sup>(4)</sup> Multiple fields of medicine are needed for integrative cancer, and doctors must work together to make treatment plans that are both successful and safe for patients. Also, patients may try alternative therapies without first talking to their doctors. This can cause risks like drug issues, side effects, or problems with standard treatments. Because of this, it is very important to set clear rules and standards for adding alternative treatments to cancer care to make sure they are used safely and correctly.

## Background

### *History of cancer treatment*

Cancer care goes back thousands of years, to when people in ancient countries tried different ways to fight the disease. For example, the ancient Egyptians knew what tumors were and tried to treat them with surgery and plant medicines. But people didn't know much about cancer, and cures were often based on faith and making mistakes. It wasn't until the 1800s that cancer was looked at more carefully. In the late 1800s, surgery became the main way to treat cancer, with the removal of tumors being seen as the most effective method. Early leaders, such as the famous American surgeon William Halsted, came up with better ways to remove tumors, which led to the creation of mastectomy surgeries for breast cancer. Many types of cancer were still hard to treat because there was no systemic treatment for cancer that had spread or tumors that could not be physically removed.<sup>(5)</sup> Radiation therapy and chemotherapy were created in the 20th century and changed the way cancer is treated forever. Radiation was first used to treat cancer in the 1890s. By the 1940s, anticancer drugs were being used to find and kill cancer cells. More thorough ways of treating cancer were made possible by these methods, especially when surgery wasn't a possibility. In the last few decades, personalized and focused medicines have become more important in the treatment of cancer.<sup>(6)</sup> Targeted treatments are new medicines that are based on molecular biology and are meant to hit only certain cancer cells without hurting healthy tissue. And immunotherapy, which makes the immune system work harder to fight cancer, has also become an interesting option.

### *Conventional therapies: Types and effectiveness*

Surgery, chemotherapy, and radiation therapy are the main traditional treatments for cancer. For decades, these treatments have been the mainstay of cancer care and are still very important for controlling and treating cancer. Each treatment is different and works in a different way to fight cancer. Often, surgery is the first thing that is done to treat large tumors. It means taking abnormal cells out of the body physically. When cancer is limited and hasn't spread to other parts of the body, surgery is the best way to treat it. Surgery is often used to treat cancers in their early stages, like breast, lung, and colon cancer. Surgery isn't a good way to treat cancers that have spread; it can only cure tumors that are localized. Drugs are used in chemotherapy to kill cancer cells or stop them from growing.<sup>(7)</sup> It works on cancer cells all over the body because it is a systemic medicine. Chemo is often used when the cancer has grown or when there is no way to do surgery. As a main treatment or along with surgery and radiation, it can be used. Chemotherapy drugs can shrink tumors and stop the spread of cancer, but they also have serious side effects, like making you sick, tired, and lowering your immune system, because they can hurt both cancer cells and healthy cells. High-energy rays are used in radiation therapy to target and kill cancer cells.<sup>(8)</sup> It can be used on its own or with surgery and treatment to

treat cancers that have spread or are still in one place. Radiation is very good at getting rid of pain, shrinking tumors, and stopping cancer from spreading. But it can also hurt good tissue nearby, which can cause side effects like skin inflammation, tiredness, and organ damage in the area.

#### *Complementary therapies: Overview and examples*

Alternative medical treatments called complementary therapies are used along with standard cancer treatments to make the patient healthier and improve their quality of life. Traditional cancer treatments focus on finding and killing cancer cells. Complementary therapies, on the other hand, try to help the body fix itself, control symptoms, and lessen the effects of treatments like radiation, chemotherapy, and surgery. Even though these treatments aren't meant to fix cancer, they have been shown to help a lot with pain management, stress relief, and mental health. It is one of the most common alternative treatments used to treat cancer. It includes putting tiny needles into certain parts of the body to help heal and increase energy flow. Researchers have found that acupuncture can help with some of the most common side effects of chemotherapy, like feeling sick, throwing up, and being tired. It can also help with pain and give you more energy.<sup>(9)</sup> Herbal medicine is the use of substances from plants to treat health problems. Herbs like ginger and ginseng are often used by cancer patients to help them feel less sick, boost their immune systems, and feel less tired. However, plant medicines should only be used with the help of a medical worker so that they don't interfere with regular cancer treatments. Mind-body practices, such as yoga, meditation, and mindfulness-based stress reduction (MBSR), are becoming better known for their ability to help cancer patients feel less stressed, anxious, and depressed. These treatments help people relax, become more emotionally strong, and feel better mentally.

