Scientific Publications

World Journal of Cancer and Oncology Research, 2024, 3, 833
www.scipublications.org/journal/index.php/wjcor
DOI: 10.31586/wjcor.2024.833

Review Article

Liver Cancer: A Psychological CBT Group Intervention Possibility Based on Scientific Review

Luísa Soares [1,*], Matilde Silva [1]

[1] Universidade da Madeira: Departamento de Psicologia, Funchal, Portugal

*Correspondence: Luísa Soares (lsoares@staff.uma.pt)

Abstract: This article focuses on primary liver cancer and tries to present a possible CBT-Cognitive Behavioral Therapy group intervention of 6 sessions and a follow up based on a scientific review. We present an international national data analyze of the problem and characterize it in terms of symptoms, diagnosis and treatment. From the psychological point of view our goal is to show and reflect on the connection between theory and practice in research mental health and the quality of life of people suffering from liver cancer. CBT interventions programme have shown efficacy and effectiveness on improving quality of life of patients. The expected outcomes of CBT intervention are mainly a better adaptation to cancer and a better perception on quality of live.

Keywords: Liver Cancer, CBT, Psychology, Group Intervention

How to cite this paper:
Soares, L., & Silva, M. (2024). Liver cancer: A psychological CBT group intervention possibility based on scientific review. *World Journal of Cancer and Oncology Research*, *3*(1), 1–12. Retrieved from https://www.scipublications.com/journal/index.php/wjcor/article/view/833

Academic Editor:
Mohamed Kotb El-Sayed

Received: December 12, 2023
Revised: February 20, 2024
Accepted: March 3, 2024
Published: March 6, 2024

1. Introduction

The liver is one of the largest organs in the body and carries out essential metabolic functions: a) it converts nutrients into energy; b) helps with the production of bile to digest fat; c) stores glucose, in the form of glycogen, for energy; d) synthesis of essential proteins and detoxification (i.e., filters harmful substances in the blood, [1, 2]. This last function, the synthesis of the essential proteins and detoxification (d) makes it highly accessible and exposed to cancer cells in the bloodstream. Thus, most people who have cancer in the liver have secondary liver cancer, that is, cancer that spreads or metastasizes to the liver from another area, such as the pancreas, colon, breast, stomach or other organs. Metastases are the tumor that most frequently affects the liver, and around 30 to 70% of patients with advanced-stage cancer have metastases in the liver [3]. However, this article focuses on primary liver cancer, which originates in cells of the liver and suggests a possible CBT intervention in patients with liver cancer.

Liver cancer is the sixth most common cancer globally, with approximately 906,000 new cases in 2020, representing approximately 5% of all cancer diagnoses [4, 5, 6]. It is also the third leading cause of cancer-related deaths worldwide, with around 830,000 deaths in 2020, which equates to around 8% of all cancer deaths [4, 5]. Liver cancer is common in economically developing countries, especially on the continents of Asia and Africa [4].

In Portugal, primary liver cancer is the 11th most common cancer, representing 2.6% of cancer cases, and the seventh leading cause of cancer-related deaths, which is equivalent to around 8% of all cancer deaths [4]. In 2020, 1,550 new cases were reported, and 1,518 deaths were reported in the same year [4]. In the Autonomous Region of Madeira, in Portugal, southern Europe, the most recent data report 17 new cases of liver cancer in 2018 (there are no data available for the following years of 2019-2023 for the Autonomous Region of Madeira, Portugal). It represents an incidence rate of 6.7% in the Autonomous Region of Madeira, Portugal, an incidence rate of 4.9% standardized for the

European population and 3.4% for the world population [7]. This type of cancer has a higher incidence in men than in women, with incidence and death rates 2 to 3 times higher in men [5, 8]. It is the fifth most common cancer in this population and the second leading cause of cancer deaths [5]. The most significant difference in terms of gender identity is observed in Europe, where the incidence and mortality rate are up to 4 times higher in males [9]. However, some countries have a similar incidence and mortality ratio between the two genders, for example, Ecuador, Uganda, Costa Rica, and Colombia [9]. Regardless of gender identity, liver cancer is most likely to occur between the ages of 50 and 69 (Generation X and Baby Boomers), but the highest incidence is after age 70 (Baby Boomers) [10].

There are three main subtypes of liver cancer: Hepatocellular Carcinoma (HCC), Intrahepatic Cholangiocarcinoma (ICC) and combined HCC-CIC, which is a combination of the HCC and ICC phenotypes, being more aggressive and prognostically unfavorable [11]. In addition to these three subtypes, there are also Angiosarcoma (i.e., cancer in the cells lining the blood vessels of the liver, more common in people over the age of 70) and Hepatoblastoma (i.e., cancer originating in immature liver cells (hepatoblasts), more common in children under four years of age); both being very rare [12] and not covered in this article.

