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# Opleiding Informatica

Ethical discussion on current protocols for Crohn's disease in the use of  
CAM therapies

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## **Abstract**

Crohn's disease (CD) is treated with medication, but other methods do exist to help a patient with its journey to get the disease under control. Diets, investigation in the microbiome and CAM therapies all fall under these other methods. However, these options are not included in the protocols for the treatment of CD. The thesis will look at different options that could be used by CD patients, as the use of medication is not the only treatment possibility. The focus will be on the ethics of these treatments, in other words, if these treatments should be included in the treatment for CD. As a result there are interviews, an ethical discussion and a website that can be used to inform CD patients about other treatment possibilities. In the end there will be a proposal for further research that is needed to include CAM therapies in standard healthcare.

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# 1 Introduction

Crohn's disease (CD) and all the complaints that it gives can make a patient's life hard and miserable. Fortunately, there are medical treatment options that can reduce symptoms and give patients relief by suppressing the inflammation [Sti16]. It is, however, a problem when the different medicines that are used do not work for a patient. The current protocols that are used to treat CD mainly focus on the use of medication. This causes problems for patients who seek other methods, such as patients who experience really bad side effects. Since doctors need to follow certain protocols, it is not always easy to find a treatment that works for a patient, assuming that regular medicine does not work. This is an area that should get more attention from the medical world. Patients should be able to get their disease under control and if the classic way of treating does not work, then other methods should be available. From an ethical point of view one could argue if methods that fall outside the protocols, or even outside regular medicine, should be included in the treatment of CD. The following sections will discuss what CD is, the protocols that are used for CD and what CAM therapies are. Then there will be an introduction to bioethics and an overview with what has already been said about CAM therapy for the treatment of CD.

## 1.1 What is CD?

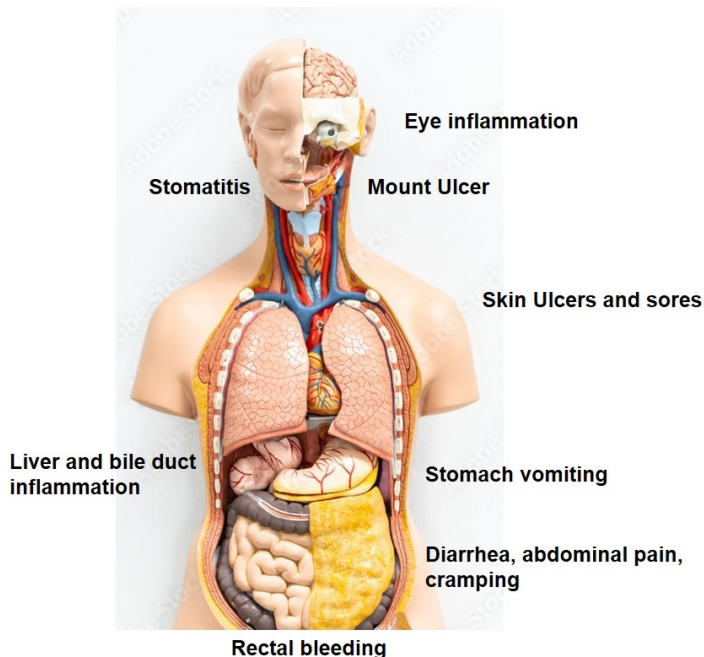


Figure 1: Several complaints a CD patient can experience.

Source: <https://pikwizard.com/?q=torso+human+body&perpage=100>.

Crohn's disease is a type of inflammatory bowel disease (IBD). The inflammation of the digestive tract can lead to diarrhea, abdominal pain, fatigue and weight loss [Sti16] (see figure 1). CD can lower a patient's quality of life. At the moment there is no cure for CD, but there are therapies that are focused on reducing the symptoms and bringing the inflammation into remission [Sti]. Unfortu-

nately, there are patients who do not benefit from the current therapies, or patients experience bad side effects of the medications. There are other methods that could help CD patients, e.g. following a diet or investigation in their microbiome, but these methods are not yet included in the current protocols to treat CD.

### General risk factors for CD

Four common factors that can cause CD are genetics, an immune response, environmental factors (e.g. use of antibiotics, migration) and the microbiome (dysbiosis) [GCP18]. Another aspect that can make the disease worse and even give a higher risk of surgery is smoking [LKR+19]. In addition, the use of oral contraceptives has also shown to be a risk factor for CD [KHA+12] and women who use oral contraceptives may have a higher risk of surgery [KGS+16].

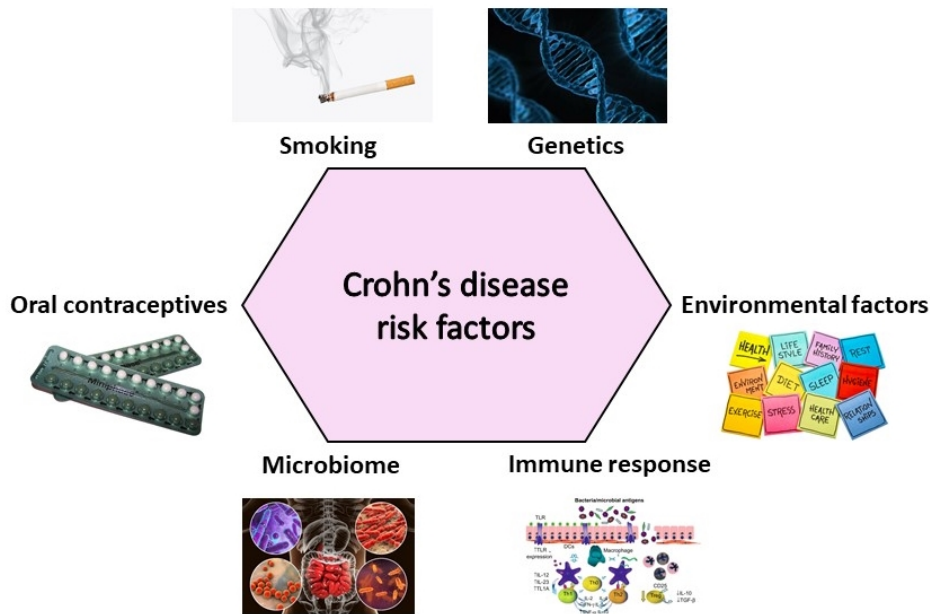


Figure 2: Six risk factors for Crohn's disease.

## 1.2 Protocols

The current protocols that are used to treat patients with CD mainly focus on the use of medication. This is not a problem if the prescribed medicine is beneficial for a patient. But what if doctors can not find a suitable treatment for a patient? Or what if this medicine gives heavy side effects that makes the life of this patient even harder? In this section we will look at different protocols from different countries to treat CD and see if these protocols include any form of complementary and alternative medicine (CAM) treatment. Before this there will be a short summary on the regular medicine treatments that are used today, based on the European Crohn's and Colitis Organisation (ECCO) guidelines and a treatment algorithm for CD.

*ECCO [TBD<sup>+</sup>19] + treatment algorithm:*

The first step is to localize the CD and observe its behaviour. Subsequently, a distinction between induction therapy and maintenance therapy is made. Both domains will be discussed separately.

### **Induction therapy**

For mild to moderate disease there are two recommended drugs for the induction of remission, namely 5-aminosalicylic acid (5-ASA) and budesonide. Antibiotics are used as well, but not recommended, as their efficacy to induce remission is not clear. For a moderate to severe disease the use of corticosteroids is recommended. If a patient does not respond to the aforementioned therapies, then the use of monoclonal antibodies is recommended. [Sti]

### **Maintenance therapy**

To stay in remission the use of thiopurines and methotrexate are recommended. If a patient got into remission with the use of an anti tumour necrosis factor (anti-TNF) treatment, then this same treatment can be used as their maintenance medication. [Sti]

A summary of these different treatments and when to use which one can be found in [SBM<sup>+</sup>20] .

<b>Medication</b>		<b>Most common side effects</b>
Aminosalicylates	Sulfasalazine Mesalamine Olsalazine Balsalazide	Nausea, upset stomach, skin problems, headache and dizziness
Corticosteroids	Prednisone Methylprednisolone	Gastrointestinal complaints, greater risk of infections, edema, headache and muscle complaints
Immunomodulators	Methotrexate Tacrolimus Azathioprine	Anemia, infections, headache, insomnia, nausea and diarrhea
Biologics	Adalimumab Infliximab Ustekinumab Vedolizumab	Headaches, gastrointestinal complaints, infections, muscle pain and skin complaints

Table 1: Medication that is used to treat CD with its most common side effects.

*The Netherlands [vMDeL15] (2014-2015)*

The protocol that is used in the Netherlands makes a distinction between a patient with active CD and a patient in remission. If a patient has an active form of CD, then the location is determined and based on this a suitable medicine is prescribed. Some commonly used medications are corticosteroids, antibiotics and anti-TNF treatments. The choice to operate a patient is made if the use of medication has no effect on the disease. If a patient is in remission, then a suitable maintenance medication is chosen to keep the inflammation under control.

