

The power of attitude

Cafo

2° de Bachillerato

Research Project

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«The greatest discovery of all time is that a person
can change his future by merely changing his attitude»

OPRAH WINFREY

Dedicated to all the people who feel like life is hard to go through,
Dedicated to those who it treats worse, to keep on loving.

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1. Introduction

Haven't you ever been told that if you stay positive and have a bright outlook on life everything will go better than planned? Have your parents never told you before an exam that if you're sure you're going to fail, you most probably will? Isn't it better to just stay positive through it all to really try and get the best out of every situation? However, to what extent are we really willing to say that a positive attitude makes everything better.

Take cancer as an example, the hardest diagnose to take in for any person. The hardest word that someone has to hear, the hardest to take in and to move on from. The most difficult one to be positive about. How can you be happy again with a tumour somewhere in your body, affecting you, your family, your friends? Now that I've made you feel sorrow, or at least get a bit sad, I'm going to blow your mind. What if scientists can prove that a good attitude can really take part in the diagnosis of a person with cancer? That some people might even get to live on because they never let their guard down, they never let their emotions through and never let their negative thoughts get to them.

As you've probably figured out, my research project is going to be about investigating how far attitude can influence someone with cancer and how their treatment develops. I'm going to be taking both sides, negative and positive outlooks on life. I will interview both people who are dealing with this illness as well as those who survived it. Doctors statements will also be taken into consideration since I will mostly work my thesis through those, complimenting them with the biological side of cancer and what processes take part in someone's body during it.

My inspiration for this project wasn't really related to any family experiences, since I've been lucky enough that any members of my family, or people of importance to me, have never gone through it. However, as bizarre as this may seem, I got it with how stressful my life seems to be recently. Having to go through many exams, trying to get diplomas, take part in as many projects as possible and looking for a suitable college, all I heard was that I had to be positive. How could I be even considering this option when all that seemed to go through my head was that I had to be successful?

This got me thinking, and finally, I got it. When people lose their last hope, when everything is hanging by a thread and their wishes are crushed, who can even dare to tell them to stay positive. Who's brave enough to look at a cancer patient in the eyes and tell them that they need to lookout for the bright side of their situation. No one would, since they'd probably look like the rudest person to walk the Earth, mocking someone with a cancer.

What people don't understand though, is that everybody should do just that. And with this research project, I'm going to prove it.

2. Objectives

Cancer is usually a genetic disease and it is caused by changes to genes that control the way our cells function, especially how they grow and divide. The medical community has yet to find a remedy and 'til now it's one of the deadliest illnesses all around the world. People have yet to realise that attitude can really make a big effect on someone's response to a treatment.

With this research project I want to find out which percentage does attitude influence cancer treatment. Not only that, but also which aspects change and how can the patient's attitude be improved. Are there any methods to make a cancer patient happy, are there things that relatives can do to cheer them up, doctors...? Looking at the biological aspect of cancer, are there any ways to increase any hormone in the body that alter the attitude of the patient, or is there any therapy that helps them cope with their situation.

Let's exaggerate it a bit, I want to find out if there really is any chance that someone who has a tumour, can be saved because of their positiveness.

With this said, I aim this research project to those with cancer and wish that their dreams get back in track and their hopes are reconstructed. Not only that, but I also target this project to those who are going through a difficult or stressful moment in life. My goal is to make them know that people can get better with a positive attitude, that their parents really aren't lying just to make them feel better when they say that if they'll smile, they'll feel happy after a while.

3. Hypothesis

I deduce that attitude has a big percentage in the way a cancer evolves. To make it more exhilarating to me and the readers, I will even take the risk to assume that having a positive attitude, can in fact, save a life.

4. Methodology

For this research project, the best way to put all the information gathered was to just write down everything found concerning this matter, not caring if some studies contradicted the other ones. These opposite views really helped in getting an insight and also dig out the darkest side of this project. Not everything is a jump from joy. Obviously, this work must include the knowledge of both a psychological and biological thinking. Without any emotion, the body doesn't function in its proper way, meaning that the hormones do not secrete in function of the body's sentiment. This is why both aspects complement themselves in a proper way and therefore both have to be thoroughly analysed.

The project took into consideration different points of view concerning cancer, such as psychologists, doctors, researchers... All these people, contributed enormously in this project since every question answered served as evidence to prove, or contradict, my deductions.

The questions used for each of them, since not all worked on the same field, were evolving their specialities, therefore, their answers could be more qualified for the research project. It started off by gathering as many curriculums as possible, since that would be how they could be classified into their specialities. From then on, some were chosen and analysed further. Questions then started to surge for each case, and the project ended up having doctors, psychologists, cancer investigators, psychiatrists and nurses as testifiers for the hypothesis.

However, the utmost important thing to do was to interview cancer patients. That is the sole thing that can give this project the insight that it needs, more than doctors themselves. Since the patient is the one that has to go through all the process, he's the only one that can really completely verify what the doctors say.

In addition, people who have survived cancer were also sent surveys, since the understanding non-cancer patients have towards the way others can overcome cancer is greater than the cancer patients themselves. These survivors define easily, since they already left their illness behind them, which factors helped them throughout their cancer. This helped the project verify whether the hypothesis was correct or wrong.

Two graphics have been made from the results of two different surveys directed to two different groups of people. There has been a survey done specially for people who have cancer, which was sent to the hospital Vall d'hebron, where Mercè Canela Cardona, one of the interviewed doctors worked, and therefore, has agreed to expand it around the hospital.

The second survey was made just for people who had overcome cancer. This one was sent to Leticia de Mattos Arruda, who works at Bbest. This offers personalized services of empowerment for women. They help achieving your goals, manage your chronic stress and overcoming stigmatization will be much easier having them by your side. From Bbest they give women the tools and the support needed so that they can be the main character of their own process of recovery and empowerment until they reach the best version of themselves. She distributed those surveys to all the women she met during her psychology services. To be fair, anonymity has also taken part in these surveys.

The questions for each survey were obviously different since they concerned completely different topics with each other.

More forward in the project, realisation came across that there were more interviews answered by doctors than by psychiatrists and psychologists. This thought then lead to the analysis of books written by people with a less objective point of view, since all that the doctors can relate to the topic is the secretion of hormones, and that is an exact science.

Therefore, four books have been consulted written by people whose science is not exact. These people rely on theories that have been proven by studies. That means that of course it's not going to work for everyone, however, an enormous percentage of the civilisation applies to the rule. These books however, have been more useful for the non-biological side of the research project.

5. The psychology of therapies

People with cancer and their families tend to feel guilty about their emotional responses to their illness. They may feel pressured to keep a good attitude at all times, which is unrealistic. Although it is very understandable that they should go through some rough patches. This feeling of pressure can come from within themselves, from other people, or both, as Mercè Canela Cardona, who was the chief of services to Thoracic Surgeries at the Hospital Universitari de Vall d'Hebron and is the reference to Catalonia for lung transplant, specified in her interview found on the annex in Interview 3.

Sadness, depression, guilt, fear, and anxiety are all normal parts of grieving and learning to cope with major life changes. Trying to ignore these feelings or not talking with others about them can make the person with cancer feel lonely. This can also make the emotional pain worse and even make some people feel guilty or blame themselves when they can't stay positive, which only adds to their emotional burden. This evidence was proven in one study in the journal *Cancer*, (Vol. 110, No. 11). It specifies that due to certain hormones that the body secretes, which are explained in the biology side of this project, the body cannot react in a positive way, therefore, retarding the treatment itself due to the patient's negative emotions.

Following this line of thought, David Spiegel, Director of the Psychosocial Research Laboratory at Stanford University, who elaborated a very complex study about how the power of the mind can control serious diseases, said how people could use their minds to stop the cancer from growing. But the downside of such evidence is that when people with cancer don't do well, they may blame themselves.

A healthy person, defined by Elisabeth Busquets, who works in the ambulatory area performing direct assistance to patients who suffer from cancer and to whom have recovered from their oncological treatment, whose interview can be found in the annex Interview 1, is the one that maintains a harmonic balance, as well as a tidy one, between the aspects that make a person, which are the physical body, the energy mechanisms and the mind, all of which interact permanently with the outside world and society. When the response capacity 'runs out' in one of these three aspects, it also does happen on the other two. This results in the balance of a healthy person being broken, which, in other terms, means that recovering the health implies recovering the tidiness of the mind, the balance lost and the energy mechanisms being reconstructed once again.

Coming back for more interviews, which have been very useful for the project, it was found that, after a very long analysis of them and carrying out a comparison, all interviews get to the same point. This one is that during all their work days in the hospital, they all have seen that people with a good attitude confront some of the treatments better, whether those with a pessimist view on their treatment, their deterioration situation rushes up.