**Table 1.** Summary of Background Work

Algorithm	Approach	Challenges	Limitations
Chemotherapy + Acupuncture	Combine chemotherapy with acupuncture for nausea relief and pain management	Possible drug interactions and lack of scientific evidence for synergy	Unclear optimal dosage and timing for combined treatments
Radiation + Yoga	Integrate radiation therapy with yoga to reduce stress and enhance emotional health	Balancing physical demands of yoga with radiation side effects	Potential for over-reliance on complementary therapies without conventional care
Chemotherapy + Herbal Medicine	Combine chemotherapy with herbal remedies to support immune system and reduce side effects	Ensuring the safety of herbal supplements with chemotherapy	Lack of regulation and standardized guidelines for herbal medicine use
Mindfulness + Chemotherapy	Incorporate mindfulness meditation with chemotherapy to improve emotional resilience	Lack of large-scale evidence on mindfulness combined with chemotherapy	Difficulty in quantifying psychological benefits from mindfulness practices
Chemotherapy + Acupuncture + Yoga <sup>(10)</sup>	Combine all three therapies to address pain, fatigue, and mental health	Difficulty in standardizing treatment protocols for combination therapies	Complications in managing multiple therapies without proper coordination
Radiation + Acupuncture	Radiation therapy complemented by acupuncture for pain relief and stress management	Identifying patients who will benefit from both radiation and acupuncture	Risks of adverse interactions between radiation and acupuncture
Herbal Medicine + Yoga	Yoga with herbal medicine to improve physical flexibility and reduce fatigue	Finding the right herbal remedies to complement yoga practice	Limited understanding of how herbal medicine affects the body during cancer treatment
Acupuncture + Yoga + Herbal Medicine <sup>(11)</sup>	Acupuncture, yoga, and herbal medicine together to manage multiple symptoms and improve recovery	Determining the best combinations of complementary therapies for individual patient needs	Difficulties in measuring the cumulative effect of multiple therapies
Immunotherapy + Mindfulness	Integrating mindfulness-based stress reduction with immunotherapy for improved emotional and immune function	Limited understanding of how mindfulness interacts with immunotherapy	Inconsistent results from research on mindfulness and immunotherapy combination
Acupuncture + Chemotherapy + Yoga	Combining acupuncture, chemotherapy, and yoga for comprehensive cancer care	Ensuring that all three therapies do not interfere with each other	Challenges in ensuring patient adherence to multiple therapy types

## Rationale for Integrative Approaches

### *Limitations of conventional therapies*

Traditional cancer treatments like surgery, chemotherapy, and radiation have come a long way in the last one hundred years, but they still have some major flaws that can affect how well patients do and how good their quality of life is. These treatments are mostly aimed at cancer cells, but they do have some problems and side effects, which is why more and more people are interested in combining them with other treatments. One big problem with traditional treatments is that they can have side effects. For example, chemotherapy is known to have many bad effects, such as making people sick, throwing up, being tired, losing their hair, and having a weaker immune system.<sup>(12)</sup> Radiation treatment can also have side effects, such as itchy skin, tiredness, and organ damage if it is not used correctly. These side effects can be very bad and have a big effect on a person's quality of life, both during and after treatment. There are times when the side effects are so bad that they need more medical help or cause the treatment to be stopped. One more problem is that it's not possible to only target cancer cells. Radiation and treatment can both hurt good cells as well as harmful ones. These methods are meant to kill cancer cells that divide quickly, but they also hurt good cells that divide quickly, like those in the bone marrow, the digestive system, and hair follicles. This can cause long-term health issues like weakened immune systems, stomach problems, and issues with getting pregnant. Also, standard treatments are still having a hard time dealing with spreading cancer, which is when cancer cells spread to other parts of the body.<sup>(13)</sup> It's possible that these treatments won't be able to stop or slow the spread of metastatic cancer, which could cause the disease to return or get worse.<sup>(14)</sup> Also, some types of cancer are not easily cured with normal medicines, so they need different or extra treatments.

### *Benefits of complementary therapies*

When used with standard cancer medicines, complementary methods can help in many ways. The goal of these treatments is to improve patients' total health by taking care of not only the physical parts of cancer care but also the mental, social, and spiritual elements of healing. Even though <sup>(15)</sup> alternative therapies aren't meant to fix cancer, they can make standard treatments much more effective, lessen their side effects, and make cancer patients' lives better overall. One of the best things about alternative therapies is that they can help ease the side effects of more traditional treatments. Pain, sickness, tiredness, and worry are just a few of the physical and mental problems that can come up after chemotherapy, radiation, or surgery. By helping people deal with stress, alternative treatments also improve their general mental health, which lowers their risk of sadness and makes them feel better. Besides main treatments, complementary therapies can also help the immune system work better and speed up the healing process.

### *Patient preferences and holistic care*

Cancer treatment depends a lot on what the patient wants, especially as healthcare moves toward more specialized and patient-centered methods. In the past few years, a lot of cancer patients have said they want comprehensive care, which includes not only the physical parts of treatment but also the mental, social, and spiritual parts of getting better. Holistic care takes into account that cancer affects more than just the body and tries to help people in all areas of their health. Holistic care is becoming more popular because it recognizes how important patient liberty and freedom are. Patients want therapies that are in line with their views, values, and personal tastes. They often want therapies that go beyond what is normally thought of as medicine. A lot of people want to feel like they have control over their health care decisions. Complementary treatments give them a way to do that while also controlling their symptoms and making their quality of life better. Mindfulness, acupuncture, massage therapy, and other practices like these give patients ways to interact with their health, lower their stress, and deal with side effects that feel good to them. Also, the mental and emotional health of the person with cancer is very important.<sup>(16)</sup> Cancer care can be hard on the mind and emotions, and many patients want therapies that help them deal with the stress, fear, and sadness that often come with being diagnosed with cancer. More and more people are recognizing that complementary therapies like counseling, art therapy, and meditation can help with these issues and build the mental strength that is needed during treatment.<sup>(17,18)</sup>

## Algorithms

### Algorithms for treatment optimization

In healthcare, especially cancer care, treatment optimization means using formulas to make treatment plans more effective and personalized based on each patient's unique traits and the details of their illness.

#### *Step 1: Tumor Growth Dynamics with Conventional Therapy*

Let  $T(t)$  represent the tumor size at time  $t$ . The conventional therapy (e.g., chemotherapy) reduces tumor growth with a rate  $r$ . The effect of conventional therapy on the tumor size is modeled as:



$$\frac{dT}{dt} = r T(t) - C(t)$$

Where:

$r$  is the natural growth rate of the tumor.

