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# Comparative analysis of cost-effectiveness of non-drug medicine (non-pharmaceutical holistic, complementary and alternative medicine/CAM) and biomedicine (pharmaceutical drugs) for all clinical conditions

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***Abstract:*** *Aim*: To compare the cost-effectiveness of CAM (non-drug talk touch therapy) and biomedicine (pharmaceutical drugs) for all clinical conditions. *Method*: Calculating cost per cured patient with physical, mental, existential and sexual health issues, year 1-50 for most efficient CAM treatments aneutical: NNT = 5-50). The cost of one year of short-term therapy (20 sessions) and drugs was 2,000€ and 2,000€ respectd most efficient pharmaceuticals. Mean NNT (number needed to treat) numbers were used (CAM: NNT = 2-6, pharmacively. *Results*: We found CAM to be 100 (10-500) times as cost-effective as pharmaceutical drugs for most clinical condition. The 50 years estimated cost for one patient cured was for: drugs 1,000,000€; physical therapy 100,000€; psychotherapy 200,000€; mind-body medicine 100,000€; holistic mind-body medicine 30,000€; one-session shamanistic healing with hallucinogenic drugs 2,000€. A large number of clinical conditions could be cured with CAM but not with drugs, which mainly only reduced symptoms. CAM is more efficient than drugs and has no side (adverse) effects and events, whereas treatment with drugs almost always has many often severe adverse effects and events. *Interpretation*: Drugs turn patients into chronic patients instead of curing. Half the population of the western world today is chronically ill, seemingly because of national health organ's preference of biomedicine instead of CAM. The shift from drugs to CAM would improve health radically in the society and reduce the cost of healthcare to a small fraction. Strict laws should be introduced immediately in all countries to stop pharmaceutical industries from promoting drugs without evidence of long term effect and from repressing CAM.

***Keywords:*** CAM, quality of life, holistic medicine, mind-body medicine, biomedicine, non-drug medicine, side effects, adverse effects, medical politics, law, all clinical conditions

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## INTRODUCTION

The cost-effectiveness of medicine has become an important issue as the prize of biomedicine in many countries has become an enormous economically burden. In countries with socialized medicine, bio-medicine is often the dominating kind of medicine for a population, where half the citizens are being chronically ill (1). Despite free medical care and massive and continuous treatment of a huge fraction of the Danish population with drugs for over 40 years, 25% of the population is chronically mentally ill, and 40% of the patients are chronically physically ill, with about half of the mentally ill patients also having some physical chronic disorder, typically chronic pain, presumably of psychosomatic origin.

Critiques have suggested that the deteriorating health intensifies the use of drugs, which again seem to deteriorate health (2,3). Some have even insisted that the national health services are creating a huge problem for the whole society that can be solved only with a sharp analysis of which kinds of medicine really provides health for the money (4).

The national cost of the pharmaceutical drugs had been doubling every five years for two decades in Denmark (5) and many other European countries, with a development that seems to continue. Therefore less

expensive holistic, complementary and alternative (CAM) treatments have become the focus of attention, as these treatments might be more cost-effective than biomedicine (6). It is well-known that many kinds of CAM are not very efficient, like acupuncture for cancer, but still the cost might be so small that even a small positive effect will make it more cost-effective than even the best surgery or chemo-therapy, which is very expensive and little productive in most metastatic cancers. Most unfortunately, very few studies have been performed in this field, rendering us with almost no data about the actual situation for most types of CAM for most clinical conditions.

Fortunately a number of reviews have recently documented that some types of CAM, especially mind-body medicine, are highly cost-efficient compared with biomedicine (7,8), and completely without the many serious side (adverse) effects and adverse (negative) events that often follows treatment with drugs (6-22). These reviews have encouraged us to make the present comparative analysis of the cost-effectiveness of CAM and biomedicine.

