EDZARD ERNST

ALTERNATIVE MEDICINE

A CRITICAL ASSESSMENT OF 202 MODALITIES

Second Edition

Springer

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Edzard Ernst
Cambridge, UK

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To Danielle

Preface to the Second Edition

Alternative medicine is full of surprises. For me, a big surprise was that the first edition of this book was so successful that I was invited to do a second one. I do this, of course, with great pleasure.

So, what is new? I have made two main alterations. Firstly, I updated the previous text by adding new evidence where it had emerged. Secondly, I added many more modalities—52, to be exact.

To the best of my knowledge, this renders the new edition of this book the most comprehensive reference text on alternative medicine available to date. It informs you about the nature, proven benefits, and potential risks of 202 different diagnostic methods and therapeutic interventions from the realm of so-called alternative medicine. If you use this information wisely, it could save you a lot of money. One day, it might even save your life.

I hope you enjoy using this book as much as I enjoyed writing it.

Cambridge, UK
May 2022

Edzard Ernst

Preface to the First Edition

In their now famous editorial of 1998, Angell and Kassirer concluded that "It is time for the scientific community to stop giving alternative medicine a free ride. There cannot be two kinds of medicine—conventional and alternative. There is only medicine that has been adequately tested and medicine that has not, medicine that works and medicine that may or may not work. Once a treatment has been tested rigorously, it no longer matters whether it was considered alternative at the outset. If it is found to be reasonably safe and effective, it will be accepted. But assertions, speculation, and testimonials do not substitute for evidence. Alternative treatments should be subjected to scientific testing no less rigorous than that required for conventional treatments."[1]

Twenty years later, alternative medicine remains popular, and assertions, speculation, and testimonials still substitute for evidence. We are still being inundated with misleading advice, biased opinions, uncritical evaluations, commercially driven promotion and often even fraudulently wrong conclusions. Consequently, consumers find it hard to access reliable data. As a result, they often make misguided, sometimes even dangerously wrong decisions.

I have researched alternative medicine for more than 25 years. Through this work, I have gathered a wealth of knowledge, facts, and experience. In this book, I have summarised the essentials into an easily accessible text. My book offers an introduction into the most important issues around alternative medicine as well as a concise, evidence-based analysis of 202 alternative therapies and diagnostic techniques.

Such information is surely a good thing, but it should nevertheless come with a warning: it will not please everybody! If you are a believer in alternative medicine who does not care about the facts, or an enthusiast for whom alternative medicine has become some sort of a religion, or a person who thinks that science is less important than anecdote, you better return this book to its shelve; reading it will only disquiet you.

[1] http://www.kitsrus.com/pdf/nejm_998.pdf.

If, however, you are looking for the facts about alternative medicine, trust in science, prefer critical assessment to commercial promotion, it might well be a book for you.

I hope that you belong to the latter group and trust this book will assist you in making the right therapeutic decisions for yourself and your family.

Cambridge, UK
November 2018

Edzard Ernst

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1.1 Introduction

In most countries, alternative medicine is popular (Fig. 1.1), and there are hundreds, if not thousands of books on the subject. I have not read them all, of course, but those two or three hundred that I did study were full of uncritical promotion of bogus, potentially harmful treatments. In case you suspect that this might be an exaggeration, I should tell you that my team once studied 7 bestselling books on alternative medicine in detail. We found 35 conditions for which more than 50 different alternative treatments were recommended by the authors; the worst was cancer for which 133 different alternative therapies were recommended. Needless to say that only very few of these treatments were supported by good evidence.[1] This level of misinformation is surely intolerable: it misleads consumers into making wrong therapeutic decisions, wasting their money, and—in extreme cases—putting their life in danger.

I cannot guarantee that you will like my book, but I can assure you that it will be evidence-based, critical, and honest.