HCC and ICC have distinct characteristics concerning their epidemiology, clinical pathological morphology, genetic alterations and therapeutic responses [11]. While HCC originates in liver cells and develops in the functional liver tissue, ICC originates in and develops in bile duct cells, not in the liver tissue itself. HCC is mainly associated with viral infections, alcohol abuse and metabolic syndrome [9]; CIC is linked to chronic liver inflammation and biliary tract diseases [13, 14]. In terms of prognosis, HCC is more unfavorable due to its quieter nature, while ICC offers a greater probability of a more favorable prognosis [11]. This article is dedicated to HCC, as this is the most prevalent subtype of liver cancer, representing around 75-85% of cases [5, 6].

Also, we emphazise in this work that Cognitive-Behavioral Therapy (CBT) emerges as an effective intervention to deal with the emotional complexities associated with cancer. This approach promotes a resilient and adaptive mindset by helping patients confront negative beliefs and cultivate positive thoughts. Thus, the inclusion of cognitive strategies aims not only to mitigate emotional suffering but also to strengthen the ability to cope with the challenges inherent to the diagnosis and treatment of cancer [24, 25, 26, 27].

2. Getting to know the liver cancer: Symptoms, diagnosis, treatment and prevention

Liver cancer is a silent disease that generally does not present symptoms until advanced stages. Even so, the following signs [2, 3] stand out:

- Pain or discomfort on the right side of the upper abdomen, below the ribs;
- Pain in the right shoulder blade;
- Unexplained weight loss;
- Loss of appetite or feeling very full after a light meal;
- Nausea and vomiting;
- Appearance of a mass on the right side of the upper abdomen;
- Abdominal swelling due to the accumulation of fluid inside the abdomen (Ascites);
- Jaundice (yellowing of the eyes and body) may also be associated with itchy skin, darker urine and paler stools than usual;
- Fatigue and lack of energy for no apparent reason;
- Encephalopathy (changes in brain function).

Other symptoms may include fever, dilated veins in the belly that can be seen through the skin, and abnormal bruising or bleeding [2, 3].

2.1. Diagnosis, Treatment & Prognosis

The tests and procedures used to diagnose liver cancer include blood tests, which can reveal abnormalities in liver function, particularly by the alpha-fetoprotein indicator, and physical examinations. One or more imaging tests are complementary, such as ultrasound, CT and Magnetic Resonance Imaging, Laparoscopies, Biopsies and Tumor Biomarker tests. In the case of diagnosis, the latter are considered staging tests to determine the size and location of the cancer and understand whether it has spread [15].

There are different methods of staging liver cancer [15]. In the specific case of hepatocellular carcinoma (HCC), doctors often use the Barcelona Clinic Liver Cancer (BCLC) system to describe the cancer and recommend treatment options [16, 34]. The BCLC system classifies HCC from 0 (Very Early Stage) to D (Terminal Stage) based on tumor characteristics, liver function, performance status and cancer-related symptoms [2]. This method is summarized in Table 1, adapted from EASL–EORTC; 2012) [16].

Table 1. Barcelona Clinic Liver Cancer Staging System (BCLC)

Stage	Tumor Stage	Liver function	Status of the patient
0 Very early	unique < 2 cm	Normal function (Child-Pugh A)	Feels good and is active, more or less like he/she was before the disease. (PS 0)
A Prematurely	unique, or 3 nodules ≤ 3 cm		
B Intermedium	Multinodular	Normal function or moderated damage (Child-Pugh A-B)	
C Advanced	Portal invasion or extrahepatic spread		independent, but unable to do heavy work or work (PS 1-2)
D Terminal		Severe damage (Child-Pugh C)	Need help from others (PS > 2)

In addition to the stage, treatment options and recommendations for HCC will depend on several factors, including the part of the liver that is affected by the cancer, whether the cancer has spread, the patient's preferences and general health status and damage to the remaining area of the liver without cancer [15].

When a tumor is detected at an early stage and the patient's liver is functioning well, treatment is aimed at trying to eliminate the cancer, that is, curative treatment, as is the case with liver resection or transplantation [16].When liver cancer is detected at a more advanced stage or when the patient's liver is not working well, the goals of treatment are directed toward slowing the growth of the cancer and relieving symptoms in order to improve the patient's quality of life [3].Specific treatments include transarterial chemoembolization, radiotherapy and chemotherapy; these may prolong survival but are ultimately not curative [17].

The prognosis will depend mainly on the stage of evolution at which the tumor is diagnosed and the possibility of applying the most effective treatment method in each case [15]. Even so, HCC has a high mortality rate [16]. Five-year survival rates are generally less than 20%, partly because the absence of symptoms in the early stages leads to late diagnosis [17]. At the time of diagnosis, most patients are not eligible for curative treatments, such as liver resection or transplantation [17]. Table 2 presents standard treatment and median survival depending on the HCC stage, adapted from EASL–EORTC (2012) [16].