The use of probiotics and specific diets are briefly mentioned, where, according to this protocol, the use of probiotics can be beneficial, but the use of a diet is not seen as an addition to the treatment

of CD. Possible use of CAM treatment is not included, as this protocol states that it does not play a role in the treatment of IBD.

Conclusion: this protocol only focuses on the use of regular medicine and patients are not informed about alternatives of the protocol.

*UK [LKR<sup>+</sup> 19] (2019)*

This protocol also starts with the location and classification of CD. After that, different treatments for the different states of CD are discussed, for example the use of corticosteroids, biological therapy with anti-TNF drugs, antibiotics and eventually surgery. Besides the use of medication for CD, the use of Exclusive Enteral Nutrition (ENN) and elimination diets are also mentioned and their effect of inducing remission. Also the advice for a low FODMAP (Fermentable Oligosaccharide, Disaccharide, Monosaccharide and Poly) diet is mentioned in this protocol. The use of probiotics and CAM therapy are discussed, where this protocol states that for both more evidence is needed to be included as a treatment of CD.

Conclusion: this protocol mainly focuses on the use of medication to treat CD, but alternatives, mostly diet-based, are suggested as well.

*Australia [Jan07] (2018)*

Localisation and classification of CD is the first step of this protocol. When the diagnosis is made, there are several treatment options, where corticosteroids, biologic agents and antibiotics are also in this protocol commonly used methods. Surgery is also an option when the current use of medication does not control the symptoms. ENN is also used to treat patients with CD. The use of CAM is discussed, such as the use of herbal and nutritional supplements, pre- and probiotics and acupuncture. As a conclusion, the protocol states that a doctor should always ask their patients about their use of CAM.

Conclusion: CAM treatment is not fully excluded from this protocol, as they mention different types of CAM treatments, but the main goal to treat a patient with CD is with the use of medication.

*USA [LLI<sup>+</sup> 18] (2018)*

The first step is to diagnose CD and measure its activity. Once this is done, the next step is to find a medical treatment that is suitable for the patient. Here corticosteroids and anti-TNF agents are commonly used medications. Surgery is also used to treat CD. The protocol shortly mentions dietary therapy, but the main focus to get the symptoms under control is by the use of medication. No other aspects of CAM therapy are discussed.

Conclusion: this protocol only focuses on the use of regular medicine and patients are not informed about alternatives of the protocol.

The use of CAM therapy is clearly lacking in the protocols mentioned above.

### **1.3 CAM therapy**

Treatments that fall outside the mainstream healthcare are called complementary and alternative medicine (CAMs) [NHS22]. The distinction between a complementary medicine and an alternative medicine is:

- complementary when it is used in *combination* with regular medicine
- alternative when it is used *instead* of regular medicine

There are several reasons why a CD patient uses or wants to use a form of CAM therapy [HVR+11]:

- To have the best treatment possible
- The feeling of having their disease under control
- Not wanting to use (steroid) medication
- Regular medicine does not work

The use of CAM therapies by CD patients is rising [JRS+06], but these alternative methods are not yet included for the (additional) treatment of CD. Therefore patients are not always informed about these treatment options. Examples of CAM therapies can be found in table 2.

<b>CAM therapy</b>	<b>Definition</b>
Acupuncture	A system of complementary medicine in which fine needles are inserted in the skin at specific points along what are considered to be lines of energy (meridians), used in the treatment of various physical and mental conditions. <sup>1</sup>
Herbalism	The study or practice of the medicinal and therapeutic use of plants. <sup>1</sup>
Homeopathy	A system of complementary medicine in which ailments are treated by minute doses of natural substances that in larger amounts would produce symptoms of the ailment. <sup>1</sup>
Hypnotherapy	A type of mind-body intervention in which hypnosis is used to create a state of focused attention and increased suggestibility in the treatment of a medical or psychological disorder or concern. <sup>1</sup>
Massage	Used to treat physical or emotional conditions. [Ern04]
Yoga	Using stretching exercises, controlled breathing and meditation to relieve tension. [Ern04]

<sup>1</sup> Definition can be found on:

<https://languages.oup.com/research/oxford-english-dictionary/>

Table 2: Different CAM therapies explained.

## 1.4 The basic principles of bio-ethics

In order to explore the justification of including CAM therapies into standard therapy, we use basic principles of bio-ethics to initiate the discussion. There are 4 main ethical principles, namely autonomy, beneficence, justice and nonmaleficence. Also informed consent is an important aspect when it comes to decision making (see figure 3). Autonomy of a patient means that a person, who can think rationally, has the right to make the choice about what shall be done with its body. This of course should be weighted against other aspects as well, as a patient’s autonomous choice should



not harm other people. Children and adults who are incompetent (e.g. mental disorder) do not fall under the principle of autonomy. Physicians have the obligation to act on the benefit of the patient. The principle of beneficence states that, for example, physicians should prevent harm, help persons with disabilities and rescue persons in danger. The concept of nonmaleficence says that physicians should not harm a patient. Here you can think about not causing pain, not causing offense and not killing. The difference between beneficence and nonmaleficence is that beneficence not only wants to prevent harm, but also have positive benefits for the patient. Nonmaleficence is only focused on not causing harm. Lastly, the concept of justice says that a person should be treated fair, equitable and appropriate. [Var21]

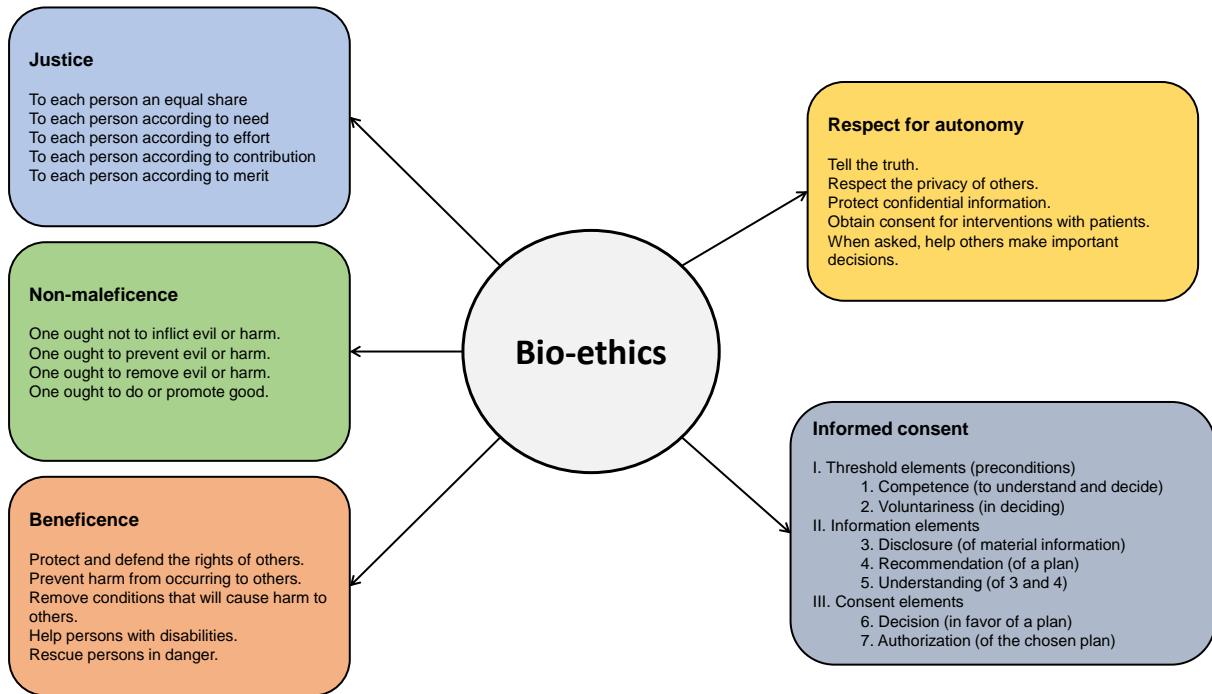


Figure 3: Concepts of bio-ethics [Jah11] with corresponding elements.

## 1.5 Related work

### 1.5.1 Interviews with IBD patients and healthcare workers

There have been several interviews that have looked at patients' perceptions of CAM therapy, which methods are most commonly used among IBD patients and how doctors and nurses look at the use of different CAM methods.

A result of a study that has been conducted in Germany [JRS+06] is that 52% of patients who participated used or had used a form of CAM for the treatment of IBD. The most used CAM therapy was homeopathy with 55%. Other two CAM methods that were used are probiotics with 43% and classical naturopathy with 38%. The reason for patients to start with a CAM treatment is that

conventional medication gives side effects, which was the case for 55% of the participants. Another reason is that a patient can be unhappy with the conventional treatment, this was the case for 20%. The percentage of patients who are satisfied with the use of CAM therapies is between 34% and 57%. Patients also reported that they think the amount of research for CAM therapies should be increased.