1.2 The Aim of The Book

Alternative medicine is a vast and often confusing subject. It includes a plethora of different therapies and many diagnostic methods. Even though they all fall under the umbrella of alternative medicine, they have little in common. They all have a different history, make different assumptions, and are supported by different evidence of different quality. Any judgement on, or evaluation of alternative medicine as one single entity is therefore quite simply impossible.

[1] https://www.amazon.co.uk/Desktop-Guide-Complementary-Alternative-Medicine/dp/0723433836/ref=sr_1_1?ie=UTF8&qid=1543598976&sr=8-1&keywords=desktop+guide+to+complementary.

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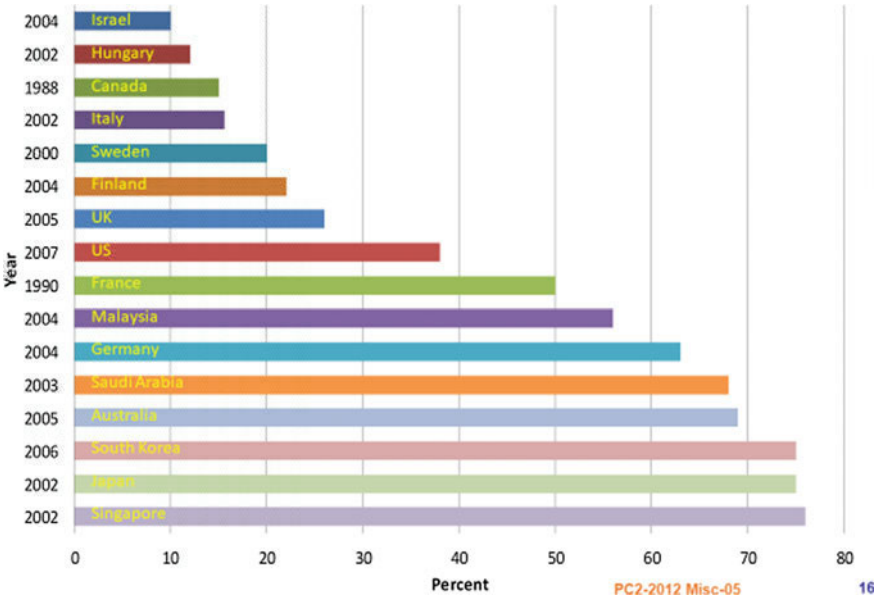

Fig. 1.1 One-year prevalence of alternative medicine in different countries according to surveys on representative samples of the general population; the numbers refer to the years of publication

We must assess every modality on its own merits. And, to be reliable, our assessments must be based on a critical evaluation of the best available evidence. If there is contradictory evidence—as is often the case—we must assess the totality of the reliable studies. And if there is seemingly positive evidence that, however, is seriously flawed and thus unreliable, we should be cautious. Such assessments are by no means a small task. To the best of my knowledge, no book has so far provided a concise yet comprehensive, critical yet fair summary of the evidence that is easily accessible to a lay-person. My aim is to fill this gap.

1.3 About the Author

Am I up to such a task? Can you trust my evaluations? These are, of course, justified questions; let me try to answer them by giving you a brief summary of my professional background and by explaining my previous involvement in alternative medicine.

I grew up in Germany where alternative medicine is widely used. Our family doctor was a prominent homeopath, and alternative medicine was an entirely normal form of healthcare for me. It was only when I studied medicine that I began to understand some of the differences between conventional and alternative healthcare.

My first job as a junior doctor happened to be in a homeopathic hospital and, early on in my professional career, I learnt how to employ a range of alternative

techniques. Later, I became a conventional doctor, immersed myself for several years into basic research, did a PhD, returned to clinical medicine, and became professor of rehabilitation medicine first in Hanover, Germany, and then in Vienna, Austria. During all these years, I kept an interest in alternative medicine and when, in 1993, the opportunity presented itself, I took the Chair in Complementary Medicine at the University of Exeter. In this capacity, I built up a multidisciplinary team of about 20 researchers conducting research into all sorts of alternative modalities. After 19 years, I retired and am now an emeritus professor at the University of Exeter. This means that I have:

- experienced alternative medicine as a patient,
- practised alternative medicine as a clinician,
- researched alternative medicine as a scientist.