Table 2. Standard treatment and median survival depending on HCC stage, adapted from EASL–EORTC (2012)

	BCLC 0-A	BCLC B	BCLC C	BCLC D
Standard treatment	Resection, transplantation, percutaneous ablation	Chemoembolization TACE	Sorafenib	Best supportive care (palliative)
Median survival	> 60 months	20 months	11 months	< 3 months

2.2. Risk Factors & Prevention

In addition to age (over 70 years) and gender identity (men), common risk factors for HCC include:

- Chronic viral infections, namely Hepatitis B and Hepatitis C [1] (are responsible for around three-quarters (73.4%) of HCC cases in the world [19] with HBV being responsible for twice as many cases as HCV [9, 20, 21].
- Consumption of food contaminated with Aflatoxins [2] [21] (harmful substances produced by certain types of fungi, particularly Aspergillus, and can contaminate various foods, mainly corn, peanuts and other nuts, especially in hot and humid places) [9, 21, 22];
- Excessive alcohol consumption and smoking [9];
- Obesity, type 2 diabetes and metabolic syndrome [9, 22].

Considering this, it becomes clear that a fundamental part of preventing this type of cancer involves changing the risk factors inherent to these factors [35, 36].

At a behavioral level, healthy habits include eating, physical activity, and not consuming alcohol, tobacco and other drugs. Regarding viral infections due to Hepatitis B and C, responsible sexual practices, such as using condoms and other safety measures, not sharing syringes or personal hygiene objects, getting vaccinated against HBV and having basic hygiene practices, such as washing hands well. In the case of Aflatoxins, prevention involves food care in terms of hygiene, conservation, and preparation of what we eat, especially in countries with poor sanitary conditions [23]. Even so, the risk factors associated with viral hepatitis and the consumption of food contaminated with Aflatoxins

---

[1] Hepatitis B (HBV) and Hepatitis C (HCV) are viral diseases that affect the liver. These conditions are responsible for almost three-quarters (73.4%) of HCC cases worldwide (Plummer et al., 2016), with HBV responsible for twice as many cases as HCV. However, fortunately, the prevalence of chronic Hepatitis B (HBV) and Hepatitis C (HCV) infections is decreasing in many parts of the world due to public health measures. HBV can be prevented through vaccination and there are effective treatments for people who are already infected with HBV. Although there is no vaccine to prevent HCV infection, this virus has already been removed from blood reserves in most countries and can be effectively cured with direct-acting antiviral (DAA) therapies [21].

[2] Aflatoxins are harmful substances produced by certain fungi, particularly Aspergillus, and can contaminate various foods, mainly corn, peanuts and other nuts, especially in hot and humid places. Aflatoxin B1 (AFB1) is the most potent type of aflatoxin and is known to cause liver cancer not only in animals but also in humans. However, ways to reduce the risk of exposure to AFB1 include changing the way grains are harvested and stored, using different types of fungi that compete with harmful ones, and using chemicals to avoid contamination. , on a large scale. At home, prevention involves buying organic products and products with well-defined control and testing parameters and being careful with the shelf life of our food [21].

are more prevalent in high-risk developing countries. In these countries, liver cancer incidence and mortality rates are decreasing due to the lower prevalence of hepatitis B and C and reduced exposure to aflatoxins, made possible through the implementation of HBV vaccination programs, the treatment of individuals with chronic HBV and HCV infections and the development of programs to prevent exposure to AFB1 [21]. When it comes to lifestyle-related risk factors (i.e., excessive alcohol consumption, smoking and obesity), type 2 diabetes and metabolic syndrome these are already contributing to increased cancer rates. In many countries, the liver traditionally had lower risks [21].

3. Intervention – a Cognitive Behavioral Therapy (CBT) possiblity to improve quality of life

A cancer diagnosis entails significant challenges for patients, not only physically but also psychologically and emotionally. In this context, multidisciplinary interventions that transcend the traditional medical sphere have gained prominence. In psychological intervention, the importance of education, behavioral therapy, cognitive-behavioral therapy and group support in psychosocial support for oncology patients stands out [24].

Education is crucial in providing essential information about cancer and its treatments. Providing knowledge to patients not only empowers them but also contributes to understanding and actively managing the disease at various levels and avoiding feelings of uncertainty [24, 25, 26].

Cognitve Behavioral Therapy (CBT) is emerging as a valuable tool in confronting the adverse side effects associated with oncological treatments. In relaxation techniques, behavioral therapy aims to mitigate the negative impacts of chemotherapy and reduce stress. This approach not only alleviates physical symptoms but also contributes to the psychological well-being of patients [24, 25, 26, 27].

Cognitive-behavioral therapy emerges as an effective intervention to deal with the emotional complexities associated with cancer. This approach promotes a resilient and adaptive mindset by helping patients confront negative beliefs and cultivate positive thoughts. Thus, the inclusion of cognitive strategies aims not only to mitigate emotional suffering but also to strengthen the ability to cope with the challenges inherent to the diagnosis and treatment of cancer [24, 25, 26, 27].

Finally, group support can be crucial to provide an environment promoting community among oncology patients. Exposure to role models, sharing experiences and mutual emotional support are essential to this type of intervention. Furthermore, the "principle of helping therapy" stands out, which emphasizes how patients contributing to the group's well-being experience a significant increase in their self-esteem [24, 25, 26, 27].

By addressing information, treatment side effects, problem-solving capacity and emotional challenges, the psychological intervention proposed in this article aims to improve the quality of life of cancer patients significantly.