Looking from the perspective of health service managers we also see different aspects [SA14]. The use of CAM therapies could improve the holistic aspect of health care, so that a hospital could offer their patients a holistic service. This can be done in three ways, where the first one is ‘treating the whole person’. The reason why CAM is interesting in this part is because CAM practitioners who treat the whole patient do not only look at for example their diet. They also look at other personal aspects of the patient such as their mood and other personal stories. Hereby patients will get the best possible treatment, as they are looking not only at one aspect of the patient, but at the patient as a whole.

The second one is filling therapeutic gaps in existing service delivery. The way CAM is used is by making use of a mind-body approach that is preferred over conventional medication. This is especially used by patients with psychological trauma and chronic disease management. Besides the mind-body approach, massages are also used as a CAM therapy, mainly to give patients the feeling of relaxation.

The third and last one is that CAM increases healthcare options. Offering CAM therapies in the hospital together with a patient’s traditional treatment ensures that patients who otherwise would not be able to use a form of CAM therapy are now able to experience its benefits. The fact that CAM therapies that are offered in traditional health care systems are free is beneficial for patients. People who could not afford them in the first place can now make use of these treatments.

Besides looking at percentages of IBD patients who make use of CAM therapies and perspectives of healthcare workers, it is also interesting to look at the experiences of IBD patients with their use of CAM therapies [LFKO14]. For this, three categories will be discussed, namely CAM use, communication and self-care.

*CAM use:* dietary change is seen as an important aspect of CAM, for example not eating gluten or dairy products. However, patients reported that they did not get the support from their healthcare professionals to change their diet. One reason could be that the healthcare professionals simply lack knowledge about CAM. On the contrary, patients want to have the best effect that is possible and are therefore willing to use CAM, as long as it helps them to reduce their symptoms. There were also patients who reported that they did not want to use any form of CAM, as they trust their doctors or do not trust CAM therapies enough to try them out. Another argument that was mentioned is that patients may lean faster towards CAM therapies if they were offered in the hospitals. For some patients, evidence of CAM methods is also an important part.

*Communication:* patients reported that they did not get the support from their healthcare professionals when they brought up the CAM subject and some even were not taken seriously. It seems to be easier to talk about CAM therapies with nurses than with doctors. Some of the patients even talked about feeling ashamed to tell their doctor that they are using a CAM therapy or that they want to start making use of one.

*Self-care:* the feeling of having your own disease under control, for example by a dietary change, is what can make CAM appealing to IBD patients.

There are several conclusions that can be made based on the different aspects that have been discussed above. First of all, physicians should inform their patients about possible CAM treatments to help their patients make the right decision, since there are a lot of CAM therapies. Also, more research should be done for CAM therapies, because this can offer a new treatment option for IBD patients. Secondly, the use of CAM could increase the holistic value of health care services. The role of CAM and its applications could be integrated in mainstream healthcare services. Lastly, healthcare professionals were reluctant once the CAM subject came up or they did not take their patients seriously. It is important that healthcare professionals know about this problem, so it can become easier for patients to ask their doctors about CAM therapies and discuss different options with them.

We can also look at a risk-benefit analysis that could be used to give patients a clinically reasonable treatment that is also ethically appropriate [ACEJ02]. There are two cases which will illustrate this further.

The first case is about a woman that does not want to have surgery for her precancerous condition and she insists in using CAM methods to get better. Her physician wants to make sure that she is competent to make this decision. It turns out that she is capable of making this decision for her treatment. Nevertheless, the physician still wants to discuss the possible risks of not having the surgery with the patient. It turns out, after both listening to each other, that the patient's core beliefs would be disrespected if she would undergo the surgery. This puts the physician in a difficult position, but eventually this case resulted in informed refusal of care. It would be more difficult if this physician was the patient's primary care provider, as this could harm the physician-patient relationship. The physician then has two options: to continue providing care for this patient, even though the decision that has been made could lead to the development of cancer, or to refer the patient to a physician that has a mindset that matches more with the patient's mindset. However, by doing this, it can be in conflict with the obligation of non-abandonment.

The second case is about a woman who seeks care from her oncologist and wants to discuss possible CAM treatments with her physician. Unfortunately her physician tells her that she cannot recommend some kind of CAM treatment, because of the lack of scientific evidence. The patient is not able to change to another physician because of her insurance. It is important to point out that the patient wants to use CAM therapies in adjunct to her regular therapy and not replace her conventional treatment. There actually is data that supports the use of CAM therapies with cancer, for example relaxation training or acupuncture, which can improve the patient's quality of life. Therefore for this specific situation, the patient's choice of making use of CAM therapies should be respected and the physician should inform the patient about its safety and efficacy.

### **1.5.2 IBD patients and the use of CAM therapies**

There are many types of CAM therapies, for example mind-body medicine, energy medicine or whole medical systems. Therapies that are most commonly used by IBD patients are vitamins, herbal products, homeopathy and probiotics. Patients report different reasons for using CAM therapies. The three most commonly heard reasons are that they want to have their IBD and their life under control, the fact that complementary treatments could be helpful and the idea of treating the whole person sounds appealing. Other factors, such as severity of the disease, type of medication, the patient's well-being and whether they did or did not have surgery, could also play a role in the patient's decision to start using CAM therapies [HVR+11].

Several CAM therapies that are used for IBD are reviewed based on the available literature [LR06].

#### *Traditional Chinese medicine*

There are different studies that reported a positive effect with the use of traditional Chinese medicine. Remission rates were higher and patients' health improved. These studies did not specify what they meant by 'cure' or 'improvement'. However, it still can be said that this type of alternative therapy had a positive effect on the patients that participated, even though the interpretation of the results were not always straightforward. [LR06]

#### *Other herbal therapies*

Aloe vera gel had a positive effect on UC patients, which can be concluded because clinical remission was higher and patients had a higher percentage of improvement. Patients also had a higher response rate. Wheat grass has also been used for UC patients. This also had a positive outcome, for example reduction of the disease activity, and there were also no side-effects with this treatment. Another element that has been used for UC patients is germinated barley foodstuff (GBF). This study concluded that it is safe to use and some of the positive effects of this treatment are that it reduced rectal bleeding and that it showed a lower relapse rate. Lastly, curcumin can also be used for IBD patients as it has an anti-inflammatory effect, but the study that performed this was really small. [LR06]

#### *Acupuncture and moxibustion*

The general well being of patients seemed to improve after making use of acupuncture and moxibustion. [LR06]

#### *Bovine colostrum*

The two main positive effects patients had after this therapy are reduction of their symptoms and the improvement of their histological score. [LR06]

Currently there is a lack of evidence for CAM therapies, but there is a difference in what patients consider as evidence and what doctors consider as evidence. 65% of the IBD patients that make use of a CAM therapy would continue using their CAM therapy even if there came a scientific report concluding that the therapy did not have an effect [HVR<sup>+</sup>11].

As IBD patients make use of CAM therapies, doctors should think about including CAM therapies for their patients and add it to their medication list. This could be helpful to discuss both benefits and risks of these therapies [LR06]. By doing so, patients can make a more informed choice about what treatments they want to use, both conventional treatments and CAM therapies [HVR<sup>+</sup>11].

### **1.5.3 Ethics and CAM therapies: what has already been written about it?**

Both in traditional healthcare and in alternative methods there is a doctor-patient relationship. An important aspect that comes with this relationship is informed consent. The terms 'natural medicine' or 'nature' sometimes can be misleading. For example, patients can think that there

are absolutely no side effects with these treatments as they think these methods are safe and soft. It turns out that patients who make use of CAM therapies experience less side effects. There are two reasons why it is important to consider both risk and benefits when starting with CAM therapy. First of all, some CAM applications can cause toxic and allergic reactions. Secondly, they can interact with conventional medicine which can cause unpleasant effects. Therefore both the conventional and the alternative doctors should offer all the information to the patients. Patients should inform their doctors about all the therapies they are using, both conventional and alternative methods. To achieve this, it is especially important that conventional doctors should be informed about the different CAM therapies. There should also be more studies that look after the risks and benefits of these alternative methods [Tei12]. A language barrier with migrants and cultural differences can be a challenge for the aspect of 'right to information' [SMC+14]. There are some CAM practitioners that make no use of informed consent, because they make use of the process the patient is going through that is based on shared decision making. Another reason is that the therapy is risk free, for example making use of music to lower someone's stress. However, not all CAM therapies are risk free and therefore others may need informed consent. To ensure that the informed consent procedure is properly complied, one standard procedure is needed for both conventional and alternative practices [CH05].