I should perhaps also mention that I have published more peer-reviewed articles on the subject than anyone on the planet (sounds pompous, but it's true), and that, contrary to many authors of books on alternative medicine, I have no conflicts of interest (sounds unlikely, but it's also true).

Yet, this does not mean that I have not been accused of being biased; and to some extent, I probably am. I trust in science, want to see reliable evidence, hope to improve healthcare, insist that patients deserve the best treatments available, and feel that ethics are of paramount importance in any type of healthcare. If I am honest, I also do not like charlatans, liars, or entrepreneurs selling false hope. If that makes me biased, so be it!

1.4 About the Book

When writing a book that covers 202 modalities (I use this term to capture both alternative therapies and alternative diagnostic methods), one is in danger of creating a colossal volume that few consumers would ever want to look at. I therefore decided to restrict myself to the bare minimum.

In part 1 of the book consists of 6 introductory chapters that will be helpful for understanding some of the issues around alternative medicine. Part 2 of the book the offers 202 short reviews each of which is focussed on one specific modality. This section is divided into 4 chapters according to the nature of the modality. Below the title of each of the short chapters, there is a list of related modalities which are discussed as separate short chapters of this book.

The choice of subjects included in part 2 was guided mainly by popularity. My aim was to cover as many modalities known to the public as possible, plus a few therapies that are of interest because they are unique or exotic. To keep the reviews as concise as possible, I summarised each modality by making just seven short points. They differ from modality to modality and are meant to tell you what matters most in relation to each of them. My ambition was not to provide exhaustive information on

each modality, but to give a flavour and offer enough evidence for making informed decisions and perhaps encourage further reading.

As I wanted this book to be as evidence-based as possible, I needed to supply references to the most relevant research articles. Here too, I decided to restrict myself to the bare maximum. This restriction frequently meant omitting important references, focussing occasionally on my own research, and merely citing the most reliable reviews.

To make things more uniform and as clear as possible, I concluded each of the short reviews with this standard table.

PLAUSIBILITY
EFFICACY
SAFETY
COST
RISK/BENEFIT BALANCE

These five criteria require some explanation:

- PLAUSIBILITY addresses the question whether the basic assumptions on which the modality is based are in line with the laws of nature and our established knowledge of the human body. For instance, the notion of reflexologists that specific areas on the soles of our feet correspond to specific organ systems cannot be called plausible, because it contradicts the basic facts from anatomy and physiology. By contrast, the notion that herbal remedies are effective is plausible, because plants do contain lots of chemicals which might have pharmacological activity.
- EFFICACY deals with the question whether, according to the published evidence, a modality works or not. In the case of a therapy, the question usually is, does it work better than a placebo? As a treatment might be efficacious for one condition but not for others, the decision is not always straight forward. When evaluating the published evidence, it is, of course, important to consider the quality of the published studies. This is not always an easy task, but many years of experience have enabled me to reliably spot poor research and pseudoscience. It is thus possible that for a given modality positive evidence does exist and I nevertheless arrive at a negative verdict based on the fact that the evidence is less than reliable.

In the case of a diagnostic method, the question is whether it is useful for identifying a disease. It is important to remember that a modality which is not supported by reliable evidence can only be characterised as being not of proven efficacy. In the tables, they must therefore be rated as “negative”.

- SAFETY addresses the question whether the modality per se can do any harm. In the short reviews, I usually omit all indirect risks of alternative medicine. Yet, such indirect risks can be significant, for instance, if an alternative therapy is promoted as an alternative treatment in a case of serious disease. These indirect risks are discussed in some detail in part 1 of this book.