**THE POLITICAL SITUATION AROUND CAM**

The kind of holistic medicine we have in Europe is developed from the classical medicine inherited from Hippocrates and his students (23). For more than 2000 years, European doctors used this kind of consciousness oriented "character medicine" using almost exclusively talk and touch for therapy and no drugs. Medical herbs were used but only externally like in aromatic massage oils and in ingenious and strangely creative cures like smoking the female genitals for energetic purification. The physician gained great fame and respect, the same way as the Native American medicine man, the African Sangomas, the Samic Shamans, the Celtic druids and witches, and the Australian aboriginal healers gained fame and respect in their cultures (24). The methods of all pre-modern medical cultures seem to be essentially identical in intervening on and developing the patient's consciousness and insight in self and reality (25,26).

First with the development of organic chemistry and biochemistry and then the following industrial revolution, pure drugs became available and soon began the search for efficient drugs, which in about 1950 led to the discovery of penicillin. This drug boosted the belief in the 'magic bullet' and started a whole industrial adventure of developing all kinds of pharmaceutical drugs, and soon the pharmaceutical industry gained money and power. Later much of the money from the tobacco industry and weapons industry found its way to the pharmaceutical industry, making this the leading industry of the world today.

Most unfortunately for CAM, biomedicine seems to have taken the threat from alternative medicine very seriously, and CAM therapists and researchers have for the last 30 years been challenged by attacks from what have been called the industrial-medical complex, where industry and doctors are working closely together to promote biomedicine and to repress CAM (27,28).

The efficacy by which CAM has been repressed and biomedicine promoted as a consequence of the competition between the most powerful industry on one side and physicians and therapists using and developing non-drug medicine on the other seems to be exactly as could be expected from the power of the political and financial forces of the capitalistic western society (2,29). Doctors have been prosecuted just for writing books that documented these powers in action, with Guylaine Lanctŏt being a well-known example (4,30). But hundreds of CAM physicians, therapists and especially CAM researchers have now been persecuted by their biomedically oriented colleagues.

The power of industrial money has also been used in international misinformation campaigns promoting bio-medicine and ridiculing CAM—campaigns that have not been based on scientific facts as comparative data have not been available (2-4,27). Huge amounts of money have been channeled to academic institutions from the pharmaceutical industry, as we also have seen it at universities in Denmark, i.e. the University of Copen-hagen. This money has built whole departments for biomedical education, development, and research and is likely to have biased the whole academia in favor of biomedicine and therefore naturally against psychosocial quality of life promoting interventions—which is CAM.

Drug research has become prestigious in medicine and at the same time, research in psychosocial inter-vention has become a low status medical field. Researchers in quality of life, salutogenesis, and healing have often been forced to leave the academia, even in Nordic countries, where we often think research is freer than in the rest of Europe. A whole institute for quality of life and CAM research, the Danish Quality of Life Research Center, was forced to separate from University of Copenhagen in 1993 due to political pressure, and had to continue as an NGO.

The strong power of industry has also been used for massive lobbying of all nations governments, sadly leading to a drug-positive and CAM-negative attitude in almost all national organs regulating medicine. Often biomedical physicians, which whole carriers as

researchers have been paid by the pharmaceutical industry before they were employed in public offices, have been leading the prosecution and repression of CAM researchers, abusing all the power of the public administration to do so.

This war against CAM has been quite invisible as few media have dared to analyze the situation in any depth. Often the journalists and film makers that have made critical documentaries on the pharmaceutical industry have been severely punished (31). The systematic misinformation about medicine in the media and the strong bios in favor on biomedicine at academic institutions have made most doctors, patients, and politicians actually believe that we have biomedicine because the original Hippocratic holistic medicine is "snake oil" provided by "quacks" that has failed to cure the patients, while modern biomedicine has been highly effective. Remembering that 50% of the whole population in countries with socialized medicine is now chronically ill documents that this is definitely not the case, quite contrary it is safe to say that it is biomedicine that has failed miserably.