Another aspect that still has problems is the research that has been done for CAM therapies. Even though there has been research going on to CAM therapies, there is still research lacking in whether such therapies are accepted, available and accessible. Working together with patients can make the content of the right to health clearer and it can clarify in what area more research is needed or wanted [SMC+14]. It can be hard to find evidence for these therapies and usually the conventional methods to find evidence does not work for CAM therapies. A reason for this is that these methods are rather different than the methods used in conventional medicine. It does not automatically mean that there is no evidence, it means that the applied methods may not always be the best methods to test an alternative therapies effectiveness [Tei12]. A simple solution is conducting more research into CAM therapies, especially to get a better understanding of its risks and benefits. One way to achieve this is to have more research funds in the field of CAM therapies to make research to these therapies possible. Another aspect that might help the research for CAM therapies is to find another way of examining these methods, as the traditional randomized clinical trials have already shown to be ineffective in this field. It is also important that the way conventional practitioners look at CAM changes by educating them about CAM therapies. At the same time, CAM practitioners should understand that it is important to have scientific knowledge and that proof of their therapies might be needed. Lastly, it can be hard to find evidence for certain CAM therapies, as some may have a more holistic approach which makes the reproducibility of these methods rather complicated [Ern04].

Cost of CAM therapies is also a topic that should be discussed when looking at the ethical aspects of CAM therapies. There are two reasons why public health services should finance research for CAM therapies. First of all because this can protect patients from possible harm that they can experience when making use of a CAM treatment. Secondly this will make sure that the research being done for CAM is equal and justified compared with the research for traditional therapies. Another ethical consideration when looking at the cost of CAM therapies is if it meets the principle of justice. In other words, is it justified if only patients who have money for these treatments can make use of CAM therapies [Tei12]. When people do not have to pay for traditional healthcare, as that is covered by the state, their choice will be to undergo traditional therapies instead of CAM

therapies. This can be in conflict with the right that health should include non-discrimination [SMC<sup>+</sup>14]. Because only people who have money can afford CAM therapies makes CAM a private medicine. It is hard to make CAM accessible to everyone, because most of the time the resources that are available for traditional healthcare are already scarce. There is also not enough evidence that the provided CAM therapies are safe and effective [Ern04].

There are CAM providers that lack the scientific knowledge which conventional doctors do have. Therefore basic medical procedures are included for everyone who is trained as a CAM therapist, so that they have the knowledge that is needed for acute, serious symptoms [Tei12]. It still raises questions when CAM providers do not have enough scientific understanding. For example, if they can communicate with conventional doctors and if their lack of traditional knowledge can put patients at risk or not [Ern04].

## 1.6 Thesis overview

This is the thesis for the bachelor Bioinformatics at the University of Leiden, Leiden Institute of Advanced Computer Science (LIACS), supervised by Lu Cao. The next sections of the thesis will discuss the following: Section 2 includes the use of diets and investigation of the microbiome; Sections 3, 4 and 5 contains results from interviews, an ethical discussion and website design; Section 6 includes a conclusion and possible further research; Section 7 gives a final discussion.

## 2 Two alternative therapies

The following sections will look at two different possibilities that could be used by CD patients, but are not yet included in the protocols. These two aspects are diets (section 2.1) and the microbiome (section 2.2). These methods can both be seen as regular and alternative medicine. Therefore they will be discussed separately and not in combination with CAM therapies.

### 2.1 Diet

Change in diet has shown to be beneficial for CD patients, whether it is to reduce symptoms or to stay in remission [KKL<sup>+</sup>17]. Unfortunately the use of a specific diet is not yet offered to patients. This section will discuss different diet options that can be used by patients to reduce their symptoms, to get into remission or even stay in remission.

#### 2.1.1 Low-FODMAP diet

The low Fermentable Oligosaccharide, Disaccharide, Monosaccharide and Polyol diet (FODMAPs) can especially be used by patients who are in remission and/or are experiencing IBS-like symptoms (e.g. diarrhea and bloating) [PAF<sup>+</sup>17]. FODMAPs include fructose, lactose, fructo- and galacto-oligosaccharides and polyols [HG17]. Foods that are high in FODMAPs are the following:

- Fructans: garlic, onion, wheat
- Fructose: fruits and honey
- Lactose: dairy products

- Oligosaccharides: nuts and seeds
- Polyols: vegetables and fruits

The low-FODMAP diet focuses on eliminating foods that are high in FODMAPs. These products are then reintroduced to examine if a patient reacts to it or not, and therefore should or should not keep these products in their diet. The use of a low-FODMAP diet has shown to be beneficial and it improved the patients quality of life [PAF+17].

Type of product	High in FODMAP	Low in FODMAP
<b>Fruit</b>	Apples Cherries Mango Peaches Pears Watermelon	Bananas Grapes Kiwi Lemon Orange Raspberry
<b>Vegetables</b>	Artichokes Beets Celery Garlic Onion Peas	Bell peppers Carrots Eggplant Lettuce Potato Tomato
<b>Lactose</b>	Cream Ice cream Milk Yoghurt	Lactose-free cream Lactose-free ice cream Lactose-free milk Lactose-free yoghurt
<b>Grains</b>	Barley Couscous Wheat	Oats Gluten-free products Quinoa
<b>Legumes/nuts/seeds</b>	Chickpeas Lentils Kidney beans Lima beans Soy beans	Chia seeds Macadamia nuts Peanuts Sesame Walnuts
<b>Protein</b>		Beef Chicken Eggs Fish Lamb Tofu

Table 3: Different food that is high or low in FODMAPs.

### 2.1.2 Semi-vegetarian diet

An increased risk of IBD can be caused by a westernized diet [HG17] [Chi10]. The Western diet consists of a lot of refined sugars and fast foods, many foods are processed and there is a lack of fruit and vegetables in this diet pattern. Following a semi-vegetarian diet has shown to prevent a relapse of CD [Chi10]. Patients who follow this diet eat for example eggs, yoghurt, fruit vegetables, brown rice and potatoes on a daily basis, fish once a week and meat once every two weeks. This is different from the low-FODMAP diet and therefore shows that each patient is unique and responds differently to specific foods.

### 2.1.3 Risk factors

Carbohydrates (mainly refined and processed carbohydrates) and proteins (especially animal proteins) are seen to be a risk factor for IBD [HG17]. A specific carbohydrate diet has shown to be beneficial for CD patients [SWC+16].

As one diet can improve a patient's life and reduce their symptoms, another diet does not necessarily have the same effect. This shows that, similar to the use of medication, what works for one patient does not always have to work for another patient. It is therefore important to guide patients who want to include a diet in their treatment and find what works for them. Hereby you ensure that the diet does not make the disease worse, but reduces the symptoms and improves the patient's life.

### 2.1.4 Vitamin D

In addition to the fact that diet can play an important role in the treatment of CD, solving a vitamin D deficiency can also make a positive contribution [JHA+13] [Whi18]. Adding a vitamin D supplementation is, especially compared to the use of medication, not expensive and it is safe to use [Whi18]. Low vitamin D levels are even associated with patients experiencing more pain and having a lower quality of life [HG17]. Adding vitamin D supplementation should therefore be considered to use in the treatment of CD.

## 2.2 Microbiome

The microbiome consists of microorganisms of thousands of different species (bacteria, fungi, parasites and viruses). All these different species will coexist in a healthy body without any problems, but if there is an imbalance in your microbiome, this can lead to a disease [Cha22]. The use of a microbiome investigation can especially be useful for patients who do not seek any benefit from the current medication treatments. This investigation may lead to a reduction of their symptoms or even remission. As a treatment option there is the use of pro- and prebiotics and fecal microbiota transplantation [OMS15]. However, investigation in a patient's microbiome can also be useful since CD can be caused by environmental factors, genetic factors, immune response and the microbiome [GCP18]. Therefore examining the microbiome may lead to new insights about for example disease development. It can also be used to make a distinction between CD and UC and thereby be a helpful tool for the diagnosis of CD [PPB+17]. In addition, the gut microbiome can also be used to predict the disease outcome, where this can be used for a personalized treatment [AGCG21].

A recent study found that a member of the gut microbiome, *Ruminococcus gnavus*, plays a role in the breakdown of the gut barrier function and that there can be a connection with the pathology



of CD [HKC<sup>+</sup>19]. Another study shows that patients who have a lower  $\alpha$ -diversity have a residual clinical activity and experience daily diarrhea [BBT<sup>+</sup>21].

Another treatment that can be used for the induction of remission is exclusive enteral nutrition (EEN). This method has shown to achieve high remission rates (up to 80%) [AGB19] [MCG<sup>+</sup>17]. EEN plays a role in the immune function, in one's microbiome and intestinal inflammation and could therefore be used to induce remission [AGB19]. The mechanism behind the effectiveness of EEN remains unclear [MCG<sup>+</sup>17]. Nevertheless, due to this treatment showing effectiveness, being low risk and patients not having to use steroids [AGB19], makes it a promising treatment. Even though it is not yet included to treat CD [MCG<sup>+</sup>17].