The interviewees even agree that when patients with a more severe case knew that some family member was coming, they kept going. However, when the family member left, they would get down and they would get, sometimes, worse than before. This interaction with body, mind and emotions is called psychoneuroimmunology, according to a book called *Psychosomatic medicine* by James L. Levenson. This concept defines the interaction produced between attitudes and behaviours, the nervous system, the immunological system and the endocrine system and how these relations affect the development of illnesses and their curatives processes.

This book also revolves around the question of how can a cancer patient achieve a positive attitude. Various currents of psychology have formulated some tools to achieve optimism and not fail in the attempt. One of the most popular is that of author Robin S. Sharma, who implements the method he calls "Opposite Thought". The book explains this method as, "the mind can only think one thing at a time. So, when a negative thought overwhelms us, the stimulant thing would be to think quite the opposite, the opposite". Immediately, the positive alternative to the conflict will be evaluated mentally, it will be taken into account what would be the tool to overcome an adverse situation or be able to see the "half-full glass" of what is happening.

The book goes beyond the individual subject and assesses how pessimism can penetrate deeply through any type of concerning matter. It talks about how in these conditions of mortification the suffering syndrome prevails, where people lose courage. Scientific research and specialists in spirituality or psychology, coincide in how a positive attitude is functional in all areas of life. To top it all off, the book ends up with this short but reasonable sentence, "The body and mind depend, in large part, on mental health, however, joy can help your care".

A very useful situation from a cancer patient, which was told by Leticia de Mattos Arruda, an expertise applying high-throughput molecular approaches to cancer and proven track record in breast cancer and molecular oncology, whose knowledge can be checked in the annex in Interview 2, was of a woman with a thyroid cancer with a very bad prognostic. This case has definitely furnished a lot this research project, since it showed the worth of attitude in this case. The patient, who has remained anonymous, confided in the whole medical team and in that it was possible for her to confront her illness.

She decided to keep going on with her oncological treatment along with all the recommendations she had been given in the hospital to improve her habits in life, nutrition and the ways to interpret her situation. She learned to enjoy every moment like it was her last day, she learned to show her emotions and, more than anything, she always believed that she could survive the cancer. At this moment, she is a very happy woman who is cancer free, a woman who is spreading her smiles to every by passer in the streets.

During many years, Leticia de Mattos Arruda told in her Bbest conference that in all the years she has worked as a cancer investigator, she has met thousands of cancer patients in the worst of conditions who have completely recovered, people who previously only had months to live.

These cases are not a miracle, from the point of view of this research project, it demonstrates that the mind can go further than what we think. It can change the functional schemes that design how the body works. It can erase and restart the 'system', to call it something, and end with any illness, whether it's cancer, diabetes or any disorder that has messed up this general scheme of the body. The project itself shows how many cases have been going on where people have gotten better because of their attitude. An optimistic view has definitely been proven that it improves the survival ratings of patients.

To demonstrate that the attitude can really help in all cases this book called the *Manual of psychiatric care for the medically ill*, by Antoinette Ambrosino and Bernard Wyszynski, has gathered in its publication the conclusion that everyone has the innate, unconscious and automatic ability to be sensitive to emotions. Furthermore, the emotions of other people also affect others. Even the coldest people always have emotions working, people are never insensitive. It is an interaction that triggers

reactions in the body. For example, if we are in danger, our brain releases stress hormones that can initiate fight or flight reactions by flooding certain regions with adrenaline. Attitude is another element for healing, especially to accelerate it.

A negative person tends to become tense easily. This lack of relaxation, which can sometimes be felt in the muscles themselves, hinders the flow of energy. As the book specifies, Chinese medicine is based on the search for energy balance. If we ourselves cause blockages due to our attitude, all the work will be more complex. The conclusion extracted from this book is that if everyone were to have a more positive attitude, people wouldn't have so many illnesses.

We live in a stressful society and that negatively affects the immune system and the nervous system, which are responsible for keeping the functioning of our body in balance. Those who become aware of this situation and change their attitude to neutralize stress may suffer, 80% less from cardiovascular diseases and 73% less from other minor conditions. In addition, they secrete more DHE, a youth hormone, as mentioned in a study from the volume.

Another book, which topic is related to the previous book, used in this research project was *The MGH Guide to Psychiatry in Primary Care* by Theodore A. Stern, John B. Herman and Peter L. Slavin.

This volume mentions distress a lot, which is stress in a negative way. This is that feeling of permanent burden, which produces very surprising changes in the functioning of the brain and in the hormones. It has the ability to injure memory and even affecting learning neurons located in the hippocampus. It can also alter our intellectual capacity since it leaves those areas of the brain without blood supply to make appropriate decisions.

This is due to a stressful situation, such as cancer, can trigger a cascade of stress hormones that produce many physiological changes. The stress response begins in the brain and the information is sent to the amygdala, an area of the brain that contributes to emotional processing and it instantly sends a distress signal to the hypothalamus, see Figure 1. After the amygdala sends a distress signal, the hypothalamus activates the sympathetic nervous system by sending signals through the autonomic nerves to the adrenal glands, where later come the NK cells, explained later in point 5.

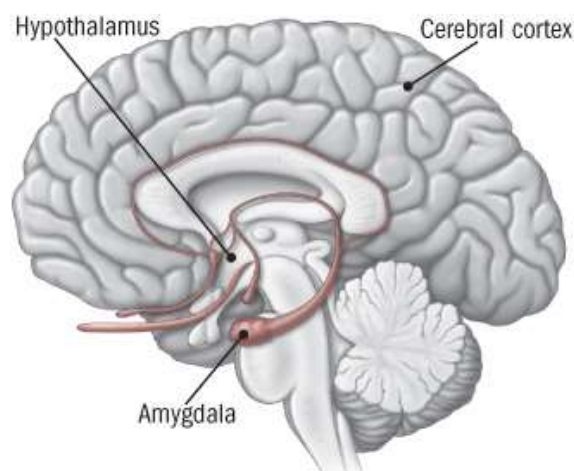


Figure 1. Example of a brain. FONT. https://www.health.harvard.edu/newsletter_article/how-addiction-hijacks-the-brain

In the case of cancer, having a negative attitude not only affects the mind but also affects the body. Pessimism directly affects the events that happen to people in the crucial areas of life. It is much more difficult for people with negative thoughts to thrive on their therapies. Thus, people who approach everything in a negative way accentuate their isolation. In this sense, a positive-minded patient with a good attitude is characterized by his ability to face complex and difficult situations with positive approaches. If you want to prosper, you must go deeper into thinking positively, the book advises.

However, the fourth and last book found was *Trastornos depresivos en la mujer*, by Carmen Leal Cercós.

In spite of all the knowledge and verification acquired from studies and doctors, not everything is as easy as it looks. This volume talks about the importance of coping with a cancer diagnosis, which is recognizing emotions and feelings. A treatment that deals with emotions and relationships, called psychosocial interventions, which includes many activities used to modify behaviour, emotional state, or feelings can help people with cancer feel more upbeat and have a better quality of life.

However, there is no good evidence in the book to support the idea that these interventions can reduce the risk of cancer, keep cancer from coming back, or help the person with cancer live longer. Still, things like group support, individual therapy, mindfulness, and relaxation techniques can be used to help reduce distress and cope with the emotions that come with a cancer diagnosis.

6. The biology of therapies

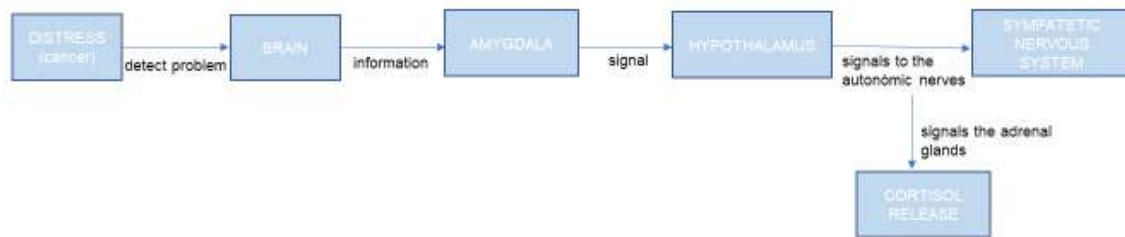
Like everything else in life, there is also a biological side of this project, a factor that will ensure you that attitude can definitely be one of the most important aspects to help someone overcome a cancer.