- COST provides an estimate on the expense associated with using the modality. In making these estimates, I also considered whether a therapy usually requires more than one session which would, of course, increase the total expense.
- RISK/BENEFIT BALANCE combines the issues of efficacy and safety by assessing whether the modality in question generates more good than harm. When considering such verdicts, it is crucial to remember two things. Firstly, the risk/benefit balance cannot be positive, even for a totally harmless therapy, if that therapy has not been documented to be efficacious. Secondly, in routine healthcare, it is generally wise to only employ treatments which have a clearly positive risk/benefit balance.

With these tables, I attempt to offer my assessments by using just three very simple grades:

- positive 
- debatable 
- negative 

On the one hand, such simplicity is desirable for accessibility and easy reading. On the other hand, it does not allow much subtlety and nuance. When making these judgement calls, I often had to rely on more evidence than I was able to cite in the text. Therefore, they represent my overall assessments based on the collective evidence from 30 years of research.

The tables are meant to complement the text; together they should give you a quick and reliable idea whether the modality in question might be of any value for you. As mentioned, all my assessments are based on critical evaluation of the published evidence. Some readers might feel that I judged their favourite therapy too harshly. Others will no doubt get the impression that I was too lenient. My aim was to be consistently critical but not dismissive.

It is nevertheless important to realise that my guidance cannot be absolute. I am only able inform you about what the evidence tells me. I do not know your precise circumstances nor your preferences. My book is therefore not meant as medical advice on specific conditions and treatments.

1.5 How to Make the Best Use of This Book

I recommend you take your time to familiarise yourself with the concept of this book. Even though the chapters are written such that they can stand alone, it might be best to first read part 1 in its entirety. This should enable you to develop a good understanding of alternative medicine and the sometimes-confusing issues that it

involves. Subsequently, you might look up the therapies and diagnostic methods that you have used, are tempted to employ or simply have an interest in. I tried not to use technical jargon, yet occasionally I had to employ some terms that might not be familiar. For this reason, I included an extensive glossary where you will find useful explanations for terms that might be unfamiliar.

I stress again that my evaluations are deliberately critical and never promotional. I feel that consumers are already swamped with such an abundance of uncritical promotion of useless and even dangerous treatments. Therefore, a critical stance is badly needed. I am convinced that this approach is the best way to assist you in finding your way through the disorientating maze of misinformation that all too often characterises the realm of alternative medicine.

Chapter 2
Why Evidence?

2.1 Experience Is Good, but It's not Evidence

Clinicians as well as their patients often feel quite strongly that their daily experience tells them about the efficacy of their interventions. If patients get better, they assume this to be the result of their treatment. I do sympathise with this notion, not least because it prevents practitioners from losing faith in their own work and it makes patients trust their therapists. But is the assumption really correct?

The short answer is NO. Two events [the treatment administered by the clinician and the improvement experienced by the patient] that follow each other in time are not necessarily causally related. The crowing of the cock is not the cause of the sun rising at dawn. We all know that, of course. So, we ought to consider alternative explanations for a patient's improvement after therapy.

Even the most superficial glance at the possibilities discloses several options:

- the natural history of the condition (most conditions get better, even if they are not treated at all),
- regression towards the mean (outliers turn out less extreme when we check them again),
- the placebo effect (expectation and conditioning affect how we feel),
- concomitant treatments (people often take more than one treatment when ill),
- social desirability (patients tend to claim they are better simply to please their therapist).

These and other phenomena (Fig. 2.1) can determine any clinical outcome in such a way that inefficacious treatments appear to be efficacious. For instance, an ineffective treatment given for a cold that has run its course could give the impression that a useless therapy taken at this stage had been effective.