The information that the microbiome provides can lead to new treatment possibilities. Even though there is still much to be researched, the promising field of the microbiome can give a solution to patients who want or need treatments that differ from the regular use of medication.

### 3 Interviews

For the interviews with Ben Witteman and the microbiome-center questions were designed before conducting the interview. There were several aspects that had to come up in both interviews. First of all, there had to be questions talking about numbers or percentages. For example, what percentage of patients does experience benefits from the use of diets or microbiome research. The second group of questions mainly focused on the experience Ben Witteman or the microbiome-center had with CD patients. Lastly, in both interviews there were questions regarding future prospects in the field of nutrition and microbiome research.

Ben Witteman was chosen to be the interviewee for the diets aspect. He is concerned with the use of nutrition for IBD. Therefore his insights are a good fit to the diets section discussed above. The microbiome-center helps people by researching their microbiome. Since the microbiome is also discussed for an additional or alternative treatment for CD, an interview with the microbiome-center seemed as a good addition to that.

## Interview Ben Witteman

*Affiliate professor at Wageningen University, Division of Human Nutrition  
Gastroenterologist and Hepatologist at Gelderse Vallei Hospital, Ede*

Ben Witteman is a specialized professor in nutrition and intestinal health. He is especially concerned with fiber. According to a research he participated in as well, 63% of the IBD patients make use of a modified diet. Around 50% of these patients notice a positive effect after changing their diet [dVDTW18]. The reason that the current protocols that are used for CD mention little to nothing about nutrition or a suitable diet is because it is scientifically hard to find proof that a diet works. Nevertheless, due to his years of experience with patients who change their diet and get a better quality of life, he is convinced nutrition works. A general advice for IBD/CD patients is to eat less meat and more fibre, due to its positive effect on your microbiome, and fatty fish, as this has an anti-inflammatory effect. It would also be good to eat less sugar, as this gives you a higher risk for developing CD, assuming you also have a genetic predisposition to it. Depending on whether a patient is in remission or not, a dietary change or the right nutrition can play a role in the recovery of the bowel. Younger people seem to follow nutrition advice easier, since they read food labels more carefully and most of the time younger people want to know more. Also women are more likely to investigate their nutrition, as generally they experience more discomfort from their disease. Therefore women want to do more to get their disease under control. Thus, the majority of participants in a nutritional study are women. Women are more punctual and easier to manage when it comes to the use of nutrition. Therefore you more often see women than men who are concerned with their diet and participate in a nutritional study. Expectations for the future are that doctors will be convinced that nutrition, but also sleep and body movement, all play an important role in IBD. Besides that, the medications that are used will get less toxic and more biologic.

Every BIG-registered doctor can make use of the microbiome-center platform in the Netherlands. They do a feces research and based on these results the patient gets a personalized probiotica. Probiotics are used worldwide, but the personalized method of the microbiome center is still unique and can only be found in the Netherlands. At the moment there are a couple of thousand patients that are being helped by the microbiome-center. The percentage of Crohn patients that go to the microbiome-center is not very clear, but 70% of all the people that make use of this microbiome investigation report to be (very) satisfied. For a Crohn patient it is not useful to do this microbiome investigation in the inflammatory phase of their disease, as what they need then is something that works fast to reduce acute inflammation. A patient that is in remission, especially if the remission is not stable, can make use of the microbiome-center, for example to make the remission last longer. A patient can end up by the microbiome-center depending on whether a doctor does or does not make use of the microbiome center. The reason for this is that some doctors are reluctant for this treatment option, because they believe there is not enough evidence for it. Another reason is the experience doctors have with the microbiome-center; if their experience is positive, they will send more patients to the microbiome center as they have seen the benefits of the treatment. The fact that this treatment is personal for every individual patient makes it hard to write one single protocol for all IBD patients. One possible addition to the current protocols could be to add a feces investigation and analyze these results.

The microbiome plays a crucial role in our well being: it changes when someone gets sick or someone can get sick because their microbiome has changed. It is usually hard to say what occurred first. A microbiome treatment could also be helpful to reduce additional complaints CD patients experience, for example skin complaints. Currently the results for probiotics interventions for CD are not so convincing, but developments for the future are promising. One example is the research that is going on for bacterial strains that produce butyric acid. This is known to be anti-inflammatory.

At the moment insurance companies do not (fully) reimburse the microbiome-center research. It will take time before this research will be completely covered, for example because they want more evidence that it is beneficial for the patients. Future prospects of the microbiome-center are to be able to serve more doctors and have a wider palette of strains that can be used. Research into the microbiome does not stand still either, it is growing exponentially. And it probably will continue to grow.

## 4 Ethics of CAM

There are other CAM therapies that are used by CD patients, for example homeopathy, herbal products and physical therapies such as a massage or reflexology [HVR<sup>+</sup>11]. The difference with these therapies and the use of a diet or probiotic for the microbiome is that there is a lack of evidence for these therapies. This makes the inclusion of CAM therapies in standard healthcare challenging. After looking into the current literature for CAM therapies and proposing two different treatment methods for CD, there is now room for a discussion.

There are a number of concepts that need to be discussed [Var21]. A big topic that definitely needs to be discussed is informed consent. Requirements for informed consent are: the patient must be competent to understand and decide; the patient receives full disclosure; the patient comprehends the disclosure; the patient acts voluntarily; the patient consents to the chosen plan [Var21]. Who should be informed about CAM therapies and what information needs to be shared with patients are two questions that are central in this discussion. What also will be discussed is if the concept of justice is met. Two aspects are: what if not all patients are informed about CAM therapies and what if not all patients can afford those therapies. Other ethical aspects are the concept of non-maleficence and the concept of beneficence. Questions we can ask with these two concepts are to what extent CAM therapies do not harm patients and are indeed beneficial for patients. This brings up another concept as well, namely the quality of life and whether CAM therapies provide a better well-being for patients compared to regular medicine. Lastly, respect for autonomy and autonomous decision making is also important when it comes to deciding what therapies patients want to use, whether this is regular or alternative medicine. The sections below will discuss all these different ethical viewpoints. It is important to realize that there is not one correct answer to the questions that arise for this topic. It is rather important to look at as many different viewpoints as possible to make sure the ethical part is being applied correctly.

*Which CAM therapies should be discussed with patients and which should not?*

As the percentage of IBD patients that are making use of CAM therapies is rising, we should consider to which extent CAM therapies should be advised by physicians. Change of a patient's diet for example is probably easily accepted by doctors trained with regular medicine, as nutrition is not seen as a holistic practice. Also, the risk of changing one's diet has little to no side effects. It is also easy to change back from a diet to the patients regular diet. Therefore the use of a diet should be discussed by physicians and some are already doing this. It becomes more complex when a therapy with a more alternative aspect comes to mind, for example the use of homeopathy. The biggest reason why doctors are reluctant to talk about these therapies is because of the lack of scientific evidence for these methods. However, patients do benefit from these alternative methods, even though there is no or not enough scientific evidence for it. One could argue if withholding this information from patients is ethically correct when looking at informing patients, as this can be seen as not fully informing the patient about all the treatment options. On the other hand, physicians may not want to inform their patients about these CAM therapies because they are worried about certain risks patients can experience. Therefore informing patients could be in conflict with the concept of non-maleficence. Here we can discuss three different aspects. First of all, the risks and benefits of the traditional and CAM methods should be weighed against each other. In other words: which method causes less or no harm to the patient? If the traditional methods turn out to have a better risk-benefit ratio, then the physician may have the right to not inform its patient about certain CAM methods. It will be different when it turns out that a CAM method might be more effective for a patient. A physician should either way still inform his/her patient and discuss both risks and benefits of different treatments. Hereby the decision will be made together with the patients, instead of the physician making the decision for the patient. This brings us to the second aspect, namely the fact that not all CAM therapies are automatically good or harmless. By discussing the risks and benefits of both regular and alternative methods, patients will be able to make a better treatment choice that is aimed at preventing harm as much as possible. Lastly, to meet the concept of non-maleficence it could be the case that CAM therapies are crucial for

a patient's decision making process. Traditional medicine can have bad side effects and CAM therapies can reduce the symptoms of these side effects. In that case, CAM is used in combination with traditional medicine to prevent or reduce the possible harm patients can experience from their use of medication. Doctors may still not want to inform their patients about CAM treatments because they think that all these methods are harmful and should therefore not be discussed with their patients. We could argue if this can be seen as overprotection. It is of course important that doctors want to protect their patients, but not informing your patient because of your own beliefs instead of looking at the data that is available seems not to be the correct way. A solution could be to always discuss possible CAM options with patients and to talk about risks, benefits and effectiveness. Hereby doctors can still protect their patients from harmful therapies and patients are provided with all the possible information to make an informed decision.