In the case of a patient, the way he acts towards his condition in his illness is going to determine his level of participation in his healing process. If the sick person has a positive outlook he will collaborate with his doctor so that he can modify, to improve habits in their daily life and change certain mental guidelines that can affect his emotional state, as specified in interview 4 by Miguel Rull Llunch, the most valued surgeon in Spain for Doctoralia Awards in 2014, 2015 and 2016 and Certificate of medical excellence for Top Doctors in 2017-2018. The patient can either run away, fight or get in shock. When doctors communicate to a patient their diagnostic, the sick person only hears the medical terms which he translates in his head like those catastrophic diagnosis he reads about in books.

Depending on the confidence the patient has on his doctor and according to the capacity he has to solve difficult situations, he will either let himself be carried away by his fear, or will face his illness. If the fear and the feeling of disability take over, the self-defence mechanism goes crazy which causes the release in the blood of a series of substances that, if this situation is long-lasting, these substances give rise to a state of chemical toxemia where blood acidity, sadness, hopelessness and depression prevail.

These substances considered toxic when delivered to the blood that cause cancer, called carcinogens, have been identified both by studies in experimental animals and

by epidemiological analysis of cancer frequencies in human populations like in the high incidence of lung cancer among cigarette smokers. Nonetheless, many agents, including radiation, chemicals, and viruses, have been found to induce cancer in both experimental animals and humans.



Personal **Figure 2.**

Radiation and many chemical carcinogens act by damaging DNA and inducing mutations, changes in the DNA. These carcinogens are generally referred to as initiating agents, since the induction of mutations in key target genes is thought to be the initial event leading to cancer development. Some of the initiating agents that contribute to human cancers include solar ultraviolet radiation, the major cause of skin cancer, carcinogenic chemicals in tobacco smoke, and aflatoxin¹. The carcinogens in tobacco smoke are the major identified causes of human cancer.

Other carcinogens contribute to cancer development by stimulating cell proliferation, rather than by inducing mutations. Such compounds are referred to as tumour promoters, since the increased cell division they induce is required for the outgrowth of a proliferative cell population during early stages of tumour development. Their activity was defined by studies of chemical induction of skin tumours in mice.

This means that the extracellular medium can be easily altered, and as Miguel Rull Llunch said in his interview, doctors already know that in an acidic medium it is easier to develop cancer cells.

What doctors also know, as psychiatrist Elisabeth Busquets, mentioned in her interview, found in the annex on Interview 1, that the central nervous system plays an important role in its own regulation and there is reciprocity in the control of the brain itself by the immune system. The network of connections that connect these systems present a high complexity, which entails methodological difficulties in the study of their interactions, presenting the experimental findings with low homogeneity and being difficult to replicate.

Although one cannot say emphatically that an attitude can cure. There are people who can say that they have been very positive throughout a bad patch in their life, like cancer, and still die. And others who have a bad attitude towards a serious illness, can survive.

That said, it is also true that more and more research, like some that have taken place in the National Cancer Institute (NCI), confirms that a positive attitude has a positive impact on the immune system, for example, it reduces the harmful effect of

¹ a potent liver carcinogen produced by some molds that contaminate improperly stored supplies of peanuts and other grains

chemotherapy, while for the person who feels victim of fate feels helpless, cortisol levels increase.

Cortisol is known as nature's built-in alarm system, it's the body's main stress hormone. It works with certain parts of the brain to control our mood, motivation, and fear. The adrenal glands are what make cortisol. It's best known for helping fuel your body's fight or flight instinct in a crisis.

Your hypothalamus and pituitary gland, both found in the brain, can sense if our blood contains the right level of cortisol. If the level is too low, the brain adjusts the number of hormones it makes. The adrenal glands, its producer, pick up on these signals. Then, they reset the amount of cortisol they release. Cortisol receptors, which are in most cells in our body, receive and use the hormone in different ways. Feeling distressed can be bad since when the body is on high alert, cortisol can alter or shut down functions that get in the way. These might include the digestive or reproductive and immune system, so that it hurts or hinders your healing process.

Specific hormones were mentioned in all of the interviews, so it would only be fair if this research project mentioned them. The NK (natural killer) are cells of the immune system that are able to recognize and neutralize cells that are infected. If patients feel alone, the decrease in these NK cells is greater and the defence system is more vulnerable. Whether or not the NK cell kills these infected cells depends on a balance of signals from activating receptors, which start up with contact. Activating receptors recognise molecules that are expressed on the surface of cancer cells and infected cells, and therefore can switch on the NK cell. That is a reason as to why the patient would need to have contact with other, so as to express himself and activate this natural killing cell.

When these same patients have become aware of their stress because of their situation and have used techniques to be calmer and more stable, the activity of NK cells increases back again, according to a Professor named Philipp Eissmann from the Imperial College of London.

Like all hormones, endorphins are biochemical substances, which in this case act as a natural analgesic, a pain reliever. They are considered "the true drug of happiness", also taking into account that they are natural chemicals produced by our body, they do not cause any side effects and obtain excellent results.

These hormones are released in response to situations that cause pain and inflammation, like a tumour, and are produced by the nervous system to act as pain relievers. There are many ways to secrete more of them for our body, which doctors recommend to their cancer patients, such as:

Enjoying the colour of meals, its texture, aroma and the taste of certain foods can stimulate various senses of the body, this produces a sensory experience that develops the production of endorphins. However, all kind of gluttony and junk food has to be eliminated of this diet, since sugar doesn't benefit the body's metabolism.

All doctors also recommend to their patients to start doing physical exercise. If possible, it should not be done by locking themselves in a gym, the best way to enjoy it is by running, walking or cycling. These exercises help eliminate depression and is the best and fastest way to raise endorphins. In the course of actual physical effort, the brain releases dopamine and serotonin only within certain regions. But if patients exercise regularly, the hormone concentration grows continuously in many areas of the

brain. Side effects therefore include a sustainable improvement of concentration and an increase of happiness and satisfaction, which definitely results in a good attitude.

Doctors say that having an optimistic view on their situation is about being able to enjoy the future, taking off from the past and the bad things that happen to their patients in the present. Overcoming adverse things by having hopeful projects and dreaming about possible things to achieve. If they keep the happy illusions and the real expectations, they will be able to maintain good humour and it will be easier for them to start their new routine every day.

As a result of analysing the interviews, a common thing that all doctors proposed to their patients was that they should all find a hobby in a way to get their mind of their more pressing matters, like their illness. When people feel that their endorphin reserves are running out, resorting to an activity they like is the solution. By developing this work that gives people pleasure they immediately raise the level of endorphins.

Recalling happy moments from the past is also one of the most mentioned in the meetings with these doctors. The brain experiences and revives them as if they were happening again, and it is right here when patients regain joy and begin to release new endorphins.

Physical contact with others increases the level of hormonal production. When patients have physical contact with those who appreciate and love them, like their family members, friends... it is important to stimulate the sense of touch, as well as the senses of smell and hearing. The brain increases the production of endorphins when the nerve endings of the body are stimulated by feeling close to another body.

Finally, the last thing answered by the experts was that a monotonous, boring routine can make the body begin to lower the level of production of endorphins. To maintain stability in this production it is necessary to maintain curiosity and interest in various subjects.

Serotonin, the third hormone that all interviews mentioned is found mainly in the brain, intestines and blood platelets. Serotonin is used to transmit messages between nerve cells, it is thought to be activated to contract smooth muscles and contribute to well-being and happiness, among other things. It helps regulate the sleeping patterns of the body. It is believed to play an important role in appetite, emotions, as well as in motor, cognitive and autonomic functions.

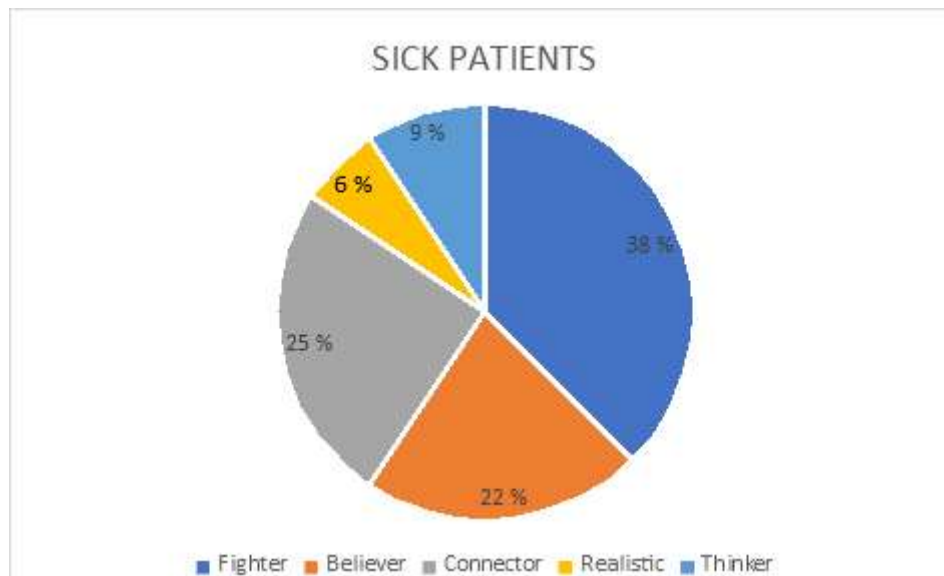
However, it is not known exactly if serotonin directly affect the cancer cells or if they have a general role in the coordination of the nervous system. It seems to play a key role in balancing people's mood, anxiety and happiness. Low serotonin levels have been linked to depression, since it can inhibit tumour growth via the decrease of blood supply to the tumour, suggesting that the role of serotonin on tumour growth is dependent on its concentration. Serotonin has also been shown to be a genetic mutant factor for a wide range of normal and tumour cells.