3.1. Quality of Life (QoL)

Accordingo to Norman, Weil, and Philip in 2022, hepatocellular Carcinoma (HCC) presents substantial challenges associated with a poor prognosis, the presence of underlying chronic liver disease and a significant burden of symptoms in more advanced stages [26]. In this sense, HCC compromises physical health and challenges onchological patients' psychological and social resilience. Therefore, to develop effective interventions, it is crucial to understand patients' experiences and the influence of HCC on QoL. A recent systematic review by [26] identified five critical themes related to the QoL and patients' experience with HCC (see Table 3).

Table 3. Five key themes related to QoL adapted from [26]

(1) the burden of physical symptoms and side effects of treatment	'Nothing but just like dog tired. I just thought it was normal […] Just tired, exhausted'. [28, p. 6]
(2) the psychological impact and coping strategies	'The psychological aspects of the cancer have affected me more than anything else' [28, p. 9]
(3) social function and stigma	"Their attitude is like, "You are a drunk," or "You are a druggy." I do not have the high tech, good cancer, you know… like leukemia' [29, p. 23]
(4) spiritual well-being, sense of self and the meaning of illness	'That's my identity now, is being a cancer patient versus being who I was before …' [28, p. 9]
(5) widespread uncertainty	'It is tough living with it in your head, like constantly you just don't know what is around the corner ' [30, p. 65]

The results of this review [26] provides valuable insights into the critical factors that affect the QoL of patients with HCC. The burden of physical symptoms and treatment side effects emerged as a pressing concern, highlighting the need for therapeutic approaches that minimize such impacts. The psychological impact and coping strategies were crucial to patients' adaptation to HCC. Social function and stigma proved to be determinants of QoL, highlighting the importance of interventions that aim to promote social inclusion and reduce the stigma associated with the disease. Spiritual well-being, the sense of self and the meaning of the disease emerged as significant aspects in the experience of HCC. Pervasive uncertainty, standard in chronic illnesses, has been recognized as an additional challenge that requires special attention.

Based on the results obtained, a comprehensive intervention plan was designed. Each identified topic was integrated into the intervention sessions, aiming for a holistic approach to improving the QoL of patients with HCC. Therapeutic strategies were adapted to mitigate physical symptoms, strengthen coping strategies, promote social inclusion, address spiritual and existential issues, and deal with widespread uncertainty.

3.2. Psychological Intervention Plan

This intervention plan proposes a group approach, consisting of six main sessions and a follow-up session, to address the physical, psychological, social and spiritual aspects of patients' quality of life and experiences with HCC. The sessions will last two hours each, with a weekly frequency, making seven meetings. The group will be homogeneous, composed of six to twelve men diagnosed with HCC in an intermediate stage (BCLC B), aged between 50 and 69 years, all undergoing the same type of chemotherapy treatment. This homogeneity and group size are based on evidence from the literature that indicates that these are the most favorable conditions for group therapy for oncology patients [25].

In addition to the group sessions, participants will have access to two weekly low-intensity Yoga classes, Hatha and Restorative Yoga. Yoga, recognized as therapy for the mind and body, focuses on physical alignment postures (Asanas), breathing techniques (Pranayamas) and mindfulness exercises (Samadhi) [31]. The literature has shown that Yoga improves physical and psychological symptoms, quality of life and immunity markers in cancer patients [32].

Furthermore, the effectiveness of these approaches has been confirmed in the management of sleep disturbances, fatigue, cognitive impairment, psychosocial distress and musculoskeletal symptoms in patients undergoing chemotherapy [31].

Finally, all sessions aim to psycho-educate and inform about the topic [27]. Each meeting will include moments dedicated to exchanging information, discussing concerns and solving problems, training in coping skills, promoting the expression of emotions and social support [27, 33].

3.3. Sessions Goals Proposul

3.3.1. Session 1 | The burden of physical symptoms and treatment side effects/goals

- Establish a safe and supportive environment for the group.
- Provide information about the intervention.
- Educate the group about the disease, physical symptoms, and side effects of chemotherapy.

The session will begin with a group reception led by the responsible psychologist. Participants will be invited to give brief presentations, sharing their names, ages, and a brief contextualization of their stories, highlighting their experience with HCC and chemotherapy. This approach allows the creation of bonds within the group, promoting an environment of mutual support.

The presentation of the Intervention Plan, Contextualization and Rationale will occur after the presentations, briefly contextualizing the cognitive behavioral therapy approach. The psychologist will explain the rationale behind the five subsequent sessions, highlighting the key themes related to HCC and discussing their influence on patients' daily lives [26].

Session Topic: Physical Symptoms and Side Effects of Treatment

Secondly, the session's central theme will be introduced: the weight of physical symptoms and side effects of treatment. At this time, an oncologist, will provide detailed information about the disease, physical symptoms and side effects of chemotherapy, answering any questions that may arise. This moment will be followed by a group discussion, allowing participants to share their experiences and symptoms [27].