We should also look at what is more important: giving patients all the information or not telling them all their options to protect them from possible harm. Here we see a conflict between beneficence and respect for autonomy. Patients can experience positive effects of the use of CAM therapies which can therefore be beneficial to their treatment. At the same time, by informing patients about all the different treatment options makes sure that patients can make an autonomous decision. Assuming certain CAM therapies are not beneficial makes it harder to argue whether this information should be discussed with a patient or not. Because to what extent goes the respect for autonomy in this case. If it is clear that a treatment is not beneficial for a patient, can a physician decide not to tell the patient about this treatment option and thereby not respecting the autonomy of the patient? Or should all treatment options always be discussed to meet respect for autonomy? The last one seems to be more ethically correct. To make sure this option also meets the concept of beneficence, physicians should give patients additional information about for example risks and drawbacks of certain treatments. By doing this, patients still get the chance to make an autonomous decision about a treatment option they believe is the most beneficial for them.

Now let's take a closer look at the term 'all the information', because what is 'all the information' about? Where do we stop informing patients about possible treatments, so in other words, where is the line for treatment options that should be discussed? One possible solution could be that therapies that help patients (e.g. stay in remission, improve quality of life), whether this is regular or alternative medicine, should be discussed with patients. A drawback of this approach is that it is not that simple to define what helps patients. Medicine, diet or other CAM therapies that have shown to be effective fall under this definition. But what if there is a patient that says that doing a certain dance helped them with getting better? Is that something that also should be included? Probably not, as we are talking about one specific person, but it may be considered when there is a significant amount of people that experience this positive effect. An aspect that can argue whether or not a therapy can be seen as useful or effective is to what extent it improves the patients' quality of life. Here you can think about reducing pain, giving patients the feeling of having their own disease under control or suffering less from side effects of certain medications. For example, if a regular medicine comes together with bad side effects and alternative medicine with less or no side effects, which treatment options should one choose? Looking from the quality of life point of view we can argue that the alternative method may be more beneficial for the patient, since this method has less or no side effects. At the same time, it is important to look at which of the treatments really helps the patient with their disease. The regular treatment does a better job

at reducing symptoms but has bad side effects and the alternative treatment is less effective in treating the symptoms but has less or no side effects. What is then the best treatment option if we want a high quality of life? In this case it is important to know from the patient what they think is more important: reducing symptoms or having a general good well-being.

Which CAM therapy should be discussed and which one should not is still a difficult question with no clear answer. By not informing patients about CAM therapies you are withholding information, but this can be done for the benefit of the patients. It is clear that scientific evidence is needed to convince more doctors to inform their patients about CAM therapies. The best solution for now, which has a lot in common with the informed consent procedure for the use of medication, can be the following: inform patients about CAM therapies and the possible risks and benefits of these therapies. By doing this, patients are better informed about different treatment options. Since they will hear about the risks certain CAM therapies can have, they are better protected from possible harm as they can make an informed choice about their treatment options.

#### *Who should be informed about CAM therapies?*

Patients who do not benefit from the regular treatment or patients who experience really bad side effects may be more likely to use CAM therapy. Informing those patients about the possibilities of different CAM therapies could therefore be useful, as physicians have an obligation to help patients. If the current treatment is not working, they should look for another treatment that does help the patient. However, if we are looking at patients who do benefit from the use of medication and are happy with their treatment, should those patients also be informed about CAM therapies? One could argue that not informing those patients about CAM could lead to withholding information and making the treatment choice for them. On the other hand, the patients do not have complaints about their treatment and giving them more information than they probably want could lead to information overload. Nevertheless, it is hard to say what patients want and not want to know about possible treatment options. A patient could be satisfied with its treatment, but may be even more satisfied with an additional CAM treatment. They will never know about other possibilities, as this option is not discussed with them because the patient is happy with the way things are. The role of the physician is crucial when it comes to informing patients. They decide what information they give to their patients and it is therefore up to them to see what a patient would like to know. This is a difficult task that has no right or wrong way. The most important aspect is that physicians look at what the patient wants to know and inform them accordingly, rather than making this choice for them. This could be achieved by keeping an open dialogue between patient and physician.

#### *Informed consent for both regular and alternative practices*

Both regular and alternative doctors should make use of informed consent. With the use of medication doctors inform their patients for example about possible side effects, what the risks are of (not) using medication and the dose they have to use. CAM practitioners should inform their patients for example about possible risks of their treatment, if there is any, and what they can expect from the treatment. Both doctors inform their patients about their own treatments, but little to nothing is said about the treatment option of one another. To make informed consent more inclusive for regular practices, doctors could inform their patients about possible risks and benefits of the alternative treatments. They can also inform their patients that there is not (enough) scientific evidence for it, but that there are patients who benefit from it. At the same time, doctors of alternative medicine could discuss with their patients if they understand that for example not

continuing with medication could cause harm to the patient. For both regular and alternative doctors it is important to know what treatment options the patient is using. This can prevent causing harm to the patient due to for example interactions between drugs and herbal medicines. Informing patients about both risks and benefits of regular and CAM methods is therefore essential for patients to make an informed decision about their treatment. To achieve this, regular doctors should have knowledge about possible CAM treatments and alternative doctors should have a basic knowledge about different types of medication. Patients can only be fully informed if both doctors, regular and alternative, have knowledge of their own treatment options as well as that of the other. The previously mentioned approach can help patients with the autonomous decision making process. Patients are allowed to make use of regular and/or alternative medicine. In both practices they can continue or stop a certain treatment, assuming that the patient is capable of making a certain decision on its own. If both regular and alternative doctors have the knowledge of different aspects of treating patients, regular and alternative, it then can help patients with their decision making progress. Advantages and disadvantages of all the possible treatment options can be compared with one another and based on this an autonomous choice can be made. This shows how important it is that patients get information about different treatment options. Not informing patients properly can eventually lead to a non-autonomous choice of treatment options, as patients do not get the chance to choose what they want when they do not know all the options. The patient's choice may not be the right option in the view of the physician. Nevertheless, physicians should respect their patients' choice to meet the ethical concept of respect for autonomy. A physician could share its concerns with their patients and inform them about drawbacks and risks they see in their patients choice. In the end, it is the competent patient that decides what shall be done with his/her body.

### *Inequalities between patients*

One aspect of the concept of justice that has already been discussed is that only people who have enough money can make use of CAM therapies, which creates inequalities between patients. Every patient should have access to CAM methods. However, these therapies are most of the time not reimbursed by insurance companies, which ensures that not every patient has CAM therapy as a treatment option. Therefore the treatment option for those patients is already decided based on their economic status, rather than on their personal choice. From an ethical point of view we can conclude that there is still room left for improvement. The reason why insurance companies do not want to reimburse these treatments is because they want to have scientific proof that these treatments work. The same applies for why a group of doctors are reluctant for these CAM methods. A solution to resolve the problem is to invest more money for research into CAM therapies. The amount of money that is being spent on the development of a new drug is between 314 million and 2.8 billion dollars [WML20]. For CAM research it is unknown what amount of money is being spent on this field. It could even be the case that there is no number because there is no money spent for CAM research. Here we see another inequality, because of the assumption that the amount of money being spent on regular medicine is much higher than the amount of money being spent on CAM research. By investing more money in research into CAM therapies, these methods can be scientifically proven, in which you solve two inequalities at once: the amount of money spent on research for regular and alternative medicine becomes more evenly distributed and both doctors and insurance companies could get the scientific proof they want. Another inequality between patients can occur when one doctor has knowledge about CAM therapies and another one does not. Hereby only patients who have a doctor with knowledge about CAM treatments are more likely to

hear about these treatment options. That means that not all patients are provided with the same information. There is not a simple solution, as not all doctors want to learn about CAM therapies and at the same time not all patients want to make use of CAM therapies. Matching doctors and patients who are both willing to discuss CAM treatments could be an option, but this is not a long term solution.

## 5 Website design

The language that has been used to create the website is HTML (Hyper Text Markup Language) and CSS (Cascading Style Sheets). Visual Studio Code is the program where the code has been written. HTML can be used to create web pages and is a standard markup language for it [W3S22b]. With HTML you create the structure of the web page, for example what text and images should be on your web page. CSS is used to style the elements that you added in your HTML [W3S22a]. Here you can think about font styles, colors, text sizes and image sizes.

The first thing that has been done to create the website is refreshing the knowledge about HTML and CSS. The text that had to be put on the website was already written beforehand. Also the structure of the website, for example menu sections, was already created on paper. The next step was to write the HTML and CSS code to actually create the website. It was important to have a good and clear structure for each web page. Therefore the Home page was created first. Font style, font sizes, colors, a menu, different heights and widths, images and many more aspects were made on the Home page. Once the structure of the Home page was finished, every other page could use the setup and structure of the Home page. That would ensure that every page had the same structure.