It follows that the prescribed treatment is only one of many factors affecting the clinical outcome. Thus, even the most impressive clinical experience of the perceived effectiveness of a treatment can be totally misleading. In fact, experience might just

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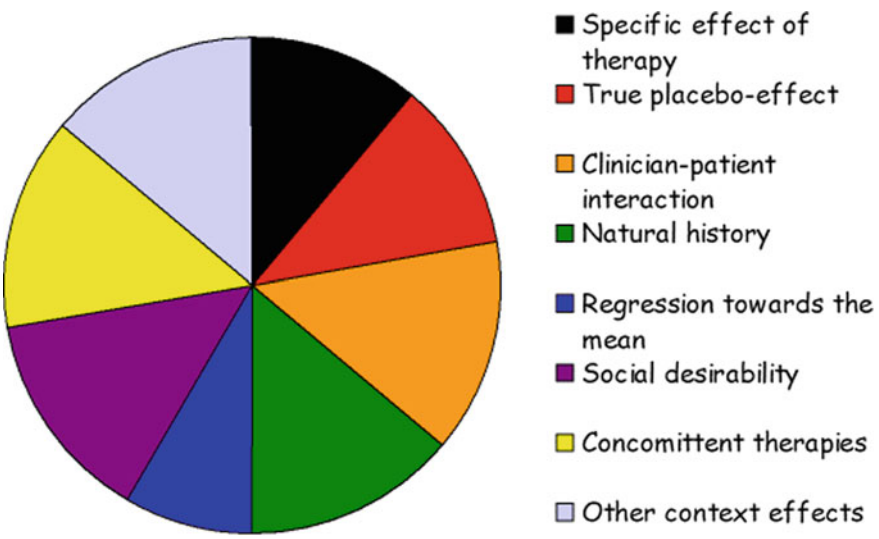

Fig. 2.1 Various phenomena that can contribute to the perceived therapeutic effect of a treatment. *Source* E Ernst

reflect the fact that we tend to repeat the same mistakes over and over again. Put in a nutshell: the plural of anecdote is anecdotes, not evidence.

Some people get upset when someone tries to explain to them how complex the situation really is, and how little their experience reveals about the efficacy of the treatment they selected. Here are seven arguments (together with the counter-arguments) they often produce:

(1) The improvement was so prompt that it was obviously caused by my treatment [this notion is unconvincing, since placebo effects and other phenomena can be just as prompt and direct].
(2) I have seen it so many times that it cannot be a coincidence [some clinicians are very charismatic; they will thus regularly generate powerful placebo responses].
(3) A study with several thousand patients shows that 71% of them improved after receiving that treatment [such response rates are not uncommon, even for ineffective treatments, if patient expectation was high].
(4) Surely chronic conditions don't suddenly get better; my treatment therefore cannot be a placebo [this is incorrect, most chronic conditions eventually improve, if only temporarily].
(5) I had a patient with a serious condition (e.g. cancer) who received my treatment and was cured [if one investigates such claims, one often finds that the patient also had conventional treatments; also, in rare instances, even cancer patients experience spontaneous remissions].

(6) I have tried the treatment myself and had a positive result [clinicians are not immune to the multifactorial nature of the perceived clinical response outlined above].
(7) Even children and animals respond to my treatment; surely, they are not prone to placebo effects [animals can be conditioned to respond; and then there is, of course, the natural history of the disease, as mentioned above].

Does this mean that clinical experience is useless? Clearly not! But when it comes to defining therapeutic effectiveness, clinical experience can be no replacement for evidence. It is invaluable for a lot of other things, but it provides us with a mere suggestion that the therapy in question might be effective.

2.2 What Is Evidence?

As the clinical outcomes after treatments have many causes, we need a different approach for verifying therapeutic effectiveness. Essentially, we need to know what would have happened, if our patients had not received the treatment in question.

The multifactorial nature of a clinical response requires accounting for all the factors that might determine the outcome other than the treatment per se. Ideally, we would need to create an experiment where two groups of patients are exposed to the full range of these factors, and the only difference is that one group does receive the treatment, while the other one does not. This is precisely the model of a controlled clinical trial.

Controlled clinical trials are designed to minimise all possible sources of uncertainty about what might have been the cause of the observed effect. They have, as the name says, a control group which means that we can, at the end of the treatment period, compare the effects of the treatment in question with those of another intervention, a placebo or no treatment at all.