The final say about which kind of medicine we will have in this world will hopefully come from people who take care of the patients' best interest, not the interests of the industry and its allies, and who unbiased will analyze which medicine is the most helpful for the patients. It basically boils down to the matter of cost-efficacy: How much health and healing can I as a patient buy for one dollar, pound, or EURO?

**METHODS**

In this study, we estimated the cost of one patient cured from the number of patients needed to treat (NNT). We compared to our best abilities the best and most efficient CAM treatments with the best biomedical treatments. We calculated the cost per cured patient after one, two, and ten years, as time is an extremely important factor here, as we shall see. We approximated the numbers from searches in MedLine/pubmed.gov. As the prize always varies with factors like country, specific disease, age, gender, general health etc. it is difficult to estimate the costs exact, but we found that we could estimate the cost in round numbers.

Treatment with biomedicine varies but we have based on the national statistics for Denmark estimated the cost to drugs alone is in average in Denmark 200 €/month or about 2000 €s/Year per patient (32). A more accurate analysis might shift this number a factor of two.

To calculate the cost of *one patient cured*, this number must be multiplied by the number of patients needed to treat (NNT) for one to be cured. Most, unfortunately, are "cured" almost never the measured outcome in biomedical studies; a likely reason for this is that the outcome for documenting a patient to be "cured" would force the industry to use global measures like quality of life, which automatically would include the adverse effects and adverse events making the drugs come out as less effective. By focusing on positive, local effects and calling other negative local effects for "adverse effects", and then claiming that the induced positive effects are more important than the induced negative, so they cannot be balanced, the industry has managed to market its product without any global quality control (see below).

Therefore, what is measured in biomedicine is the improvement of some local symptom. Even more problematic is it that the test of efficacy, the randomized clinical trial, is testing the drugs against placebo, the effect of a positive change of consciousness for the disease, which is philosophically speaking identical with non-drug CAM. We know that the power of placebo varies dramatically with the set and setting, the close relationship to the doctor has been shown to be the most important factor for a strong placebo effect (33). In almost all industrial trials the relationship to the physician has been reduced to almost no relation, taking all power out of the placebo effect as has been shown recently (34). We therefore know that drugs, despite the formally correct design, have not been tested fairly against placebo. Just using active placebo instead of normal placebo often changes the whole picture, eliminating the effect, as we have seen with the antidepressant drugs (35). In this study, the NNT number for antidepressant drugs was changed from the normal NNT of 3-5 to about 500 (estimated). All NNT numbers of pharmaceutical drugs are therefore likely to be a factor 3-100 to small, which is highly problematic. We also know that practically all adverse effects on the global level of the being has been excluded in most industrial randomized trials—like the measures quality of life, self-evaluated mental and physical health, self/rated ability of sexual, social and job/studying ability etc. In reality we do not know if the drug really helps the patients all in all. The reason why so many countries' national organs of quality control of pharmaceuticals have accepted the industrial standards of documentation that introduces such strong bias in favor of biomedical drugs should urgently be investigated, and the industry should be asked to document the treatment effect on the global level also; quality of life, self-rated health and self-rated functioning which is easily documented with a small

questionnaire like QOL1, QOL5 or QOL 10 (36,37).

In the present study, we have chosen to use the number for the general effect of the drugs given by the industry itself (NNT = 5-50); we have used the number 10 for practical reasons, but the most common number is more likely to be around 20 (38). Seen in the light of the above mentions problems with the industrial designs, it is fair to say that we have been kind to biomedicine in this analysis.

In CAM the endpoints are often quality of life, self-rated health (global, physical or mental) or functioning (sexual, social, working/studying); from these data it is possible to see if the patient is actually cured, if we define "cured" as the experienced normalization of the patients quality of life, health and functioning.

Severe side effects of pharmaceuticals often lead to hospitalization and to more specific treatments for the side effects with other drugs, which is also costly. In Denmark, we have about one suicide attempt with drugs (common pain killers) for each teenager during adolescence, which is also costly. These attempts often lead to prolonged negative reactions that also need treatment, which is also costly. Severe side effects also lead to lower quality of life which burdens other family members etc. We have not in the present study estimated the derived costs from the adverse effects of drugs but this should be included in future research.