For the biological part of the research, surveys were taken, as mentioned in the methodology of the research. These were useful to identify different patterns of patient in each case, for the cancer patients and the cancer free.

This first graphic belongs to the survey for people with cancer. In here we can see the percentages of each group that was extracted from the sample. There were thirty-two people who answered this survey. Since it was a complex and thoroughly thought

study, different groups of people were identified. Among all of these, they were divided into the ones visible in the graphic, explained down below.

The people have been classified according to what they had answered on the surveys, whose questions can be found in the annex in page 32. Some people talked about how God helped them keep living, some were just waiting to know what would happen, others were hysteric, while others were naively positive. The main objective for this survey was to understand the way cancer patients reasoned. This way there will be different groups of people that can be analysed in their body response due to their attitude. The results have been ordered in a way that from the first to the last is the most effective attitude towards the treatment.

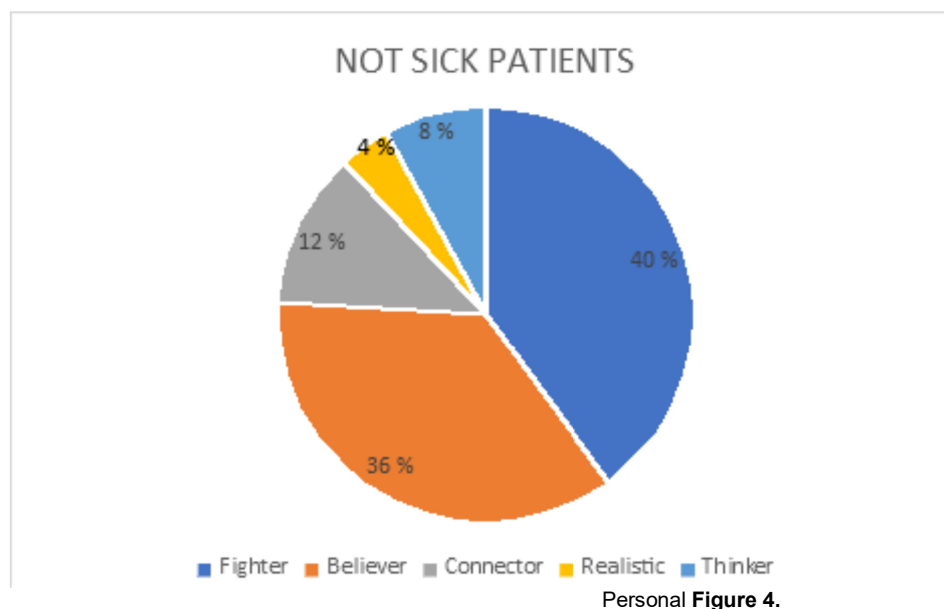


Personal Figure 3.

1. A *fighter* has the willpower and the needed determination to fight whatever comes his way. A fighter demands a lot on himself to give the best part of him. When he falls down, he will get up again and again, and only for the better. A fighter always keeps going forward when others have given up. A fighter fights 'till the end, where he will get his reward. This is the best way to get through cancer since it's when the NK work best. The person remains calm, and when going through ups and downs, doesn't get stressed. Therefore, not affecting the way NK cells work.
2. A *believer* is the one who rests all his faith in something superior to them because they believe that this way, someone will protect them and help them along all their tests. Their beliefs are like a lifejacket that keeps them afloat in their moments of difficulty. They are convinced that this thing that they believe in will never put them through something that they couldn't handle. Even in the hardest moments these patients feel blessed and they believe that things will turn out in the best way for them. This kind of faith gives them hope and optimism. They are able to suppress their negative thoughts and even turn them into positive ones. They even answered that they find humour in many situations. This one is the second one since it gives the patient hope, and when hope arises, so does attitude. A person who has hope is usually happier, which means that their serotonin levels arise. This helps the patient sleep better, so letting the body get its much-needed rest. Also, it balances the mood of the cancer patient, making the treatment more stable.
3. *The thinker* is the patient that in moments of difficulty, analyses the problem from all angles, produces new ideas and discovers unexpected solutions. It

- focuses on what needs to be done. He is very good at converting ideas into acts. When others are stuck, he can improvise and find a way out.
4. *The connectors* are those who tend to rely in the presence of other people. The love for their parents, their partner, their children and their friends give them motivations to overcome any obstacle however big it is. They get their strength in the importance of their relationships. These patients are also the ones that attend support groups or check in social sites to help them conquer any troublesome bit. In short, it is a very sociable person who makes the most of his contacts. This is nice, since when being with other people, receptors intervene, therefore, the signals to the adrenal glands are being used. This releases adrenaline as well as regulates the level of cortisol. There is a downside though, when the people leave the patient back alone, there's a sudden drop of adrenaline, which leads to a slight depression, slowing down the treatment.
 5. *The realistic* is the one that when others overreact or panic, he keeps calm and owns himself. When faced with a challenge, this patient is hard-headed and quickly thinks of the best way to face it. Intuitively, he knows when to lie down and wait for the worst to happen. He also knows when the time is right to take an action. This is the worse attitude possible. This lets the brain down, communication is not good and distress is more present. This leads to substances filtrating in the blood. Making the ph. more acidic and contributing to the growth of cancer cells.

This second graphic refers to the people who survived cancer. For the non-sick patients, the interviews were 25, since there weren't much people at the Bbest conference. However, the groups of people were divided the same way as the previous group, since it has been analysed as what people during cancer feel and what people after cancer feel.



Both graphics were divided into the same groups of people. In this one it is easy to spot that the answers varied a bit. However, they didn't stray too much from the previous ones. Examples of each type of group can be found in the annex, page 32.

7. Conclusion

There are many external factors that are greatly involved in the recovery of a patient and without those, attitude would most definitely not have the desired function at the therapies. Making it clear for the reader that attitude shows up in all of the cases for cancer as one of the most relative factors and as one to never be steered away from.

At the beginning of the project I wrote about how this project occurred to me. Also, about how it was because I was at a stressful moment and wanted to test out if what people said about keeping a positive attitude was true. I believe a project that I have been working on for months has to give me some kind of life lesson. I have come to realise that when people believe they are at their lowest is because they let themselves think like that. Cancer patients are probably on the lowest level of positivity, but here they are, saying how attitude really helped them out.

This part of the research project is just to correct my hypothesis. First of all, as seen before in every point of the project, attitude definitely plays a part, and a big one, in the recovery of a cancer patient. However, this cannot save a life. Secondly, attitude cannot be a percentage, it is not possible at all to know exactly how much it takes part in a sick person's recovery.

Attitude is something that cannot be measured because it is different in every person. There is no objective way to decide that being happy is a good attitude. Because really, that is not a good attitude towards cancer, since it is a naive reaction.

As seen in the project, the positive attitude produces an internal reaction that helps the body overcome any kind of ups and downs.

Work with psychologists for some time to get an insight on what they do to their patients. This would incite the student to develop new therapies focusing on improving self-esteem of the patients. Also, to erase the feeling of guilt, explained in the beginning. Another way of continuing with this research project, would be to find a way to secrete more serotonin into the body. Like the interviews answered, they weren't helped with that. However, as the many studies cited on the project say, it would greatly help. Lastly, it would be nice to see if all these theories, facts and solutions are applicable to other illnesses, like it did with cancer.

8. Annex

8.1. Annex 1. Interviews

Interview 1: Elisabeth Busquets, psychiatrist

OBJECTIVE: Being able to identify different patterns between the patients who no longer have cancer and those who still live with this illness. Being able to have a closer look, a more expertise point of view, to the patient and try to confirm my hypothesis, whether it's true or not (at the least in a majority of patients). Which methods does she use to raise her patient's mood (happiness hormone) in a mental point of view?