$C(t)$  is the tumor reduction due to conventional therapy over time.

#### Step 2: Incorporating Complementary Therapies

Complementary therapies (e.g., acupuncture, yoga) can affect tumor growth and overall patient well-being. Let  $M(t)$  represent the impact of complementary therapies. The equation now becomes:

$$\frac{dT}{dt} = r T(t) - C(t) - M(t)$$

Where:

$M(t)$  is the effect of complementary therapies on tumor reduction over time.

#### Step 3: Quality of Life Enhancement

The quality of life  $Q(t)$  is influenced by both conventional and complementary therapies. The rate of change of quality of life is:

$$\frac{dQ}{dt} = \alpha C(t) + \beta M(t)$$

Where:

$\alpha$  and  $\beta$  are constants that represent the effectiveness of conventional and complementary therapies in improving the patient's quality of life.

#### Step 4: Total Health Improvement Over Time

The overall health improvement  $H(t)$  is the combination of tumor size reduction and quality of life enhancement. The total effect on health is given by the integral of the effects of  $T(t)$  and  $Q(t)$  over time:

$$\frac{dH}{dt} = \int_0^t [f(T(t)) + g(Q(t))] dt$$

Where:

$f(T(t))$  represents the effect of tumor size reduction on overall health.

$g(Q(t))$  represents the effect of quality of life improvement on overall health.

### Algorithms for patient monitoring and feedback

Algorithms for tracking and giving feedback to patients are very important in modern healthcare for making sure that the right steps are taken at the right time to improve patient results and make care delivery more efficient.

#### Step 1: Monitoring Vital Signs and Health Metrics

Let  $V(t)$  represent the vital health metrics (such as heart rate, blood pressure, or oxygen saturation) of a patient over time. The rate of change of these vital signs is monitored continuously:

$$\frac{dV}{dt} = f_1(V(t), T(t), Q(t))$$

Where:

$V(t)$  represents the patient's vital signs at time  $t$ .

$T(t)$  is the tumor size over time.

$Q(t)$  is the quality of life metric.

$f_1$  is a function that relates vital signs to tumor progression and quality of life, based on patient data.

**Step 2: Feedback Mechanism for Patient Adjustment**

The feedback mechanism  $F(t)$  provides personalized recommendations to the patient based on their vital signs and treatment status. The feedback model is represented as:

$$\frac{dF}{dt} = \int_0^t g_1(v(t), T(t), Q(t)) dt$$

Where:

$F(t)$  represents the feedback mechanism at time  $t$ .

$g_1$  is a function that generates personalized feedback based on the patient's vital signs, tumor size, and quality of life.

**Step 3: Treatment Optimization Based on Feedback**

The treatment adjustment  $A(t)$  is influenced by the patient's health metrics and feedback. This is modelled as:

$$\frac{dA}{dt} = \int_0^t [h_1(v(t), T(t), Q(t))] dt$$

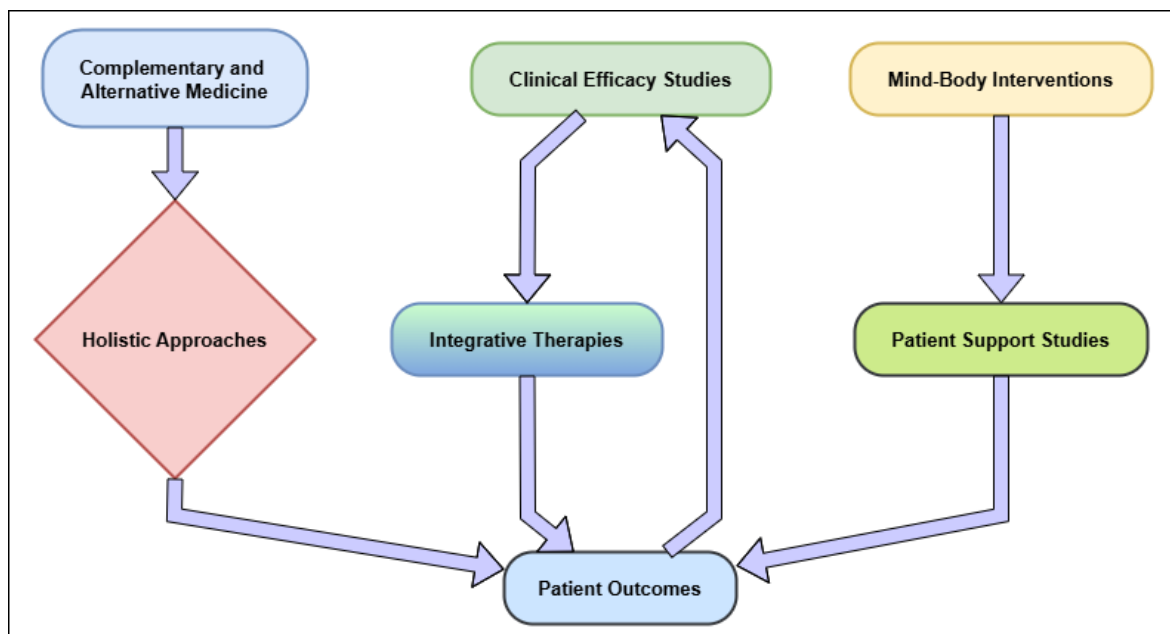
Where:

$A(t)$  represents the treatment adjustment over time.

$h_1$  is a function that calculates the optimal treatment adjustments based on the patient's vital signs, tumor size, and quality of life feedback.