The CAM treatment is normally 10 to 20 sessions a year at a prize of 100 € per session, or 1,000-2,000 € per treatment-year if we use the figures from our own research clinic for holistic mind-body medicine and similar types of intensive short-term psychotherapy and CAM (39-44). We use the last prize, which is relevant to most chronic patients, to simplify the matter.

Costs to biomedical examinations and hospitalizations are not included in the prize of 2,000 € per year (see discussion below). We estimate that biomedicine is two to three times as costly as drugs alone from all these related procedures. Hospitalization and expensive objective examinations are not used in CAM as the results almost never have consequences for the treatment.

The accumulated cost grows though time as the patients that are still treated in spite of not getting cured cost much money. As about 50% of patients are cured first years with CAM (mind-body medicine which is the most efficient type of CAM (7,8,17)), and another 50% of the not-cured patients will be cured the next year (45) (a tendency which seems to continue judged from our clinical experience with about 90% of patients cured in three years), the accumulated prize of one patients cured with CAM is only slightly more than the first year cost. In biomedicine where only about 2-20% of patients (NNT = 5-50) are "cured" (or rather most often only improved with regard to a specific symptom), the sad reality is that the rest is rarely much helped by continued treatment with drugs, but are turning into chronic patients now depending on the medication. So here we have the opposite pattern where the cost is accumulating with almost the same amount of money adding to the total amount each year. We have calculated the figures as simple as possible, as a simple addition of money spent though time, but some corrections of this simple schedule could be made, and dependent on how the calculated is done, the numbers will be a little different (a factor 1.5 to both sides).

**RESULTS**

Table 1 lists the NNTs and NNHs for biomedicine and seven different classes of CAM. The normal NNT number for biomedicine was set to ten (38), while the normal NNT number for CAM was set to two (17). As normal NNTs are from 10 to 50, we know that we have been kind to biomedicine here, and experts often conclude that "NNTs under 5 are unusual, whereas NNTs over 20 are common." (38), indicating that the most normal NNT number is around 20. When it comes to the NNH numbers they are often 2-10 for each adverse effect, but the total likelihood to get one side effect is much larger, often around one ($NNH_{total}$ = 1-2) meaning that most patients will have one or more adverse effect. These numbers vary with a factor 2, dependent on the source, which gives an uncertainty of a factor 4 on the final result which is not important for the conclusion due to the magnitude of this.

Table 2 and figure 1 show the estimated fraction of patients cured as times goes by, from one to ten years. In biomedicine 80% of patients become chronic patients, in the most efficient CAM therapies only 5-20% of the patients become chronic patients. Most interestingly, figure 1, which promises fine results as times goes by, is in strong contrast to the empirical finding that half the population is chronically ill after 40 years of free biomedicine in countries with socialized medicine, like Denmark. As not everybody has a tendency to get sick, it is likely that the majority of patients become chronic patients with biomedicine. The reason the this is that patient not cured year one has a much less likelihood to get cured with the drugs years two, and after year two the therapeutic benefit from drugs seems to be marginal. CAM has the opposite tendency: year after year a fraction of patients get well,

Table 1. *NNT and NNH numbers of the seven CAM classes estimated from clinical studies (with chronic patients, see text) (based on 39-74, see 17).*

| CAM class | Short term effect (0-6 month) | Long term effect (6-24 month) | Side effects/ adverse events |
|---|---|---|---|
| | NNT | NNT | NNH |
| Class 0-Biomedicine | 5-50 | 5-100 | 1-5 |
| Class 1-CAM (Chemical CAM) | ≥10 | ≥20 | 25 (allergy) |
| Class 2-CAM (Physical therapy) | 2-4 | 6 | >64,000 |
| Class 3-CAM (Psychotherapy) | 3 | 6 | >64,000 |
| Class 4-CAM (Spiritual therapy) | 10 | 20 | >64,000 |
| Class 5-CAM (Mind-Body medicine) | 2 | 4 | >64,000 |
| Class 6-CAM (Holistic medicine) | 2 | 1-2* | >64,000 |
| Class 7-CAM (Shamanism w. drugs) | 1 | 1 | >1000 |