The title of the website is “Treatments for Crohn’s disease” with subtitle “Methods that you might or might not have heard about”. There are 6 different pages, namely Home, Diets, Microbiome, CAM methods, Tips and References. What can be found on each page will be discussed below.

**Home:** The home page first discusses why this website has been made. After that there is an explanation about CD. At the end of the page there is a personal story where you can read about my journey as a CD patient.

**Diets:** Different diet options are discussed on this page: the low-FODMAP diet, semi-vegetarian diet and the use of vitamin D. There is also an interview with Ben Witteman. Questions that were the most relevant for patients are chosen to put on the website.

**Microbiome:** The use of the microbiome for treating CD is discussed on this page. There is also an interview with the microbiome-center. Questions that were the most relevant for patients are chosen to put on the website.

**CAM methods:** 4 different CAM methods are discussed here, namely homeopathy, classical naturopathy, hypnotherapy and herbalism. An explanation about CAM is also given.

**Tips:** General tips and tips regarding friends & family, stress & sleep and food are given on this page. These tips are all meant for CD patients.



**References:** The references that are used to create the text on the website are stated here. Both scientific papers and websites can be found on the references page.

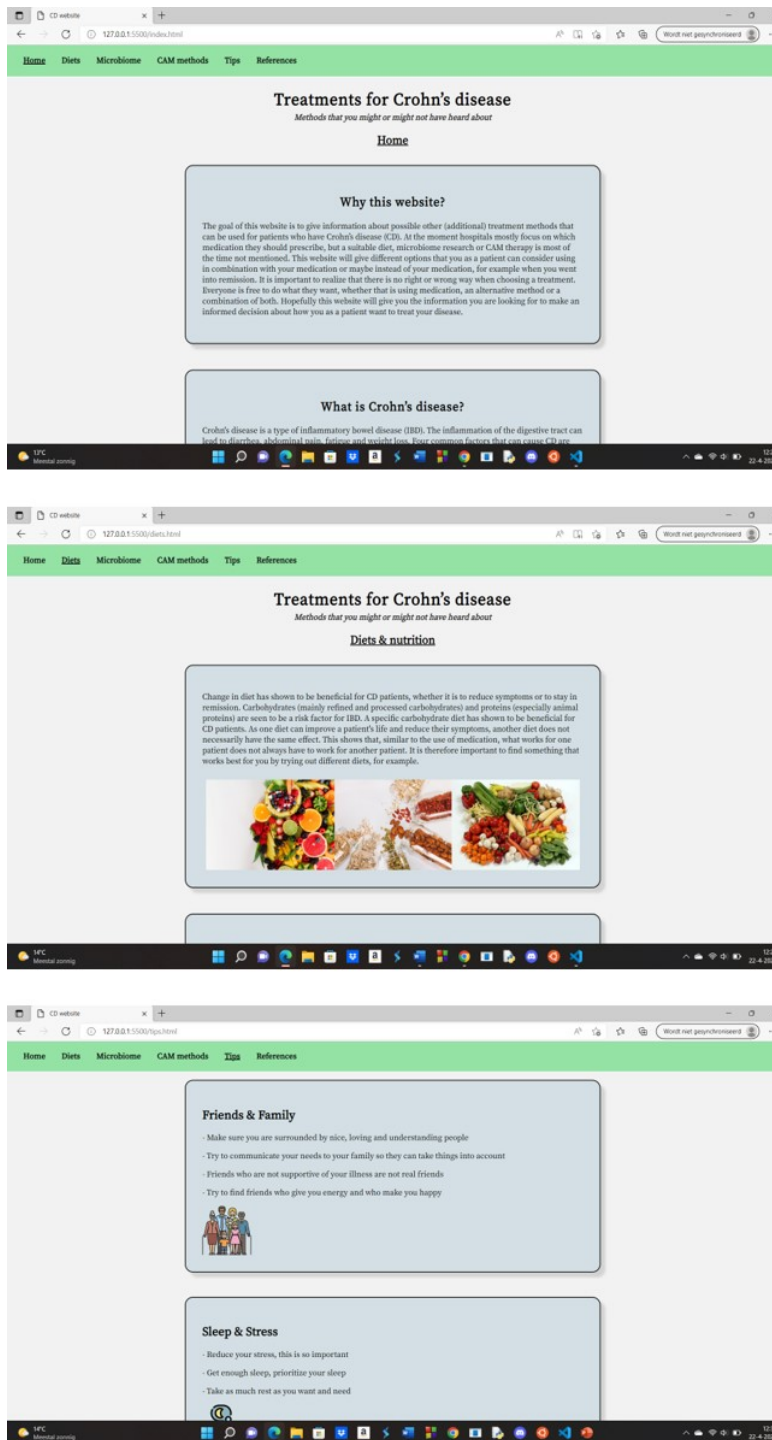


Figure 4: Examples of web pages of the website.

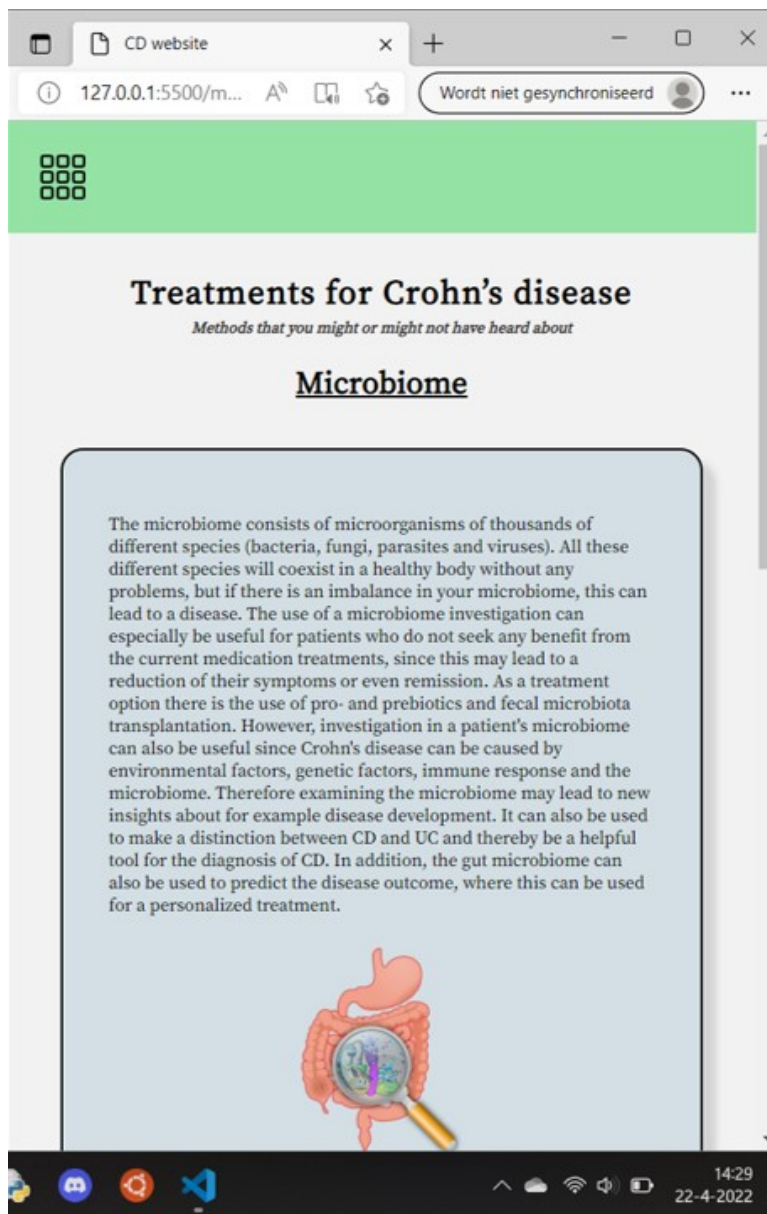


Figure 5: Example of a web page with a smaller window size.

Different page sizes are taken into account while creating the website. The menu changes when the size is too small to a folded menu that you can click on (see figure 5). Also text sizes, sizes of the boxes around the text and images change when you make the website bigger or smaller. The name of the current web page that you are on is underlined, so you can see which web page you are visiting (see figure 4). If you hover over the menu names, the color of the text changes.