She works in the ambulatory area performing direct assistance to patients who suffer from cancer or who have recovered from their oncological treatment. She also worked in various coaching and research activities.

1. Does attitude have something to do with cancer treatment's?

I have worked with many people to be able to know that the attitude someone has can determine whether a person is going to get better or not. It all is just a psychological matter, if all conflict points are on high alert, the whole body of the person crumbles down. I am completely sure that a very strong trauma is enough to break the balance of the mind and body, therefore resulting in a cancer. With psychiatry there are many factors that get people on the limit. This limit is when the person has a mindset focused on their death, due to their illness. However, like in a patient's case, there was a turning point, that was when his family visited him, that the patient had a very strong will to live.

2. Was there any noticeable difference between you patients and the ones who had cancer?

Not really honestly, however, it is true that when a patient came after being treated, imagine after their breast being cut out, that hurts a lot. It is a very big change resulting in the emotional start of the patient to deteriorate.

3. Do the patients that come to see you, if they come to the sessions with a negative attitude, what do you do to me them think in a more positive way?

We tended to do psychotherapies to help them out so they got out of their comfort zone and talked. With that we built a personalized treatment, before, however, it was detecting the symptoms and had follow up interviews every one week and a half. We can always tell the patient what is best for him, however, that person chooses whether he wants to listen or ignore, we can't force them to think any differently. The patient will only agree to what I say when he thinks somehow equally. It is exclusively hard for dependent people to start thinking how it is best, positively, since they rely on their pain and their negativity issues of the situation. We did a pharmacological treatment and then treated the causes with pills. What I treat my patients with belongs to them, it only affects them, not me, so I have to be very focused on what they really need, what their emotional state and body balance is at.

4. What would you tell me about serotonin?

Let's see, it's the happiness hormone, serotonin is a neurotransmission that takes part on most of the depression charts. Now there are new pills, however, I'm not very familiar with those. Antidepressants were all stopping the collection of serotonins. There are different types of depression you can be someone without any conflict and

still have depression. Curiously, the people who all the external factors influence less are the people whose pills worked fine. It is true that pills work, but I don't believe in miracles and it was very unreal for me to see people walking out of the room, just after two days, feeling much better. Attitude definitely did something there.

We are the interaction of a lot of things, and it is not true that we only work in a biological way. Our emotional state takes a toll on how the body reacts and accepts or rejects hormones.

Interview 2: Leticia de Mattos Arruda, cancer research

OBJECTIVE: I want to see which are the most common results in cancer patients depending of their attitude, positive and/or negative (how can you measure positive and negative attitude in an objectively way?). End up with a study about how research about the cure for cancer has been improving and see which percentage, more or less, does attitude influence the recovery of a cancer patient. Finally, what do doctors do biologically to encourage patient.

Expertise applying high-throughput molecular approaches to cancer, including cutting-edge massively parallel sequencing methods. Proven track record in breast cancer and molecular oncology, and in the integration of genomic and clinical findings, particular in the setting of liquid biopsies and targeted therapies.

Bbest offers personalized services of empowerment for women. They help achieving your goals, manage your chronic stress and overcoming stigmatization will be much easier having them by your side. From Bbest they'll give you the tools and the support needed so that you can be the main character of your own process of recovery and empowerment until you reach the best version of yourself.

1. How did you come to the creation of Bbest, what did you base it on?

Of wanting to help those patients who have gone through cancer, focusing on women, women whom we know go through a lot of mentally instability, family feuds, working problems and more, after overcoming cancer. Chemotherapy is a very big problem since for you, everyone disappears and you have to rediscover yourself in that matter of time, therefore I sought out for something that could help those women retake control of their life, those women who want to get back to where they started. It didn't matter if they couldn't get to where they belonged at first, cause now they did somewhere else, maybe even better. So, I wanted them to see how much better their life could still be, even after everything that's previously haunted them.

2. Exclusively for women, what about helping men in a future as well?

Of course, we focused on women first since I've gone for what I've been working for the last ten years of my life, which is breast cancer, metastasis, which is another extreme problem, it is for women who have has breast cancer, mainly, because it makes the tumour more frequent.

3. The vast majority of women who assist these therapies, what do they tell you there?

The come to us with high expectations, they tell us a lot of their problems, they slowly but surely open up their hearts to all of us working there. I am the oncologist working there, leading the project, and with I have a very good team which I handpicked, people who work with healthcare and complementary therapies and even personal trainers. These women come here and they have a lot of enthusiasm to talk to us, to tell their stories, let them all out. There are a lot of different personalities. Closed off people, they are very reserved, however they want to go back to their old ways and go back to having an open relationship with people. There are also people who have a very good mentality, people who overcame cancer with a very open mind and positivity. One woman told us every detail of how her experience was. She said: "I saw positive things

while having cancer, and look where that got me, sitting in front of you, talking and laughing about it". I found that incredible because it is a very heavy situation and they never know what will happen because it is a severe illness, there is no guarantee that the illness won't come back you know? When that comes back, the vast majority of times is metastasis, and that's not curable.

4. When they come, do you notice if whether they come in with different attitudes, the process of them getting better and coping with everything after having cancer is different?

Absolutely, we want to help both parties, negative and positive attitude wise, mainly since the ones who come without any hope are usually the ones who need more help. That's why we offer help by a coach and a personal trainer, they help them get back in track to their old ways. There are other women who have specific objectives with them coming here, even though they have a positive mindset, there are still some things that they cannot achieve by themselves. For example, there's this woman who couldn't put in place her emotions, therefore she couldn't reach her working demands. Her partner also left her during the cancer and she was due to having a baby. We give them the support they need to keep going. We take women who are in need of our services, we have a questionnaire of assessment where there are questions concerning psychology and stress, that way we can 'diagnose' the state of mind of our patients.

5. You also worked with people who had cancer at the moment. Are there any variations to the treatment for cancer that you do to the patients depending on their attitude?

From my personal experience treating patients in the breast cancer unit, I visited a lot of patients each day for ten years, I could surely say that there were different types of patients, those with a negative attitude which complained all the time and those who were more positive. My impression has always been that the patients with a positive mindset, as an oncologist, get better day by day.

6. You yourself have concluded that men and woman with positive attitude in the hospital go along better with the treatment. However, when having people with opposite attitudes, the same treatment is given to them right? Having in mind all the details of the cancer.

Exactly, there isn't any variation due to personality, treatments are based on the biological side, always, to follow a treatment.

7. And are there any noticeable differences on the results of the treatments between positive and negative thinking patients? Not only on how fast does the treatment go.

We relate negativity with distress, this can interfere with the immune system of the patient, which is a system that is coordinating the whole response to the treatment, since it tends to clean the bad cells. It needs to be working properly. The topic of stress needs to be more balanced since it messes up with the whole hormonal process of the patient. For that to go better, it is good for the patient to get enough food on his system as well as doing some sport, because endorphins secret and the pain lowers.

8. Biologically, are there any treatments that affect more the mental state of a patient?

Yes, there are. Nowadays we are testing some new treatments that are very recent, so not very developed. These ones caused depression, a bit of drowsiness and some even psychiatric disturbance.

9. The treatments with severe consequences are followed by health problems. So that means that there are worse results in the treatment, right?

Yes, but it depends. Any secondary effect interferes with the development of the treatment. We have the guides, to call it some way, that we follow to administer the pills.

10. Is there any personal experience you can tell me to verify this? Like if someday there has been a drop on the treatment due to the attitude, pills.

We have drugs that aren't allowed to be used in the treatment neither in testing because they are being made in the laboratory right now. We have cases that the whole treatment has been in vain because a drug used in the patient resulted in him having to assist group therapies. That was an extreme bad experience. However, there was this woman who was the most intent one on literally following the doctor's orders exactly on time. This woman tried to have a positive mindset all time and now she's back in her own life, cancer free.

11. On your official page of Bbest I saw that you recorded some women talking about their experiences. Are they all really open about this topic?

Yes, I loved it. All of the women who assisted wanted to be there, they knew we would help them open up, some later than others. They all wanted to talk and to pour their hearts out to us, since they knew we could help. They even help each other. By talking about their experience, they help themselves come to terms.

12. So then, the women who aren't really willing to talk about their cancer, what methods do you use so that they start opening up?

Coaching, definitely. We have a very capable team composed of psychologists and Psychiatrists to try and get them to express themselves and to get to work and get over their problems.

13. Lastly, what would you say to a woman who has cancer to keep going.

That it sucks but everything happens. We are here to help, working from ten to fifteen hours a day to find a remedy for them. Trying to let them live their life to the fullest.

Interview 3: Mercè Canela Cardona, doctor of patients with cancer and winner of the medal Josep Trueta.