*The effect of clinical holistic medicine and similar medical systems seem to continue to increase though time (53).
NNT: Number Needed to Treat. NNH: Number Needed to Harm

Table 2. *The fraction of ill patients cured for drugs and non-drug medicine, if NNTs could simply be added, and health accumulative*

| Number Needed to Treat (NNT) | Not cured (years of treatment) | | | | | |
|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 |
| Biomedicine | | | | | | |
| 5 (most effective drugs) | 100.0 | 80.0 | 64.0 | 51.2 | 41.0 | 32.8 |
| 10 (typical drug) | 100.0 | 90.0 | 81.0 | 72.9 | 65.6 | 59.0 |
| 20 (typical drug) | 100.0 | 95.0 | 90.3 | 85.7 | 81.5 | 77.4 |
| 50 (cancer chemotherapy, antipsychotic drugs (”mental state”)) | 100.0 | 98.0 | 96.0 | 94.1 | 92.2 | 90.4 |
| 100 (less effective drugs) | 100.0 | 99.0 | 98.0 | 97.1 | 96.1 | 95.2 |
| CAM | | | | | | |
| 1 (like sexology) | 100.0 | 7.0 | 0.5 | 0.3 | 0.0 | 0.0 |
| 2 (typical mind-body medicine) | 100.0 | 50.0 | 25.0 | 12.5 | 6.3 | 3.1 |
| 3 (typical non-drug CAM) | 100.0 | 67.0 | 44.9 | 30.1 | 20.2 | 13.5 |
| 5 (less effective CAM) | 100.0 | 80.0 | 64.0 | 51.2 | 41.0 | 32.8 |

even without continued treatment (see i.e. 46). The reason is that the therapy has started a process of personal development that continues even if the therapy is discontinued, as the change happens in the patient’s consciousness and philosophy of life, before it materializes in life and body. Another important aspect is that the adverse effects of drugs tend to accumulate though time, thus burdening the patients health (total NNH = 1-3 for most drugs), presumably giving a negative curve of lost health very much the same way as the NNT = 1-3 (see the NNT = 2 AND NNT = 3curves in figure 1). Drugs therefore give health and take about the same amount of health, not really contributing to an overall improvement of health, which is why global health (self-rated physical and mental and total health) is almost never measured in industrial drug trials. Our estimate of a realistic development of health as a function of “years treated” can be found in Table 3. The

Table 3. *Accumulated number of patients cured through time under continued treatment (year one, two, ten and forty) with biomedicine and the seven CAM classes estimated from clinical studies with chronic patients and the state of health of the Danish population after 40 years of free biomedicine (based on 39-74, see 17) (see text)*

| Class | Fraction of patients cured (percent) | | | |
|---|---|---|---|---|
| | First year | Second year | Year 10 | Year 40 |
| Class 0-Biomedicine | 10 | 25 | 20 | 20 |
| Class 1-CAM (Chemical CAM) | < 10 | < 10 | < 10 | < 10 |
| Class 2-CAM (Physical therapy) | 33 | 50 | 60 | 60 |
| Class 3-CAM (Psychotherapy) | 33 | 50 | 60 | 60 |
| Class 4-CAM (Spiritual therapy) | 10 | 15 | 20 | 20 |
| Class 5-CAM (Mind-Body medicine) | 50 | 75 | 80 | 80 |
| Class 6-CAM (Holistic medicine) | 50 | 85 | 90 | 90 |
| Class 7-CAM (Shamanism w. drugs) | 90 | 90 | 90 | 90 |