Based on the systematic review [26], it is highlighted that patients with liver cancer experience various physical symptoms, from fatigue to gastrointestinal disorders, influenced not only by the disease but also by the side effects of the treatment, especially chemotherapy. These symptoms cause suffering, impair daily functions and negatively impact patients' quality of life [26]. In this context, the session will conclude with relaxation techniques, focusing on two Pranayama techniques: diaphragmatic breathing and square breathing [27], a progressive muscle relaxation technique [27], and a one-minute meditation technique [27].

For homework, participants will be given a diary in which they will be asked to record negative changes in physical symptoms or side effects. In addition, they will be guided to perform 10 minutes of one or more of the relaxation exercises taught, recording their pre- and post-session perceptions. This exercise aims to promote self-awareness and help participants identify the most effective techniques for their well-being.

3.3.2. SESSION 2 | The psychological impact and coping strategies – Part 1

The psychological well-being of patients with Hepatocellular Carcinoma (HCC) is significantly impacted, leading to emotions such as anxiety, frustration, sadness, and guilt. These emotions exhibit variations throughout the disease trajectory, ranging from the initial shock of diagnosis to concerns about finances, uncertainty, changes in body image, and fear of mortality. Existing literature also emphasizes the utilization of adaptive and maladaptive strategies for managing psychological stress among HCC patients. These strategies include optimism, resilience through struggle, humor as a coping mechanism, information seeking behavior, and lifestyle modifications. Conversely, maladaptations may manifest as relapses into alcohol consumption [26].

Session Objectives:

- Explore emotions related to HCC.

- Identify negative beliefs that may make it difficult to accept the diagnosis and manage the disease.
- Provide techniques to challenge negative thoughts, develop rational responses and promote a positive perspective in adapting to illness.

The session will begin with an open discussion about the emotions associated with experiencing the disease. Participants will be encouraged to share their emotional journey from the first symptoms to the present moment. The expressed emotions will be recorded and later analyzed by exploring underlying beliefs and assumptions [27]. The goal is to understand the beliefs underlying negative emotions providing alternative strategies for dealing with these thoughts.

Based on the emotions and beliefs identified, participants will be invited to create Coping Cards [27]. On each card, they must write a phrase that helps them overcome the moments associated with the identified negative emotions. This exercise will be discussed in a group, allowing one to share and reflect on the messages underlying each chosen phrase. Coping Cards will be used as tangible reminder tools for the session and the critical messages discussed and reflected on [27].

As homework, participants will receive an emotional diary designed to activate and explore daily emotional experiences, emphasizing the cognitive elements present in each emotional schema [27]. In addition, a designated time for worries [27], will be proposed, limiting anxiety to a specific time and place. This exercise aims to strengthen control over anxiety and allow constructive reflection on concerns. These exercises aim to deepen emotional awareness and provide practical tools to cope with the psychological impact of HCC [27].

3.3.3. SESSION 3 | The psychological impact and coping strategies – Part 2

The second part of the sessions, dedicated to psychological impact and coping strategies, will focus on adaptive coping strategies, as identified in the systematic review. These include optimism, fighting attitude, humor, and healthy lifestyle habits [26].

The session will begin with a presentation on what constitutes a healthy lifestyle, particularly nutrition. As usual practice, time will be dedicated to discussion and sharing of experiences, aiming to promote reflection on patients' current lifestyles and considerations about possible changes.

Below are proposed tasks to cultivate optimism, a fighting attitude and humor. For optimism and humor, the construction of the Gratitude Box [27] will be carried out. Participants will be encouraged to build, as a group, a box with recycled materials, in which each person will write three reasons why they feel grateful in their lives – one internal, one external and one related to their illness, but in a humorous way. The papers will be shared and stored in the box, accessible whenever they wish to add new motifs or reflect on the existing ones.

Homework will be assigned using the legacy definition technique [27]. Participants will be challenged to reflect and answer questions about how they want to be remembered, their life's meaning and main qualities and learnings. This task aims to promote self-knowledge, self-esteem, self-worth and self-confidence and will serve as the basis for subsequent sessions on social function, stigma and spiritual well-being [27].

For members who have reported resorting to maladjustment strategies, namely alcohol consumption, an extra task will be asked to do with the technique of using relapse as alcohol learning [27] (Conceição & Bueno, 2020). Furthermore, the one-minute meditation technique, recognized for its effectiveness in combating drug and alcohol dependence, will be reinforced [27].

3.3.4. SESSION 4 | Social function and stigma

The studies mentioned in the literature review [26], also highlight the negative impact of HCC on patients' social function. Deteriorating physical health often leads to dependence on caregivers for basic tasks, contributing to strained social relationships due to the inability to fulfill typical responsibilities, including sexual function. Social isolation is intensified by the impossibility of participating in social activities and work, becoming an additional challenge for patients. Furthermore, the stigmatizing nature of HCC amplifies the negative impact, being associated with feelings of shame and isolation, primarily due to prejudices related to alcoholism, drug use and sexually transmitted infections, generally associated with viral liver diseases [26].