OBJECTIVE: Get the realest point of view, a doctor who survived cancer. What attitude did she have during the treatment? Did she notice any differences in her physical state depending on her attitude? Get information of the medical process that is done to a patient during the oncological treatment. Do they provide psychological services to patients with cancer, and why? Does she think then, that there is a difference that is provided by the variations in attitude of the patient?

She was the chief of services to Thoracic Surgeries at the Hospital Universitari de Vall d'Hebron, she's the reference to Catalonia for lung transplant. She's licensed and a doctor in Medicine from the UAB. She joined the Hospital of Vall d'Hebron and assumed the maximum responsibility in the service since 2009. In addition to the multiple communications and publications in congresses and journals of the international ambit, she has training in hospital management and has led an important number of doctoral theses.

1. As a doctor, could you verify my hypothesis, being how attitude affects everything in our lives?

I can't say I totally agree. I understand that a positive attitude can be of some comfort but it cannot interfere on the evolution of an illness. A positive attitude cannot avoid the presence of an illness. I believe that it is here that where the genetic code comes in. Far beyond, we can say that the genetic code can be modified or influenced by certain aspects that could have interfered in your life. So, it is not confirmed that because of your personality or because you have a certain problem, there are amino acids that change their place in the DNA chain and produce a tumour.

2. As a patient, as you have suffered pancreatic cancer, can you say you have noticed any changes due to your attitude?

I think that doctors are a bit harsh when it comes to telling news. We don't support the patients as they should be supported. It is true that it is not our job to do so, but I believe it is nobody's job. As a cancer patient I have been scared, fearing what the future held, without knowing what it was. I guess this made me do a reset and think "well, the situation it what it is and I have to keep going." It possibly depends on the reaction capacity of the person.

3. Do you know if there is psychological help for the patients at the hospital?

Yes, there's a team of psychologists. What I do not know is if they send them to work with these kinds of situations.

4. And if they were sent to these reinforcements, what would be the cause?

I would say that they should be directly sent to these reinforcements, if not to help the patient realize of the dangerous situation, he or she is in. Give them the basic weapons to deal with their emotions. In my case, thank God, I had my family and friends by my side. But sometimes I think that in a mother's situation, with no one to help her nor having any kind of support. Without anybody to bear part of the weight, it would be a lot more difficult to handle the illness.

5. So, to have someone to support you makes it a lot easier to bear the illness?

You have to find someone to support you, or maybe a reason that keeps you going, if you want. And of course, we must bear in mind that everybody is different, not only in terms of personality but of professional formation.

6. Perhaps you know already, but now there is a new thing called “personalized therapies”. Do you think it is a better option?

Yes. There have been plenty of advances in this field. Now there’s a thing called individual analysis for each kind of tumours that help you know better which treatment is the best for each situation. This opens the gate to a new kind of immunotherapy treatments that go directly to reinforce the weakest points of your immunological system that have allowed, in some terms, the development of the illness.

7. Now, if you want to, you can tell me whatever you like on the matter.

I believe it is important to know that cancer is an illness that is about to become a chronic disease. Nowadays, it is a frequent malady that is diagnosed more and more through the years. As the population is getting older and we die of elder age, the probability to end up having cancer increases. And this makes people talk about cancer without worrying as we did before. I think it is good. It’s good for people to shake off this stigma and start tolerating the illness. It is not playing down its importance but not treating it as taboo.

8. Is there a noticeable change between patients who have cancer and people who survived it, since you work in a hospital and have assisted a Bbest session?

The people who were there wore their emotions on their sleeves, that was even more noticeable because they were talking about an illness they had. We believe that our lives won’t die due to any not natural cause and that’s why we allow ourselves to be so carefree. But all of us, deep down, have a red light that lights up and shuts off, because rally, we never know what’s coming our way. However, when a cancer risk detected, that red light, instead of hiding herself, comes to the back of our head, being a constant reminder. Emotionally, we have to be able to understand it, or else, everything will go downhill. To be able to get through cancer you have to be able to manage.

9. You’ve worked with cancer patients, did you ever notice any pattern related to attitude and the treatment?

People talk to themselves to try and convince themselves to make it through. They tell themselves that they should not be scared and that they will survive. That type of person though is the kid that drown their selves in false hope. They are scared, all patients go through that. There are some patients who have a bigger capacity to react, as well as a bigger change to recover. Others live around their illness, that is very bad. They should do a reset to rethink their situation.

10. When you visited patients with cancer in the hospital, were there any noticeable changes from one month to another?

The patient was usually the happiest when they got over their treatment phase, usually chemotherapy. They were sad before the treatment, just moments before the surgery. I usually saw them when there was a relapse, which was the lowest point of emotional State for the patients. The doctor needs to alert himself of the emotions of the patient, so that he doesn’t distance from them. The patient doesn’t have a person to look up to, they got the doctors, the psychological team...

11. You want to treat a patient and want him to have a positive attitude. Are there any techniques to warm up the patient?

There are only the things you can do for them. This translates to a minimisation of the illness towards the patient, to not spite him or make him feel depressed. We can tell them that we do this daily, but he only goes through that once in his life. We have to be as honest as possible, not go with facts, statistics. Everyone can be out of the equation.

Interview 4: Miguel Rull Lluch: Most valued surgeon in Spain for Doctoralia Awards 2014, 2015 and 2016 and Certificate of medical excellence for Topdoctors 2017-2018.

OBJECTIVE: As a very recognised doctor in the world of cancer, particularly breast cancer, with this interview I will get my most objective answers. What I hope is to, not only get answers about a patient's attitude, but also seeing it in real life. As the doctor that he is, he has to be able to treat a patient in a way that will make him/her feel good. I want to see that doctor to patient communication with this interview.

He joined as a surgeon in opposition to the Hospital Universitari Germans Trias i Pujol (Barcelona), where he worked until 2005. Being in charge of the Breast Unit of the same centre, he developed the application of the technique of conservative surgery in the treatment of breast cancer. This way, he implemented the axillary preservation technique in Spain with the study and detection of the sentinel lymph node.

1. Do you notice any changes in the treatment due to the patient's attitude?

It's not proved but it is most definitely true. This is always useful, if you have a positive attitude, you'll always have better results. Good attitude is always good, and in a situation like that, even better.

2. If a person is super positive and has a very good response to the treatment, can this treatment vary, and the opposite, if he's very negative, can it go to worse?

The treatment does not depend on one's attitude, it depends on the illness' intensity, it's an important factor to the response of the treatment, it helps but it doesn't cure. The important thing about cancer is that when we hear the name, we instantly think death, it's an instant reaction. We start a countdown, we think about our family, our friends...

3. What can you tell me about the personalized therapies?

This has nothing to do with attitudes but with an interesting thing. Years ago, illnesses were cured with penicillin and sulphonamides, what wasn't cured with that, died, it's as easy as that. Now we know that there are different medicines towards each virus that infects you. We do a «urocultivo» to see how these germs are born and then we know that each germ is vulnerable to a different antibiotic. Because we have so many antibiotics, now we know which one we have to use for each germ, we kill much more of them, and use less antibiotics in bigger packs. From the point of view of oncology, it isn't exactly the same, but similar. We have cells that turn crazy continuously, either because we evolve to something better, it's a mutation, which means that those who develop it are more resistant than those who don't. Imagine that animals who had a high tipped nose had more infections than those who had a flatter nose. All mutations we do is to get better, it's Darwin's theory of evolution. However, there are mutations who happen to be bad, therefore, those who get them, are weaker, which means that in a near future, they could die. When you have a cancer, you have a mutation that's definitely negative, it could be called crazy even. It means that some cells don't have the bodies' control, but they grow in such disproportionated measures and without any response and have a level of autonomy that allows them to create their own resources. These mutations can also be determined as germs, right? We know that they have a treatment, an antibiotic, that in a way will establish control again when inserted into those crazy cells. However, when that antibiotic is killed, since it's so strong, some of the good cells can also die, that's when you reinsert them again. With chemotherapy, you insert marrow from another person for that patient to get his cells back. The evolution of the treatment varies with the patient's capacity to deal with the illness. The

response doesn't come from the attitude but from the type of tumour and of what I have to treat that tumour. Even now, it's common knowledge that when cancer cells are exposed to an acidic medium, they are easily multiplied.

There are animals that are very resistant, like rats you cut them and they don't feel it. If you have a very weird tumour, what we do is, we take a piece of your tumour and insert it in a hundred rats. Ninety-three die, but seven don't get the cancer, that's because they have proper defences to that type of tumour, they have strong antibodies. Therefore, we get those cells and we analyse them. We check which antibody is the one that's in common, we create it again and insert it in your tumour.