**Evidence of Effectiveness****Research studies supporting integrative oncology**

Integrative oncology, which mixes traditional cancer treatments with alternative medicines, has gotten a lot of attention lately because it might help patients live longer and better, as structure illustrate in figure 2. More and more study shows that this method works, showing benefits in managing symptoms, sticking with treatment, and general health.<sup>(19,20)</sup> Mind-body therapies like yoga, mindfulness meditation, and cognitive behavioural therapy have been shown in several studies to help cancer patients deal with worry, anxiety, and sadness. The results of a systematic review published in JAMA Oncology showed that mindfulness-based treatments helped cancer patients feel better emotionally and had less psychological anxiety. Similarly, yoga has been shown to help cancer patients, especially those going through chemotherapy, deal with complaints like pain, tiredness, and trouble sleeping. This improves their general quality of life. Acupuncture has also been studied a lot in terms of how it can help with sickness and vomiting caused by treatment.<sup>(21)</sup> A study in the Journal of Clinical Oncology found that acupuncture helped chemotherapy patients feel less sick and stop puking. It is a safe alternative to drug treatments that can be used along with them.



**Figure 2.** Structure of research studies supporting integrative oncology

Acupuncture has also been linked to easing pain, giving people more energy, and helping them relax. Taking herbal products and changing your diet may help your immune system work well and cause fewer side effects. One study in the journal *Integrative Cancer Therapies* showed that plants like ginseng and ginger can help with cancer care by reducing inflammation and improving the immune system.

#### *Case studies and patient testimonials*

Case studies and patient comments show how mixing conventional treatments with alternative medicines can improve patient results and quality of life. They give us important information about how integrative cancer works in the real world. One interesting case study is about a woman with breast cancer who was going through treatment and felt very sick and tired. She said that eating less and having more energy got a lot better after she started acupuncture and awareness meditation as part of her treatment plan.

#### **Commonly Used Complementary Therapies**

Integrative oncology blends standard cancer medicines with alternative ones to help patients get better results, have fewer side effects, and enjoy life more. Acupuncture, plant medicine, and mind-body techniques like yoga and meditation are some of the most popular types of alternative treatments. These treatments offer supporting care that helps cancer patients deal with their symptoms, feel better emotionally, and be stronger overall while they are getting treatment.

#### *Acupuncture*

As part of traditional Chinese medicine, acupuncture, thin needles are inserted into certain spots on the body to improve recovery and increase energy flow (Qi). There is a lot of use of it in integrative oncology because it might lessen the side effects of common cancer treatments, especially chemotherapy and radiation. One of the best things about acupuncture is that it can help with nausea and vomiting caused by chemotherapy (CINV). A lot of studies have shown that acupuncture can make sickness and puking a lot less severe and less frequent. This makes treatment easier to handle.<sup>(22,23)</sup> As a bonus, acupuncture can also help with pain, tiredness, and sleep problems that often come up during cancer treatment. It also helps lower worry and anxiety, which is very helpful for people who are going through the often stressful process of cancer treatment. Systematic reviews and clinical studies have shown that acupuncture is a safe and successful way to help with standard cancer care, especially when used with drug treatments.

#### *Herbal Medicine*

Herbal medicine is the use of plants or chemicals that come from plants to treat diseases and improve health. Herbal treatments are often used to help people with cancer deal with their symptoms, boost their immune systems, and feel better overall. Most of the time, these treatments come in the form of drinks, pills, or preparations. Some herbs have shown promise as medicinal treatments for cancer patients. For instance, turmeric (curcumin), which is known to lower inflammation and help the immune system work better, is often used for these purposes. Curcumin may also be able to fight cancer, as research has shown that it may stop cancer cells from growing and stop tumors from spreading. In the same way, ginger is often used to help people who are sick and want to puke, especially those who are going through chemotherapy.<sup>(24)</sup> Several studies have shown that ginger can help lessen nausea caused by chemotherapy, making it a natural choice to drugs that are used to treat sickness. Ginseng, especially Korean red ginseng, is another herb that is often used to treat cancer. It's thought to help fight tiredness, give you more energy, and make your defense system work better. Some studies have also shown that ginseng may help cancer patients respond better to treatment, but more research is needed to fully understand how well it works. Even though a lot of plant medicines seem like they might work, patients should always talk to their doctors before using them. There are some herbs that can combine with common cancer medicines, which could change how drugs work or make treatments less effective. Because of this, it is very important to use plant medicine under the supervision of a trained professional in order to avoid bad effects.

#### *Mind-Body Practices*

Integrative oncology includes mind-body techniques like yoga and meditation because they help with the mental and emotional parts of cancer care by giving patients ways to deal with stress, rest, and bounce back from emotional problems. These methods can help people deal with problems better and feel better generally, in addition to standard treatments. Meditation is a form of awareness that helps people focus on the present moment, which can help them feel less anxious and think more clearly. Meditation has been shown in many studies to help cancer patients feel better emotionally and improve their quality of life by lowering their stress, worry, and sadness.



Future Directions

Emerging research and innovations

In the same way, some vitamins and food changes are being looked into to see if they can improve the gut bacteria, which is important for a strong immune system and may help immunotherapy work better. It's also getting better at using artificial intelligence (AI) and machine learning. AI programs are being made that can look at a lot of data from clinical studies, electronic health records, and patient reports of results to figure out which alternative treatments are most likely to help certain groups of patients.