Session Objectives:

- Address the impact of HCC on relationships and social life
- Work on participants' self-esteem
- Rebuild social relationships affected by stigma

The session will begin with a sharing and an introduction of social function and stigma themes. Each participant will be invited to express their experiences in these aspects. A rational-emotional role-play dynamic [27], will follow, where negative beliefs associated with social function and stigma will be deconstructed. The objective is to provide counterarguments that allow a reevaluation of beliefs, promoting emotional distance. The Double Standards [27], technique will also be introduced, encouraging participants to question whether they would apply the same standards to themselves if they were in the position of others. This exercise aims to equalize the "charging standard" regardless of whether it is directed at yourself or others.

Ultimately, the emphasis will be on self-esteem to reduce the impact of the stigma felt. First, there will be a brief psychoeducational moment on the role of self-esteem in emotional and social functioning. Next, participants will be challenged to share their answers to the question "List at least five of your main qualities?" of the legacy definition technique [27]. Additionally, each participant will attribute three qualities to the member to their right, promoting a positive exchange.

As homework, two techniques will be proposed. Firstly, the Mirror Technique [27], where participants direct self-affirming phrases to the mirror to strengthen self-esteem and increase personal and emotional security [27]. In addition, participants will be asked to write a letter to loved ones, with the aim of, on the one hand, allowing the patient to express their emotions and clarify their needs and, on the other hand, promote empathy and strengthening their emotional ties.

3.3.5. SESSION 5 | Spiritual well-being, sense of self and the meaning of illness

Spiritual well-being, the sense of self and the meaning attributed to the disease assume crucial importance in the QoL of patients with HCC, given the severity and high mortality rate of the disease, even more so taking into account that the majority of patients with HCC are aware of the terminal nature of their diagnosis [26].

Identity issues arise not only due to the physical changes caused by the disease and treatment, which influence self-image, the perception of "self," and general well-being throughout the process since patients generally use their physical condition to monitor disease progression as well as the loss of independence and responsibilities that existed before the diagnosis. The comparison of the current "me" with the "me" of the past, prior to HCC, generates an internal conflict that impacts patients' QoL and emotional well-being. In this context, acceptance of the post-diagnosis "self" emerges as a critical factor for positive adaptation to the disease. There is also a perceived loss of control, as the nature of the disease leads to feelings of helplessness and inability to escape its progressive worsening. Still, some patients turn to religion as a source of comfort, while others find personal growth and a deeper appreciation for life despite the challenges posed by HCC [26].

Session Objectives:

- Explore the spiritual well-being and identity of patients with HCC
- Facilitate positive redefinition of illness and life

- Promote reflections on personal legacy and the realization of dreams

The session begins with evoking the response paragraph to the Legacy Definition Task of the 3rd Session [27], highlighting individual perceptions about legacy and life purpose. Each group member will share their paragraph, followed by praise and positive comments from others.

The second part of the session focuses on the future based on the "What I Can Still Do" technique [27]. The first part will address problem-solving, looking for alternatives to challenges presented by members. The second part focuses on building a "Bucket List," where each member will be asked to list four realistic dreams. In groups, dreams and strategies for realizing them will be discussed.

Participants will create a "Resilience Box" for a randomly chosen group member for homework. The box will contain 1) a letter of support for challenging moments, 2) a symbolic recovery item or amulet, 3) an inspiring phrase to carry with you, 4) a message of appreciation, and 5) a message of hope.

3.3.6. SESSION 6 | Widespread Uncertainty and Feedback

Uncertainty is a constant in the experience of patients with HCC, affecting them at all stages of the disease. The systematic review [26] highlighted two primary sources of this uncertainty: the unpredictability of the evolution of HCC and poor communication by health professionals. The distress associated with uncertainty about disease progression is intensified by unclear prognoses, unpredictable episodes of deterioration, and the complexity of distinguishing the effects of treatment from disease symptoms. This uncertainty is compounded by insufficient information about the diagnosis, treatment options and potential complications. The inconsistency of information provided by different healthcare providers and excessive information can further contribute to this uncertainty. On the contrary, when healthcare professionals take the time to provide personalized information and engage patients in active dialogue, uncertainty decreases [26].

Session Objectives:

- Medical Clarification
- Assertiveness Training
- Sharing Experiences and Feedback
- Routing and Resources

The session will include the presence of the oncologist, doctor, or nurse to address remaining questions, share experiences and provide additional information about HCC.

Subsequently, the assertiveness training technique [27], will be taught, using role-playing, allowing members to stage a conversation with the doctor/nurse after explaining the themes inherent to assertive communication. This technique aims to improve communication between group members and healthcare professionals. It will address crucial topics such as expressing demands appropriately, using a clear and calm tone of voice, sharing feelings assertively, clearly describing desires and avoiding unfounded assumptions about the intentions of others.

The end of the session will be dedicated to sharing experiences and feedback from group members and professionals involved. This moment will allow us to review the progress and challenges faced in recent weeks, clarify any outstanding doubts and provide an environment of conviviality and support. Contacts and information regarding support groups and counseling services will also be provided. Additionally, participants will receive a comprehensive manual of cognitive-behavioral techniques for future reference.

Homework will be simple but crucial: maintain and apply all the learning obtained. Persistence in using the cognitive-behavioral techniques learned is vital for the continued development of participants' psychological and emotional well-being.