4. Do you, as a doctor, do something to your patients for them to have a better attitude?

We have what we call oncopsychologists. A person who has just been told that they have cancer, breaks down, we give them someone who's experienced in talking about your illness and helps you vent your feeling, making that tight knot on your chest lessen and making you have a better attitude.

5. But there are some cancer patients who refuse to have a oncopsychologist, right?

Then that's a negative attitude, it doesn't have to be a oncopsychologist though. It can be your own doctor, any nurse that comes into your room, your own family, friends... Just anyone so that you're willing to talk, someone who helps you.

6. With a cancer survivor, do you provide psychological help?

It depends on whether they need it or not. They always have that feeling that it's going to come back. Once they get over that cancer, they get kind of paranoid. It also depends on what doctor they have. Some are very square headed and remind them that it's a chronic illness and that it can always come back. I always tell them that after three years, nothing will happen, that's because not a lot of cancer survivors go back to having cancer after these three years. If one of my patients is not one of the lucky ones, then so be it. But it's still better than living with remorse and fear. After three years, I tell them that they're cured, and they start screaming and jumping around from pure happiness, that puts them in a good mood, that's as good as a positive attitude that you'll get. If you get one of those doctors that tells you that it'll come back, you get home feeling like you've been ran over by a bus. It isn't lying, but it's hopeful thinking.

7. Could you please explain the effect of the happiness hormone in the body of a cancer patient, biologically?

You cannot moderate your serotonin, nothing depends of just one thing. Our body is such a complex machine that a thousand things make it work. Not all of the people who smoke have cancer, but those who smoke have more cancer than those who don't. It's not that there's just a factor for lung cancer, there are million.

8. Has there ever been a conclusion, hypothesis, about what percentage does attitude affect the recovery of a cancer patient?

There are people who affects them a lot, but there is not a percentage, that's not possible, it cannot be measured. For example, if I love you more, will our marriage last

more, because I love you a 30% more than yesterday That just doesn't make sense, there are things that are not to be measured, but that they can be perceived.

9. Biologically, are there any treatments that will affect more or less a patient's mental health?

Not really, the treatments affect more the physical state of a person than a mental one. Treatments, usually, if there isn't metastasis in the brain, it doesn't affect mental health. However, the consequences of that treatment, for example, if you do chemotherapy and end up without a strand of hair in your head, it can be a reason of a break down. Theoretically, everyone responds the same way to the same treatment, but do you respond the same to an antibiotic as you mother and your father, relatively, yes.

10. Is there an objective way to measure good and bad attitude?

Yes, good attitude is that person who accepts the situation and gets on with it.

Interview 5: Anna Bordas, cancer survivor

OBJECTIVE: For this interview, which is solely of a cancer patient and survivor, my goal is to get a close look to a person's feelings. What really is that going through someone's head when they hear the word cancer? In my previous interview (Mercè Canela Cardona) due to her also being a doctor, the feelings were influenced by her knowledge. However, in this interview, I'll be getting the real deal. Answers from an unexpected victim of cancer.

1. When were you diagnosed with this illness?

8 March, 2016, about three years and some months now.

2. How long did it go for?

The treatment lasted about 6 months, and then I had the surgery. Everything went better than expected so I didn't have to do anything else. Now I'm just doing check-ins to ensure that everything is in place.

3. When you were diagnosed with cancer. what stage were you in?

I was in the second one.

4. What attitude did you have, generally, during the treatment?

Initially, it's super unexpected, you get paralyzed and shocked, it's hard to take in the idea that now you have cancer. You need to process everything, that this is now happening to you. After that realisation appeared, I tried to collaborate as much as possible to the treatment, therefore, I believe I had a good attitude, however, that cannot be confused as being happy. You can't be happy in a situation like this, if you are, you're faking it, and by doing so, you won't get anywhere, because it means you haven't understood the severances of it all. I had a positive attitude in the way that all I was thinking was ways to make the treatment go faster, I did sport, yoga, everything that helped me being relaxed, everything that helped me have a good mental state. I knew that was the only thing, or one of the main things, that would really make an impact in the process of getting better. Obviously, one of the most important things is to have the support of your family, feeling loved and not lonely. With this plan I did, which is obviously no scientifically based, I achieved that all of the session for chemotherapy were done the day they were programmed, they didn't have to change any dates. Because I worked hard in my mental stated by constantly doing things, my analytics always came out positive.

5. With variations of your attitude, you get variations in your treatment. If you said that they did everything the day it was planned, I believe you didn't have any.

I actually did, I had a small variation but in a very positive way, thanks to the chemotherapy, since it had such great effects on me. They achieved what doctors say "complete response", therefore, I didn't have to do radiotherapy after the surgery,

5. Did the doctors you had do something to you to secrete serotonin, like bringing your family to the hospital...

Not really. I'm pretty rational, for example, there's people that asks for psychological support, however, I didn't ask for any of those, because I understand that I was a patient who was privileged, in a way. I had a very responsive system and I had all the support in the world from friends, family members... What I needed the most was for the doctor to be completely honest with me, I had the luck that I had a doctor who was very empathic with my emotions. He never did anything for me, he let me in on my illness completely, he had a very positive attitude, very hopeful, and I always went home very comforted and buoyant. The way the doctor tells you your situation is super important, it helps your stability as a person, whether you get sad or understand it.

6. After getting over your illness, would you ever consider having a psychological support?

Honestly, I wouldn't. I didn't need it since I has a very good response, I'm thoroughly clean, which means I'm completely cured, which made me wake up every day with a massive smile in my face, there really was no time to me to ponder over my illness when I was completely free of it. I'm very grateful to have what I call, a second chance in life. However, I understand that not everyone sees it the same way nor have the same reactions as I did. I kept going on with a lot of enthusiasm, I directed all of my happiness to my surrounding, to my family, really, I didn't have any problem at all.

12. So, it wasn't hard for you to go back to your previous routine, before cancer?

Actually, there are a few things you rethink. While you're doing the treatment, one for the things that's the hardest to deal with, is not knowing how you'll end up. You rethink a lot of things in your life, you think about what's important and what's not so much. You instantly know the people that love you and the people that are there for you are the things that matter, not the materials nor any objects. I told you all this because I wanted to make you understand why after everything I went through, the only thing I lost interest for, was my work.

13. If you had to tell a cancer patient some words that helped you get through as well, what would you say?

Let yourself be helped, feel loved. Make yourself think that once everything is over, life will be even better that what it was before.

8.2. Annex 2. Surveys

Cancer patients survey:

OBJECTIVES: Know a direct point of view with the illness. Keep in mind that it will be a bit pessimistic, considering the situation, and that it should be done indirectly. Obviously, we want to reach some sort of pattern with the patients, see if they themselves can see the pattern. To be able to know if the Bbest company could benefit those who are sick also, since they surely need more attention. Analyse each factors of each patient, try and find the different ways each patient deals with his illness.

1. When were you diagnosed with cancer and what stage are you at?
2. Have you had any relapses, if so, how many?
3. What would you define your attitude during the oncological treatment?
4. Do you notice any difference in the treatment when you have a positive attitude than when you have a negative one?
5. What are the things that raise your hopes, that make you happy?
6. Do doctors recommend you to have a certain attitude?
7. Do the doctors recommend you to do any activities or/and to have company over?
8. What do you find yourself relying most on?

Cancer free people surveys:

OBJECTIVES: They will be more direct and personalized questions. In this way, I can investigate the specific opinion of each of them, thus specifying more my answer. Next, I want to see if they themselves are aware that they need help opening and talking about the subject. It will be used as an afterthought from the first survey, second thoughts they had about how they went along with the treatment.

1. Why did you start assisting the Bbest sessions?
2. How do you feel after having gone through cancer?
3. How did you do it to move on?
4. Do you feel lonely now that you won war against cancer?
5. What attitude did you maintain during the treatment?
6. Which attitude did you wish you had maintained?
7. What did you find yourself relying most on?

The results from the survey was written in the memory of the research project, however, the questions that have been more effective and have determined in which groups the `people have been divided in were based on the questions that made the patients, and the cancer free ones, think about:

Did I bring the cancer on myself?

Can my emotions really make cancer grow or affect the outcome of my treatment?

Can I control the tumour growth by visualizing how my body is fighting the cancer or by thinking myself well?

Would relaxation or keeping a "positive attitude" help cure my cancer?

Interview 6: María Diaz, cancer survivor

1. When were you diagnosed?

I was seventy-one years, so nine years ago.

2. How long did it last?

Not a lot really, the first day I already had my breast surgery done.

3. What stage were you in when the cancer was diagnosed?

There wasn't metastasis when I was diagnosed.