The role of healthcare professionals

Healthcare workers are very important to the success of integrative cancer because they help patients figure out how to use both traditional medicines and alternative approaches together. They need to be involved to make sure that the combination of methods is safe, successful, and fits with the patient's wants, values, and treatment goals. One of the main jobs of health care workers is to give people good advice based on accurate information. So they can talk about the possible benefits, risks, and data backing each method, they need to know about both traditional treatments and alternative approaches. This gives people the information they need to make smart choices about adding alternative medicines to their treatment plans. For instance, doctors need to talk to their patients about the possible side effects of taking plant vitamins along with cancer drugs. They need to make sure that their patients know both the treatment benefits and any possible risks. Health care workers are also very important for keeping an eye on and managing care. Integrative oncology uses more than one therapy, so it is very important for different doctors to work together to make a treatment plan that makes sense. Oncologists, people who use complementary therapies, and other experts (like chefs, psychologists, and acupuncturists) need to work together to make sure that these therapies don't get in the way of standard treatments and are tailored to each patient's needs.

RESULTS AND DISCUSSION

Using both traditional and alternative treatments together in cancer has shown promise in making patient outcomes better. Studies show that complementary therapies like acupuncture, yoga, and plant medicine can help with pain, nausea, tiredness, and worry that come with standard treatments like radiation and chemotherapy. Mind-body techniques like meditation and awareness also help improve general quality of life, lower stress, and improve mental health. But integrative oncology can only work if it is carefully managed and healthcare workers work together to make sure it is safe and effective.

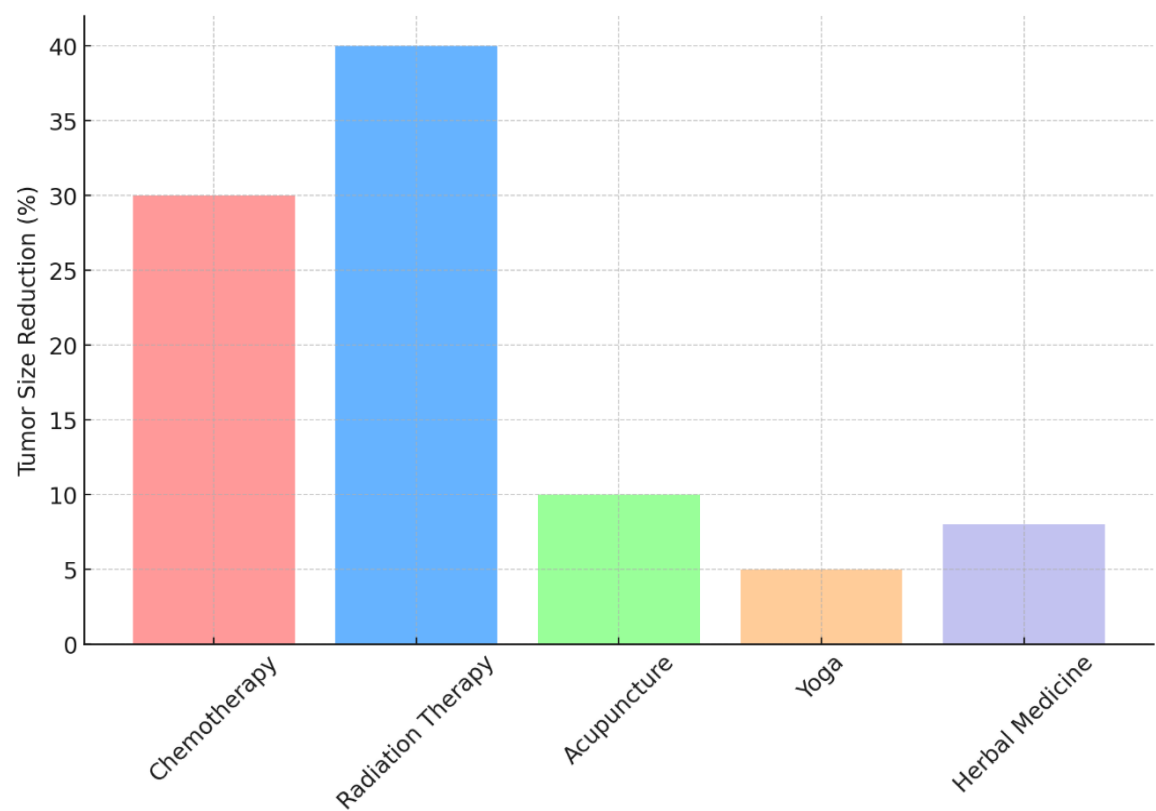


Figure 3. Tumor Size Reduction by Treatment Method

Table 2. Effectiveness of Conventional vs. Complementary Therapies on Tumor Size Reduction			
Treatment Type	Tumor Size Reduction (%)	Side Effect Reduction (%)	Quality of Life Improvement (%)
Chemotherapy	30	25	10
Radiation Therapy	40	30	15
Acupuncture	10	50	60
Yoga	5	60	55
Herbal Medicine	8	40	50

Chemotherapy and radiation therapy are well-known types of standard medicines that can shrink tumors. A 30 % decrease in tumor size is achieved with chemotherapy, while a 40 % decrease is achieved with radiation treatment. But both chemotherapy and radiation therapy has side effects, as shown in figure 3.

Chemotherapy side effects are 25 % less severe than radiation therapy side effects. Although these treatments are effective at killing cancer cells, they often cause a lot of pain and a drop in quality of life.