The link to the website is: <https://aylin99aydin.github.io/>

## 6 Conclusions and Further Research

### 6.1 Possible solution for the inclusion of CAM in protocols for CD

Before discussing a solution that could make sure that every patient and physician is informed about CAM therapies, let us first look at the way most people think about CAM. Most of the time CAM is seen as an extraordinary treatment, something that is not immediately necessary for a patient and probably will not be beneficial. If we look a bit closer at for example suitable diets or the use of the microbiome, this definition becomes less accurate for CAM therapies. There are CAM methods that are beneficial for patients, especially when we look at for example a dietary change. Is it therefore fair to still look at CAM therapies as an alternative option on the regular medication treatment patients get in the hospital? Should the way we look at CAM not change from extraordinary to ordinary? The amount of IBD patients who are using it keeps rising and patients do experience positive effects from it. Therefore it may be time to start seeing CAM therapies as a good and useful addition to regular medicine. That being said brings us to the possible solution to inform everyone, patient and physician, about CAM therapies. There could be a standardized protocol that discusses different kinds of CAM therapies with its possible risks, benefits and efficiency. It should also state which CAM therapies can be used in combination with certain medications and which ones can not, to prevent interactions between one another. Another important aspect is that CAM should be discussed when informing patients about possible treatment options. Not only different medications but also different kinds of CAM methods should be discussed. Lastly, and maybe the most important point of all, is that regular and alternative practices should start working together. Everyone wants the best for their patients, but they all have different methods to achieve this. Collaboration of both fields can lead to better informed patients and treatments that are better tuned on each other. That will give patients the opportunity of getting the best treatment option that is possible.

### 6.2 New scientific method and additions to protocols

Two things are needed to make sure CAM is being included in mainstream healthcare. First of all, a new method has to be made to test CAM therapies and possibly achieve scientific evidence. Secondly, a protocol is needed that states how to inform patients about possible CAM therapies.

#### 6.2.1 New scientific method for CAM therapies

There have been several studies that indicated the need for a new way to investigate CAM therapies. They aim for a new research framework that could be used to generate evidence for CAM therapies. Since CAM is different from regular medicine, a new method is needed to conduct research in this area [FGW<sup>+</sup>07]. Also, it is of social importance to produce evidence for CAM therapies. Evidence for CAM may provide new health solutions and it can lower the cost of those therapies [dAAP18]. There have been suggestions for improving research on CAM, but here is no general research framework for CAM yet. Therefore, another way that could be used to validate CAM will be proposed below.

Probably the best way to find a common method that can test all different kinds of CAM therapies, even the more holistic ones, is to make use of patients' experiences. Data needs to be collected for different aspects of the different CAM treatments, here you can think about:

- Does the patient experience an effect?
- Is this effect a positive or negative effect?
- Does this method reduce symptoms?
- Are there side effects to this CAM treatment?

Based on the results that are collected from at least thousands of patients, a conclusion can be made on whether a certain CAM treatment works or is beneficial. To do this, there needs to be a standard protocol that decides when we can say CAM is useful and when not. If for example 80% of the patients report for homeopathy that they experience an effect and that 70% of this is a positive effect, then we could say that homeopathy is beneficial. This is just an example to illustrate how this new method could work. There are of course a lot more percentages needed to make a conclusion. It is also important to think about if one aspect should have a higher weight: is having a positive effect more, less or equally important as the reduction of symptoms, for example. Giving every aspect a weight based on its importance will in the end lead to a final percentage, let's say the 'CAM benchmark'. Beforehand it needs to be decided above what CAM benchmark a CAM treatment can be seen as effective and beneficial and below what CAM benchmark we can conclude that a certain method should not be advised to patients.

The previously mentioned method is different from the ones that are used for medication trials, but that is actually logical. CAM methods are most of the time different from medication treatments and therefore a same method to test both ways would not work. That is also what makes it hard to do scientific research for CAM, simply because the applied method is not suitable for this field. With this new method CAM treatments can be tested and a real number of quality (effectiveness, benefits) can be assigned to each treatment.

### **6.2.2 Protocol that describes how to inform patients about CAM therapies**

Besides introducing a new method to measure CAM treatments, it is also important that a protocol is made that states how physicians should inform their patients about CAM. The protocols are not intended to describe different CAM methods, for example how homeopathy or herbal medicine works. The reason for this is that every patient is different and especially with CAM treatments it is quite personal which method will work for a patient. Therefore the protocol needs to be focused on how to inform patients about different treatment options rather than telling them every detail about different CAM methods. It is of course useful that while informing patients both risks and benefits are discussed, but the emphasis should be on informing and not so much on every specific CAM method. There can be made a distinction between methods who have scientific evidence and methods who do not have scientific evidence. Both ways of informing patients will be discussed separately.

#### *Scientific evidence*

Assuming that there are CAM treatments who have a scientific proof, for example due to the new method described above, then informing patients about CAM is quite easy. The role of the physician is to include information about CAM while discussing possible treatment options. Normally only medication options were discussed, but with this new protocol CAM should also be discussed. Physicians should inform their patients about both fields, which methods can be combined and which not, and possible risks and benefits. This will ensure an informed choice from the patient

about their treatment option, as they will be informed about medication options, CAM treatments and the combination of both.

### *No scientific evidence (yet)*

The way patients get informed about CAM treatments that have no scientific evidence looks a lot like the method described above for CAM treatments with scientific evidence. Here physicians should give extra information to the patient about the fact that there is no proof (yet) for these kinds of treatments. You can think about telling patients that there are other patients who make use of CAM therapies, that there are patients who benefit from certain treatments and the different risks and benefits of these treatments. By doing this, patients will always be informed about CAM methods, whether there is evidence for it or not. This ensures that patients will always be fully informed about possible treatment options and if there is proof that these treatments work or not. Based on the whole story an informed treatment option can be made by the patient.

## **6.3 Making use of media power**

A new scientific method and adjustments to the current protocols is something that will take a long time before these two aspects will be considered. Therefore a short and effective way is also needed to reach people about CAM. The best way to do this is to make use of today's media power, for example social media, youtube and blogs. The goal of this approach is to inform people about CAM and its possibilities in an accessible way so that it is understandable for everyone. CAM practitioners could make videos where they talk about their methods and the possibilities of their treatments. Patients who have experience with the use of CAM could write pieces about their experiences and the effectiveness of the treatments they use. A blog could be made to give an overview to patients about CAM treatment based on other patient's experiences. The website (see section 5) could also be used to inform patients about other treatment possibilities, such as diets, the microbiome and CAM methods.

Whatever methods are chosen to make CAM more known among people, the most important thing is that people start talking about CAM therapies. The shame or taboo that patients sometimes experience when talking about CAM needs to make room for an open debate and clear communication. By informing people about CAM in an easy and understandable way, the gap between these two sides, say CAM users and non-CAM users, hopefully will vanish.

## **7 Discussion**

The different protocols that are used for the treatment of CD mainly focus on the use of regular medicine and not on possible other additions [TBD<sup>+</sup>19]. As we have seen, diets and the microbiome could play an important role in getting symptoms under control and help patients to stay in remission. These two main methods are still seen as 'alternative', or even as a CAM method. It is therefore not surprising that the protocols state that changing a patient's diet will not help, but we have seen that this is not always the case. The interview with Ben Witteman for example shows that a dietary change does help patients. It may be different when we look at the microbiome, as there is still much research going on in this field, but the results are promising. As the interview with the microbiome showed, investigation in one's microbiome could help reduce additional symptoms such

as skin complaints. Is it, when we have seen that there are other methods that are beneficial for patients, still justified to not include these methods in the current protocols? Or should patients at least be informed about these methods? We have to look at what does help patients instead of only focussing on what is written in the protocols. The use of medication does not always have to be the only solution to get CD under control. Therefore additional methods should be considered for the treatment of CD. We have also seen the ethical aspects of the use of CAM therapies. Here we can say that every treatment that is beneficial for a patient, with or without scientific evidence, should be considered to be used to treat patients. It can be a dietary change, which is for most doctors close to 'regular medicine', but it could also be a CAM treatment. Besides the consideration to use these different treatment options that are not included in the protocols, the most important aspect is that patients get well informed about the different options. Medication can help patients, reduce symptoms and help to stay in remission, but that can also be the case for CAM therapies. Especially the combination of regular and CAM treatments can lead to great results.

Unfortunately it is still difficult to change the current protocols. One aspect that can make the research into CAM therapies hard is the absence of a placebo. With regular medicine, you have a group that gets the tested medication and a group that gets the placebo [Moe02]. For alternative medicine it is not that easy to define the placebo group. For example, doing yoga or meditation can be seen as the test group, but what will be the placebo here? Patients not doing yoga or meditation? It may be easier to define a placebo if the patient is given something, such as probiotics. But it may still be hard to draw a conclusion based on someone getting or not getting something. Also, alternative medicine is most of the time really personal. Therefore testing certain practices can be hard, as one patient might react well to herbal medicine, where another patient might notice a better effect of the use of hypnotherapy. It may even be that research into certain methods is so difficult that no evidence will ever be found. That is another drawback of including CAM into mainstream healthcare. It may take a while to do proper research into CAM methods. Therefore we have to argue what to do with methods without scientific evidence until then.

For the future, when there are scientific methods that can test CAM therapies, the conclusion can be the following. The protocols for CD have to change from only focussing on the use of medication and surgery to a wider applicable protocol. Hereby a dietary change, the microbiome and different CAM methods should be included. That will give patients the opportunity to choose the treatment, regular or alternative, they want to use for their disease.

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