4. What attitude did you maintain during the treatment?

What am I going to do about it? At least I lost some kg. Honestly after being checked out and after being told that I has cancer, I really didn't worry that much. I had a really good attitude, the doctors were very good with me, but it was a whole year. You lose hair, and that really made me cry. I even stuck the weave to my hair because I couldn't even begin to think that my hair wasn't mine. That was probably went I went downhill for a while. However, I was with a lot of my family members though. I was very positive.

5. Did they do any modifications in your treatment due to your emotional state? Or did they go along their protocol like expected?

Nothing out of the box, everything went according to plan. Just a month after the surgery they started chemotherapy. I had breasts problems because one night I woke up and I took the drainage off unconsciously. Therefore, I had to have check ins every two days since my breast could have gotten badly injured and affected the cancer. That was a rough patch because there wasn't any gynaecologist since they were on vacation.

6. Did the doctors that assisted you do something so that your body could secret more serotonin?

At the beginning the gave me cortisone and that really got me going. I got home and I cleaned the whole house. I even started to go to the supermarket just two days after the operation.

7. How did you get on with life after surviving cancer?

I got a good prosthesis for my breast and that was it. My attitude didn't change at all honestly. Since I had cancer at a quite old age, I really didn't have the excitement of living life, since I did. Tough I am definitely glad to be here nowadays

8. If you had to give some advice to a cancer patient, what would you say?

Cancer is easier to get over with now more than ever. Things come and go, you just have to go with it. Attitude was definitely something that got me going, since it made me believe that the whole process was going faster. You can fake it with your weave and make yourself feel better. Don't think about what ifs, live in the moment.

This is the fighter, the one who gets up after being punched. She made fun of her situation and stayed positive.

Interview 7: Dominic Cugueró, cancer survivor

1. When were you diagnosed?

They diagnosed me one year and seven months ago.

2. How long did it last?

After two weeks I went through the surgical process because it wasn't very aggressive. Then I just had to go through chemotherapy and radiotherapy that was to reassure that the cancer was gone. The first surgery took place in February and I finished the radiotherapy at the end of October.

3. What stage were you in when the cancer was diagnosed?

It was when the ganglia were affected.

4. What attitude did you maintain during the treatment?

The attitude was a positive one I believe. I did pray a lot and put my faith in God, because since I was a kid, me and my siblings were told to believe that we could go on in life.

5. Did they do any modifications in your treatment due to your emotional state? Or did they go along their protocol like expected?

However, the attitude didn't vary the treatment. How they saw that I was very strong physically and was very positive they did the chemotherapy every two weeks instead of every three weeks, which obviously sped up my treatment.

6. Did the doctors that assisted you do something so that your body could secret more serotonin?

Because it wasn't a very strong cancer nor a developed one serotonin wasn't a requirement.

7. How did you get on with life after surviving cancer?

I thought about getting a psychological support. But at the end I didn't because I have a lot of faith, I'm catholic and when I had a bad moment or when I felt myself about to get sad or tip over the edge I just went to church and cried out my problems. With God's help I got through my cancer. Doctors warned me that after the treatment, women usually got a bit depressed, so I accepted a project that I could organise, therefore not have any time to worry myself. It was a bit hard to go back to my routine since it wasn't the same. In had a hormonal treatment that in the morning it made my whole-body ache.

8. If you had to give some advice to a cancer patient, what would you say?

I would say what helped me get through with mine. Many of the nurses, doctors, family and friends just cheered me on. Really the messages they sent me daily just were enough to get me in a good mood, and I think than helped a lot.

The believer, she stayed with God throughout her journey and had hope through it all.

Interview 8: Veronica Viladomiu, cancer survivor

1. When were you diagnosed?

October 2010, a week before I turned forty years old.

2. How long did it last?

On November 2010 I started the treatment and ended on March 2011, five months of treatment, where every fifteen days I had a chemotherapy session. However, I spent the following two years doing a treatment in Vall d'Hebrón which consisted of antibodies, every one month. But it was different because it wasn't a chemotherapy treatment and it didn't have any secondary effects. It was a very modern treatment to prevent the cancer from resurging.

3. What stage were you in when the cancer was diagnosed?

I can't quite remember but it was a very advanced one, the lymphoma wasn't aggressive but it was pressing against a kidney and it stopped working, so it was urgent for me to start chemotherapy as soon as possible.

4. What attitude did you maintain during the treatment?

At first, since the diagnostic wasn't a hundred percent sure, I was very worried and sad and it was fifteen days of tests and more tests, which made me very scared. However, when they gave me my results and they told me that nothing too bad would happen, I had a very positive and open-minded attitude throughout the whole five months of treatment. It is true I overthought some of the things that would happen to me, but I had to think about all the possibilities and chances that it had to either go wrong or well I also had three children at that time and that forced me to be positive, and that facade soon became reality. I even tried to go to school to pick them up, and at home I still cooked and had fun.

5. Did they do any modifications in your treatment due to your emotional state? Or did they go along their protocol like expected?

I didn't because I didn't have any attitude modifications, therefore the treatment cannot be modified. It is true that some days you are sad because you can't take care of your children like you'd like. We all like helping others but we loath when people help us and I hated it with a passion. It frustrated me having to ask for things because I couldn't do it.

6. Did the doctors that assisted you do something so that your body could secret more serotonin?

Not at all. The only thing they gave me was a pill to go to sleep so that the body could rest well. Because at night when I went to sleep, I kept thinking and thinking and I just couldn't sleep.

7. How did you get on with life after surviving cancer?

I honestly didn't even think of getting psychological support after cancer, because between the children and all the work I had to do... There were days where I was sadder but not to the point to seek for help. I stayed with anaemia after the cancer and that also made me a bit depressed, but nothing I couldn't handle. After surviving cancer, I looked at life with better eyes. I was more optimist and small things that worried me before I didn't even glance at after. It is true that they told me I wasn't going to die, but at Vall d'Hebrón I saw people who were hanging onto their last hope and it was very painful to see. You learn to walk the world after an experience like this. Going

back to my work routine was a bit tough, but because everybody asked me how I was, I looked differently physically and I felt it.

8. If you had to give some advice to a cancer patient, what would you say?

They throw things in our life, like it or not, and we need to learn how to manage them and confront them. When there's a thing you like you enjoy it. When there's a thing you don't you have to get it done and over as soon as possible.

She's the thinker. She couldn't sleep due to her overanalysing her situation. This led to her having to take some pills.

Interview 9: Magda Castro, cancer patient

1. When were you diagnosed?

It started in 2015 but kept growing and it got metastasis.

2. How long did it last?

It's still going on

3. What stage were you in when the cancer was diagnosed?

I started with three but now it's four.

4. What attitude did you maintain during the treatment?

My attitude is the best I could

5. Did they do any modifications in your treatment due to your emotional state? Or did they go along their protocol like expected?

I don't have any changes in attitude, nor in the treatment.

6. Did the doctors that assisted you do something so that your body could secrete more serotonin?

It isn't really present in my case but they insisted I keep my body responsive

7. How did you get on with life after surviving cancer?

I never felt the need to have a psychological support.

8. If you had to give some advice to a cancer patient, what would you say?

One has to go through cancer how he can, he has to have the need to fight and keep on fighting, I've been doing it for four years, but I'm still here. People just need to be positive and fight.

The realistic, knew what to expect and didn't expect more.

Interview 10: Marta Bosch, cancer survivor

1. When were you diagnosed?

July 2018

2. How long did it last?

They removed the tumour ten days after the diagnosis and after that I got treated with chemotherapy for half a year.

3. What stage were you in when the cancer was diagnosed?

It was operable but with some lymph nodes with cancer cells.

4. What attitude did you maintain during the treatment?

I was trying my best to be positive, did a lot of sport and go on as usually. I tried to have a lot of people over so my mind wouldn't go anywhere no desired.

5. Did they do any modifications in your treatment due to your emotional state? Or did they go along their protocol like expected?

I did have one. Because people tended to come visit me a lot. One family holiday I was left alone and that took a toll on me. My self-mechanism shut down and that made the chemotherapy longer that needed.

6. Did the doctors that assisted you do something so that your body could secret more serotonin?

They told me to go and get a hobby and to try and eat good and healthy and not force myself on anything. Also, on staying positive and having contact with people.

7. How did you get on with life after surviving cancer?

The same, since I didn't change almost anything during the treatment.

8. If you had to give some advice to a cancer patient, what would you say?

I tried to stay as normal as possible in life, as if nothing happened. Whenever I could I would go walking, work, go to the gym, go to restaurants on days without nausea, talk to my friends Go through the month as normal as possible and always with a positive and active attitude.

A clear example of the connector. She spent a lot of time with her two kids, making her rely herself on them. When they left, that would lead to negative effects.

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