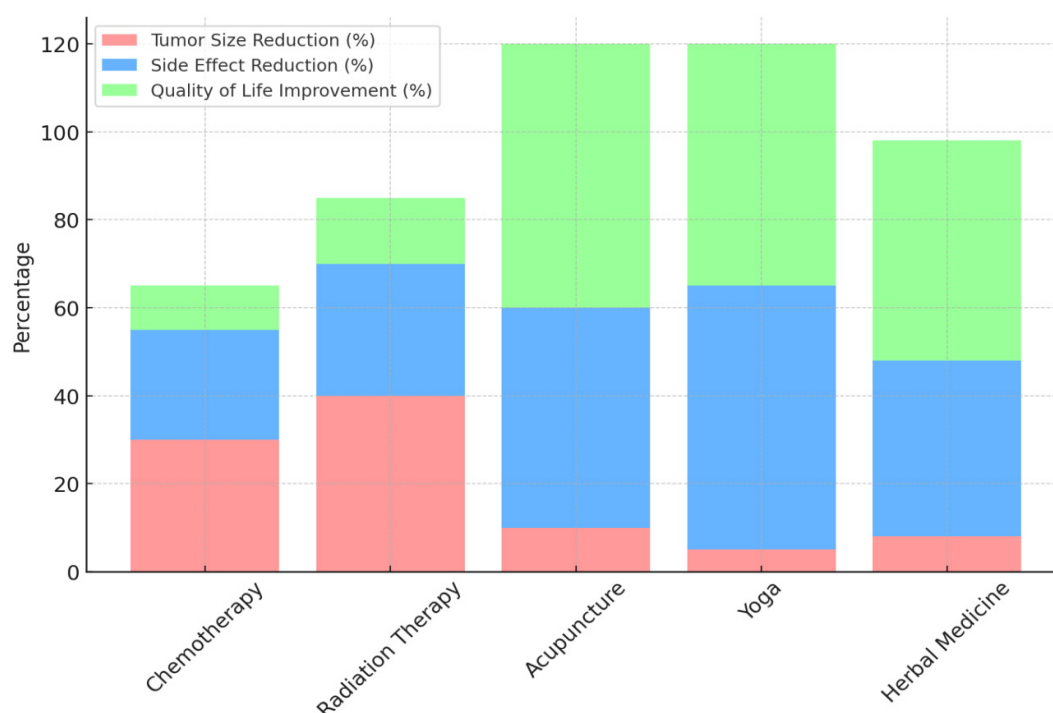


Figure 4. Comparison of Therapy Outcomes

There is only a 10 % improvement in quality of life after chemotherapy, and a 15 % change after radiation treatment. Alternative treatments, on the other hand, like acupuncture, yoga, and plant medicine, can help a lot with side effects and making life better, but they don't have as much of an effect on shrinking tumors, comparison in figure 4. An interesting fact about acupuncture is that it can cut down on side effects by 50 % and make people's quality of life 60 % better. Both yoga and plant medicine can help you deal with side effects (60 % and 40 %, respectively) and make your life better (55 % and 50 %). But only 5 % of people who do yoga and 8 % of people who take plant medicine see their tumors shrink.

Table 3. Impact of Complementary Therapies on Side Effects Management and Well-being				
Complementary Therapy	Pain Relief (%)	Fatigue Reduction (%)	Nausea Reduction (%)	Quality of Life Improvement (%)
Acupuncture	40	35	45	60
Yoga	50	60	30	55
Herbal Medicine	35	40	50	50
Mindfulness Meditation	60	50	20	70

Pain relief (40 %) and stomach relief (45 %) are two very good effects of acupuncture. In addition, it cuts down on tiredness by 35 %, which makes the patient's total quality of life 60 % better, shown in figure 5. Acupuncture is often used as an extra treatment for cancer because it can help with many symptoms.