Many different variations of the controlled trial have been developed so that a study can be adapted to the requirements of the treatment under scrutiny and the specific research question at hand. The over-riding principle is, however, always the same: we want to make sure that we can reliably determine whether the treatment was the cause of the clinical outcome.

Causality is the key in all of this; and here lies the crucial difference between clinical experience and scientific evidence. What clinicians witness in their routine practice can have a myriad of causes; what scientists observe in a well-designed trial is most likely caused by the treatment. The latter is evidence, while the former isn't.

But clinical trials are rarely perfect. They can have many flaws and have rightly been criticised for a plethora of inherent limitations. Yet, despite all their shortcomings, they are far superior than any other method for determining the efficacy of medical interventions; they are, so to speak, the worst kind of evidence, except for all other types.

To be extra sure that a finding is reliable, we should not rely on the findings of one single study. Independent replications are usually required before we can be reasonably sure. Unfortunately, the findings of these replications do not always confirm the results of the previous study. Whenever we are faced with conflicting results, it is tempting to cherry-pick those studies which seem to confirm our prior belief—tempting but very wrong indeed! To arrive at the most reliable conclusion about the effectiveness of any treatment, we need to consider the totality of the reliable evidence. This goal is best achieved by conducting what experts call a "systematic review".

In a systematic review, we assess the quality and quantity of the available evidence, try to synthesise the findings, and arrive at an overall verdict about the effectiveness of the treatment in question. Systematic reviews and meta-analyses [these are systematic reviews where the data of individual studies is pooled mathematically] constitute the best, i.e. most trustworthy, evidence for or against the effectiveness of any treatment. In this book, I will, whenever possible, depend on this type of evidence and provide references of the original articles.

2.3 Why Is Evidence Important?

In a way, this question has already been answered: only with reliable evidence can we tell with any degree of certainty that it was the treatment per se—and not any of the other factors mentioned above—that caused the clinical outcome we observe on ourselves or on others. Only if we have such evidence can we be certain about cause and effect. And only then can we make sure that patients receive the best possible treatments currently available.

But there are those who say that causality does not matter all that much. What is important, they claim, is to help the patient. If it was a placebo effect that did the trick, who cares?

While this argument sounds empathetic, there are many reasons why this attitude is deeply misguided. To mention just one: we all agree that the placebo effect can benefit many patients, yet it would be wrong to assume that we need a placebo treatment to generate a placebo response. If a clinician administers an efficacious therapy [one that generates benefits beyond placebo] with compassion, time, empathy, and understanding, she will generate a placebo response **plus** a response to the therapy administered. In this case, the patient benefits from two elements:

- from the placebo effect,
- and from the specific effect of the prescribed therapy.

It follows that, merely administering a placebo is less than optimal; in fact, it usually means preventing the patient from benefitting from the effect of an efficacious therapy. In other words, it is not in the best interest of the patient.

Some also claim that there are many patients who are ill without an exact diagnosis and who therefore cannot receive a specific treatment. This may be true, but even

those patients' symptoms can be alleviated with an effective symptomatic therapy. The administration of an ineffective treatment is surely not preferable to using an effective symptomatic therapy.

2.4 When Do We Have Enough Evidence?

Most research papers end with a sentence stating that more research is needed. In many cases, this is true. But there are exceptions. When is the existing evidence sufficiently compelling for making reasonable therapeutic decisions? This is a question that is relevant to much of alternative medicine. Take homeopathy, for instance; how much more negative data do we need to concede that highly diluted homeopathic remedies do not work beyond placebo?

In my view, it is foolish, wasteful and therefore unethical to fund, plan, or conduct further research in areas where there is no or just minimal chance of rigorous investigations finding a positive result. In alternative medicine, this is frequently the case.

2.5 Conclusions

Helping the patient is the most important task of any clinician. This goal is best achieved by maximising the non-specific effects [e.g. placebo], while making sure that the patient also benefits from the specific effects of what medicine has to offer. If that is our aim, we need reliable evidence and experience.