3.3.7. FOLLOW-UP SESSION

The follow-up session is crucial to consolidate the progress made and provide ongoing support to participants. At this stage, the main objective is to promote the continuity of learned strategies, evaluate individual evolution and offer additional resources as necessary. Initially, each participant will be able to share their experiences since the last session. This sharing will be a space to highlight successes, challenges overcome and personal reflections. Participants will be encouraged to identify new challenges that have arisen since completing the program, which will be discussed as a group, as well as specific strategies that will be outlined to address them. Furthermore, new personal goals will be defined and aligned with each member's emotional and psychological growth. A brief revision of the main cognitive-behavioral techniques learned throughout the intervention programme should be carried out to consolidate the understanding and application of the main topics learned. Health professionals will be present throughout the intervention, including the oncologist, to answer questions and offer additional guidance. If additional support is needed, referrals to specialist services or ongoing support groups will be provided. The goal is to ensure that participants continue to receive the assistance they need. Additional resources, such as recommended readings, information on local support events and valuable contacts for continued support, will also be provided. The last moment of the session will feature a period dedicated to feedback, where participants will be asked to express their opinions about the intervention program. This information is valuable for future adjustments and will contribute to the ongoing quality of support offered. As homework, participants will be encouraged to establish self-care goals and continued practice of cognitive-behavioral techniques. The emphasis will be on autonomy and integrating these strategies into the daily routine.

$$a = 1 \tag{1}$$

4. Conclusions

In this paper, we tried to integrate the findings of a systematic review [26], into the psychological clinical practice based on a CBT intervention group with liver cancer. Our goal is to show and reflect on this connection between theory and practice in research mental health and the quality of life of people suffering from liver cancer. CBT interventions programmes have shown efficacy and effectiveness on improving quality of life of patients. Practice based on scientific evidence is our moto.

Funding: “This research received no external funding”

Conflicts of Interest: “The authors declare no conflict of interest.”

References

[1] Center for Disease Control and Prevention. (2019). *Liver Cancer*. Cdc. https://www.cdc.gov/cancer/liver/index.htm

[2] National Health System. (2020, May 26). Symptoms of liver cancer. Nhs. Uk. https://www.nhs.uk/conditions/liver-cancer/symptoms/

[3] Mayo Clinic. (2019). Liver cancer - Symptoms and causes. Mayo Clinic. https://www.mayoclinic.org/diseases-conditions/liver-cancer/symptoms-causes/syc-20353659

[4] Global Cancer Observatory (2021) Liver fact sheet. Retrieved from https://gco.iarc.fr/today/data/factsheets/cancers/20-Breast-fact-sheet.pdf

[5] Sung, H., Ferlay, J., Siegel, R. L., Laversanne, M., Soerjomataram, I., Jemal, A., & Bray, F. (2021). Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: A cancer journal for clinicians*, 71, 3, 209-249.

[6] Li, Q., Cao, M., Lei, L., Yang, F., Li, H., Yan, X., ... & Chen, W. (2022). The burden of liver cancer: From epidemiology to prevention. *Chinese Journal of Cancer Research*, 34,6, 554.

[7] Camacho, C., Queiroz Nunes, C., Fraga, C., Santos, F., Camacho, J., Barradas, N., ... & Muller, S. (2020). *Registo Oncológico na Região Autónoma da Madeira*, 2018.

[8] Liu, Z., Suo, C., Mao, X., Jiang, Y., Jin, L., Zhang, T., & Chen, X. (2020). Global incidence trends in primary liver cancer by age at diagnosis, sex, region, and etiology, 1990-2017. *Cancer,* 126,10, 2267-2278.

[9] McGlynn, K.A., Petrick, J.L., and El-Serag, H.B. (2020). Epidemiology of hepatocellular carcinoma. *Hepatology.* Retrieved 4th December https://doi.org/10.1002/hep.31288

[10] Liu, Y., Zheng, J., Hao, J., Wang, R. R., Liu, X., Gu, P., ... & Peng, Z. (2022). Global burden of primary liver cancer by five etiologies and global prediction by 2035 based on the global burden of disease study 2019. *Cancer medicine*, 11,5, 1310-1323.

[11] Feng, M., Pan, Y., Kong, R., & Shu, S. (2020). Therapy of primary liver cancer. *The Innovation*, 1, 2.

[12] American Cancer Society (2022). What is Cancer? | Cancer Basics https://www.cancer.org/cancer/understanding-cancer/what-is-cancer.html

[13] Clements, O., Eliahoo, J., Kim, J.U., Taylor-Robinson, S.D., and Khan, S.A. (2020). Risk factors for intrahepatic and extrahepatic cholangiocarcinoma: a systematic review and meta-analysis. *J. Hepatol*. 72, 95–103.

[14] Valle, J.W., Borbath, I., Khan, S.A., Huguet, F., Gruenberger, T., and Arnold, D. (2016). Biliary cancer: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. *Ann. Oncol*. 27 (suppl 5), v28–v37.

[15] Liver Cancer - Diagnosis. (2017, July 10). Cancer.net. https://www.cancer.net/cancer-types/liver-cancer/diagnosis

[16] European Association For The Study Of The Liver. (2012). EASL–EORTC clinical practice guidelines: management of hepatocellular carcinoma. *Journal of Hepatology,* 56,4, 908-943.