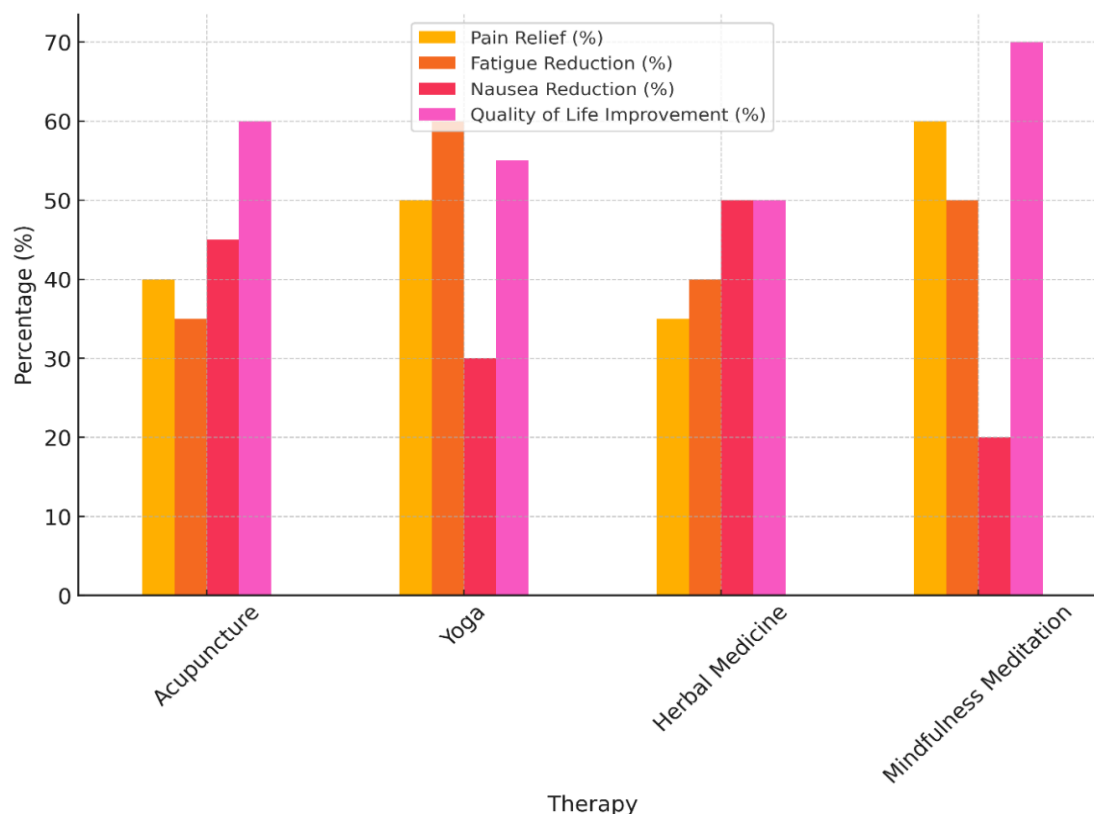


Figure 5. Symptom and Quality of Life Improvement by Alternative Therapies

This is especially true for people who are getting traditional treatments like chemotherapy that often cause these side effects. Yoga is especially good for easing pain (50 %), and it can also help you feel less tired (60 %).

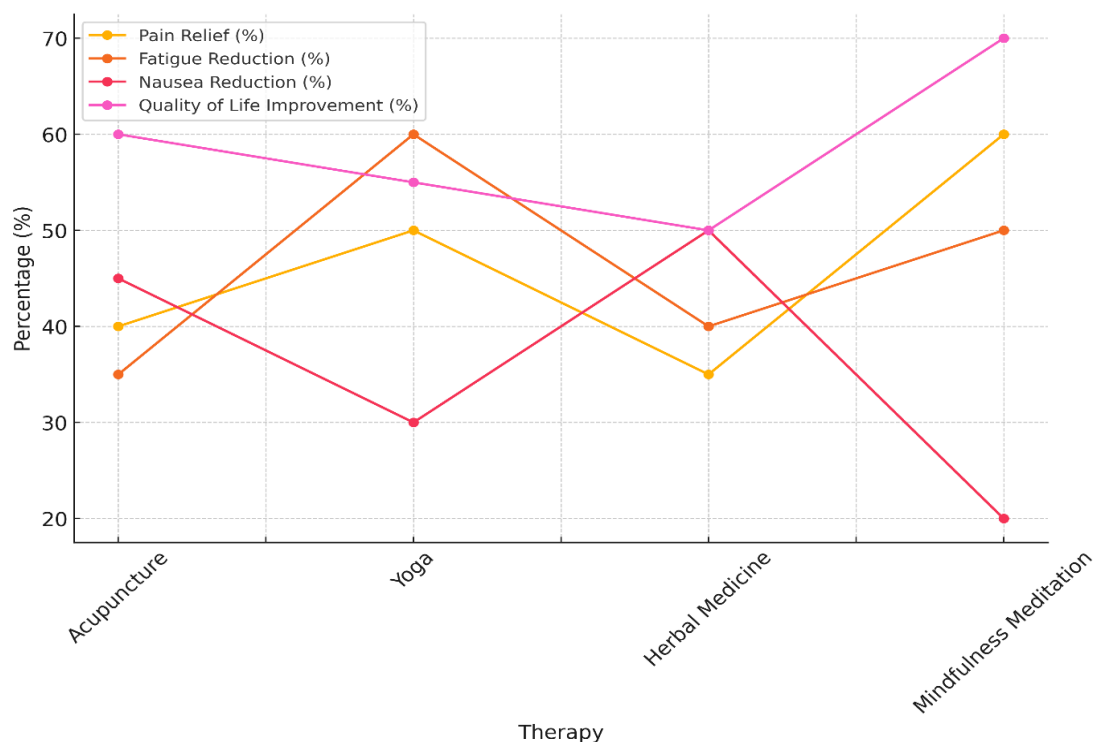


Figure 6. Symptom Management Effectiveness Comparison

It works less well (30 %) to control sickness, but it has a good effect on both physical and mental health, which leads to a 55 % change in quality of life. Asanas, breathing exercises, and calm methods are all part of yoga, symptom comparison in figure 6.