Evidence without experience is just knowledge. Experience without evidence does not make good medicine and is often the hallmark of quackery. With my book, I cannot hope to transmit experience, instead I intend to inform you regarding the evidence. Whichever way you want to look at it, evidence is an essential precondition for making sound decisions. This book offers a systematic evaluation of the evidence as it applies to alternative medicine.

Chapter 3
The Attractiveness of Alternative Medicine

Alternative medicine is attractive to many customers; the amount we currently spend on it provides ample proof. By 2025, we are predicted to spend just short of US$ 200 billion worldwide on alternative medicine, and most of this sum comes directly out of the consumer's pocket.[1] Such a figure begs the question as to the reason for the extraordinary attractiveness of alternative medicine. In this chapter, I will discuss some of them and assess their validity.

3.1 Alternative Medicine Is Effective

The most obvious attraction of any therapy would be its effectiveness. Patients use a medical treatment because they are ill and hope for a cure. So, is alternative medicine effective? As we are dealing with a plethora of different modalities, the answer will differ for each of them. Therefore, I will not attempt to address it here, but refer you to part 2 of this book where it will be evaluated for each treatment separately based on the most reliable evidence available to date.

At this point, it seems important to note that the attractiveness of alternative medicine can instantly turn into the opposite when the hope invested in it is betrayed. Once we realise that a frequently made claim is untrue, our attraction to it is likely to change into the opposite. If, for instance, we find that therapeutic claims made for an alternative medicine are false or even fraudulent, we are no longer attracted but put off by it. This remarkable reversal of attractiveness into unattractiveness is a phenomenon that will a constant companion in this chapter.

[1] https://www.prnewswire.com/news-releases/alternative--complementary-medicine-market-worth-19687-billion-by-2025-grand-view-research-inc-619591673.html.

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3.2 Alternative Medicine Is Risk-Free

The belief that alternative medicine is risk-free is wide-spread and attracts many consumers. Anyone who goes on the Internet or reads a book about alternative medicine will be bombarded with this message. "Alternative medicine is gentle and harmless, pleasant and holistic, agreeable and relaxing. Contrary to conventional medicine, it has an unblemished safety record. Adverse effects are a problem of synthetic drugs and not of alternative medicine." These are just some of the notions we hear regularly. They are undoubtedly well suited to boost the alternative medicine businesses. Yet, they have one crucial disadvantage: they are not true!

In part 2 of this book, we will see that many alternative therapies can cause direct adverse effects. To mention just a few:

- Acupuncture might cause infections and organ injuries followed by deaths.
- Alternative diets can cause malnutrition.
- Aromatherapy could cause allergic reactions.
- Chiropractic and osteopathic spinal manipulations can cause strokes followed by deaths.
- Colonic irrigation may cause a perforation of the colon.
- Herbal remedies might cause liver damage or interact with prescription drugs.

In conventional medicine, stringent mechanisms are in place to monitor adverse effects of drugs. Thus, action can be taken, once serious problems emerge (it is because of such safe-guards that drugs are withdrawn from the market with some regularity). Remarkably, nothing remotely similar exists in the realm of alternative medicine. This is why we currently have only scant data on problems caused by alternative medicine; and the few reports that do get published depict almost certainly only the tip of a much bigger ice-berg.

Because the specifics of **direct** risks depend entirely on the treatment in question, they will be discussed in the short chapters of part 2 dedicated to specific modalities. Here I intend to focus on the **indirect** risks of alternative medicine. Indirect risks are not caused by the treatment itself but arise in the context in which therapy is given. If, for instance, a completely harmless but ineffective alternative treatment replaces a vital conventional one, the harmless therapy becomes life-threatening. Proponents of alternative medicine tend to claim that this situation hardly ever arises. Sadly, this claim is false.

To explain this more clearly, I invite you conduct a little thought experiment: picture 10 groups each of 100 patients suffering from the following conditions:

- cancer
- AIDS
- Ebola
- sepsis
- tuberculosis
- multiple sclerosis
- coronary heart disease