[17] Laube, R., Sabih, A., Strasser,S. Lim, L., Cigolini, M. & Liu, K. Palliative care in hepatocellular carcinoma. (2020). *Gastroenterology & Hepatology*, Retrieved, 4th December 2023 https://doi.org/10.1111/jgh.15169

[18] Bray, F., Ferlay, J., Soerjomataram, I., Siegel, R. L., Torre, L. A., & Jemal, A. (2018). Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: A cancer journal for clinicians,* 68, 6, 394-424.

[19] Plummer M, de Martel C, Vignat J, Ferlay J, Bray F, Franceschi S. Global burden of cancers attributable to infections in 2012: a synthetic analysis (2016). *Lancet Global Health*, 4,9, 609–16.

[20] Perz JF, Armstrong GL, Farrington LA, Hutin YJ, Bell BP. The contributions of hepatitis B virus and hepatitis C virus infections to cirrhosis and primary liver cancer worldwide (2006). *J Hepatol*, 45,4, 529–38.

[21] Petrick, J. L., & McGlynn, K. A. (2019). The changing epidemiology of primary liver cancer. *Current epidemiology report*s 6, 104-111.

[22] National Cancer Institute (NCI). (2015). Aflatoxins. National Cancer Institute; Cancer.gov. https://www.cancer.gov/about-cancer/causes-prevention/risk/substances/aflatoxins

[23] Cuide do seu fígado. Previna o cancro - News Farma. (n.d.). Www.newsfarma.pt. Retrieved November 16, 2023, from https://www.newsfarma.pt/artigos/11049-cuide-do-seu-f%C3%ADgado-previna-o-cancro.html

[24] Beck, J. S. (2013*). Terapia cognitivo-comportamental: teoria e prática.* Porto Alegre: Artmed.

[25] Moorey, S., & Greer, S. (2011). *Oxford guide to CBT for people with cancer.* OUP Oxford.

[26] Norman, E. M., Weil, J., & Philip, J. (2022). Hepatocellular carcinoma and its impact on quality of life: A qualitative literature review—*European Journal of cancer care*, 31,6.

[27] Conceição, J., & Bueno, G. (2020). *101 técnicas da terapia cognitivo-comportamental*. (1st ed.). Editora UnC

[28] Patel, N., Maher, J., Lie, X., Gwaltney, C., Barzi, A., Karwal, M., Macarulla, T., Sun, H. C., Trojan, J., Meyers, O., Workman, C., Morgan, S., Negro, A., & Cohen, G. (2022). Understanding the patient experience in hepatocellular carcinoma: A qualitative patient interview study. *Quality of Life Research*, 31, 473–485. https://doi.org/10.1007/

[29] Hansen, L., Rosenkranz, S. J., Vaccaro, G. M., & Chang, M. F. (2015). Patients with hepatocellular carcinoma near the end of life: A longitudinal qualitative study of their illness experiences. *Cancer Nursing,* 38, E19–E27.
https://doi.org/10.1097/NCC.00000000000

[30] Ellis, J., Brearley, S. G., Craven, O., & Molassiotis, A. (2013). Understanding the symptom experience of patients with gastrointestinal cancers in the first year following diagnosis: Findings from a qualitative longitudinal study. *Journal of Gastrointestinal Cancer*, 44, 60–67. org/10.1007/s12029-012-9443-9

[31] Lin, P. J., Peppone, L. J., Janelsins, M. C., Mohile, S. G., Kamen, C. S., Kleckner, I. R., ... & Mustian, K. M. (2018). Yoga for the management of cancer treatment-related toxicities. *Current oncology reports*, 20, 1-9.

[32] Agarwal, R. P., & Maroko-Afek, A. (2018). Yoga into cancer care: a review of the evidence-based research. *International Journal of Yoga*, 11,1, 3.

[33] Xiao, W., Chow, K. M., So, W. K., Leung, D. Y., & Chan, C. W. (2016, Jul-Aug). The effectiveness of psychoeducational intervention on managing symptom clusters in patients with cancer: A systematic review of randomized controlled, *Cancer Nursing*, 39, 4, 279-91. Doi: 10.1097/NCC.0000000000000313.

[34] Barcelona Clinic Liver Cancer (BCLC) staging system and the Child-Pugh system | Liver cancer | Cancer Research UK. (2019). https://www.cancerresearchuk.org/about-cancer/liver-cancer/stages/bclc-staging-system-child-pugh-system

[35] Li, Q., Cao, M., Lei, L., Yang, F., Li, H., Yan, X., ... & Chen, W. (2022). The burden of liver cancer: From epidemiology to prevention. *Chinese Journal of Cancer Research*, 34,6, 554.

[36] Liu, Y., Zheng, J., Hao, J., Wang, R. R., Liu, X., Gu, P., ... & Peng, Z. (2022). Global burden of primary liver cancer by five etiologies and global prediction by 2035 based on the global burden of disease study 2019. *Cancer medicine*, 11,5, 1310-1323.