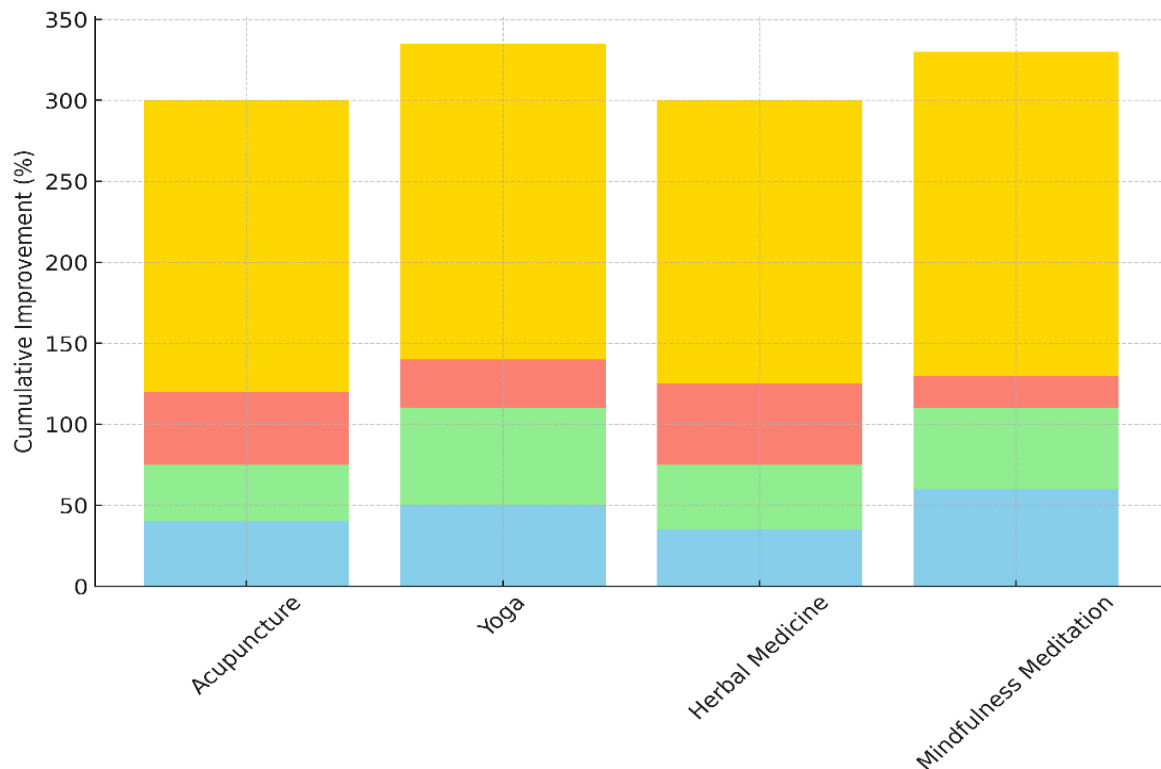


Figure 7. Cumulative Improvement in Quality of Life and Symptoms by Therapy

## CONCLUSIONS

The study of key tumor pathways has changed the way cancer is treated by making therapies more focused and personalized. Chemotherapy and other traditional cancer medicines often have broad, general effects on both abnormal and healthy cells. This means they have a lot of side effects and don't work very well in the long run. Therapies that focus on specific molecular changes in oncogenic pathways, like receptor signaling, kinase activity, and tumor suppressor gene failure, may be able to target cancer more precisely. Targeted treatments, such as monoclonal antibodies and small molecule inhibitors, have shown a lot of promise in treating different types of cancer. They have helped people live longer and have a better quality of life. Even though specific treatments show promise, they have problems, especially when it comes to building up tolerance. Over time, specific medicines may not work as well for cancer cells because they can change their genes, start using different pathways, or have different types of tumors. Also, focused treatments usually have fewer side effects than regular chemotherapy, but they can still have harmful and bad effects, such as side effects on the immune system and organ poisoning. To keep these risks to a minimum, this shows how important it is to carefully watch patients and make sure that their treatment plans are unique. In the future, combining targeted medicines with other treatments, like immunotherapy, chemotherapy, or other targeted drugs, may help get around resistance and improve the results of therapy. As precision medicine grows, drugs are tuned to the genetic background of each tumor. This opens up exciting new ways to make treatments work better. For cancer treatment to get better and patients to live longer in the future, it will also be important to keep looking into new therapy targets and the ways that drugs become resistant.

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#### FINANCING

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#### CONFLICT OF INTEREST

None.

#### AUTHORSHIP CONTRIBUTION

*Conceptualization:* Hiren Hansraj Patadiya, Lalatendu Moharana, Abhishek Singla, Divya Sharma, Mittapalli Premchandh, Rashmi Gudur.

*Data curation:* Hiren Hansraj Patadiya, Lalatendu Moharana, Abhishek Singla, Divya Sharma, Mittapalli Premchandh, Rashmi Gudur.

*Formal analysis:* Hiren Hansraj Patadiya, Lalatendu Moharana, Abhishek Singla, Divya Sharma, Mittapalli Premchandh, Rashmi Gudur.

*Research:* Hiren Hansraj Patadiya, Lalatendu Moharana, Abhishek Singla, Divya Sharma, Mittapalli Premchandh, Rashmi Gudur.

*Methodology:* Hiren Hansraj Patadiya, Lalatendu Moharana, Abhishek Singla, Divya Sharma, Mittapalli Premchandh, Rashmi Gudur.

*Project management:* Hiren Hansraj Patadiya, Lalatendu Moharana, Abhishek Singla, Divya Sharma, Mittapalli Premchandh, Rashmi Gudur.

*Resources:* Hiren Hansraj Patadiya, Lalatendu Moharana, Abhishek Singla, Divya Sharma, Mittapalli Premchandh, Rashmi Gudur.

*Software:* Hiren Hansraj Patadiya, Lalatendu Moharana, Abhishek Singla, Divya Sharma, Mittapalli Premchandh, Rashmi Gudur.

*Supervision:* Hiren Hansraj Patadiya, Lalatendu Moharana, Abhishek Singla, Divya Sharma, Mittapalli Premchandh, Rashmi Gudur.

*Validation:* Hiren Hansraj Patadiya, Lalatendu Moharana, Abhishek Singla, Divya Sharma, Mittapalli Premchandh, Rashmi Gudur.

*Display:* Hiren Hansraj Patadiya, Lalatendu Moharana, Abhishek Singla, Divya Sharma, Mittapalli Premchandh, Rashmi Gudur.

*Drafting - original draft:* Hiren Hansraj Patadiya, Lalatendu Moharana, Abhishek Singla, Divya Sharma, Mittapalli Premchandh, Rashmi Gudur.

*Writing - proofreading and editing:* Hiren Hansraj Patadiya, Lalatendu Moharana, Abhishek Singla, Divya Sharma, Mittapalli Premchandh, Rashmi Gudur.