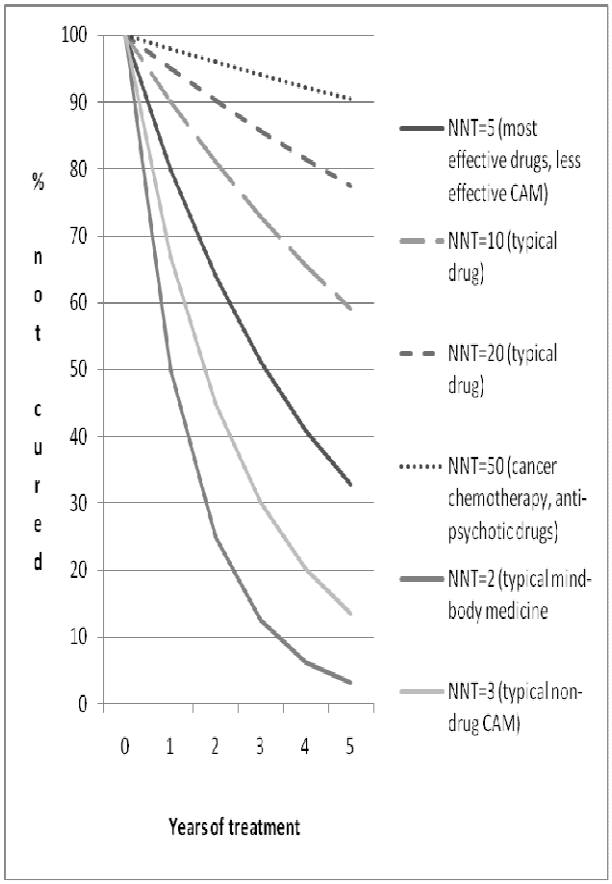


**Fig. 1:** The fraction of ill patients cured for drugs and non-drug medicine, if NNTs could simply be added, and health accumulative

Table 4. *Accumulated cost for one patient cured through time (year one, two, ten and fifty) for biomedicine (calculated for NNT = 10) and the seven CAM classes (NNT = 1-10) based on clinical studies with chronic patients (based on 39-74, see 17, and Table 4)*[1]

| Treatment | Accumulated cost (€) | | | |
|---|---|---|---|---|
| | per patient | per cured patient | | |
| | First year | Second year | Year 10 | Year 50 |
| Constantly treated w. biomedicine | | | | |
| Class 1-CAM (Chemical CAM) | >20,000 | >40,000 | > 200,000 | > 1,000,000 |
| Constantly treated w. CAM | | | | |
| Class 2-CAM (Physical therapy) | 4,000 | 6,000 | 24,000 | 100,000 |
| Class 3-CAM (Psychotherapy) | 6,000 | 10,000 | 46,000 | 200,000 |
| Class 4-CAM (Spiritual therapy) | 20,000 | 38,000 | 180,000 | 800,000 |
| Class 5-CAM (Mind-Body medicine) | 4,000 | 6,000 | 16,000 | 100,000 |
| Class 6-CAM (Holistic medicine) | 4,000 | 5,000 | 10,000 | 30,000 |
| Class 7-CAM (Shamanism w. drugs) | 500 | 600 | 800 | 2,000 |

[1](cost of biomedical examination, hospitalization, and treatment of adverse effects and events not included) (estimated round numbers, see text)

figures here are consistent with the existing knowledge on biomedicine and CAM, although we do know very little about long term effects as the industry hardly ever documents long term effects of adverse effects, quality of life etc. in their studies. Biomedicine and CAM cost is, if you exclude the cost for examinations and hospitalization often necessary in biomedicine and often unnecessary in CAM, almost the same on a yearly basis per patient treated for most kinds of drugs and most kinds of CAM.

Based on the figures in table 3, the accumulated cost per cured patient after one, two, 10, and 40 years can be estimated (table 4). The high number needed to treat biomedicine makes this kind of medicine a fairly expensive medicine per cured patient, five times as expensive as CAM the first year. But because many patients are cured the first year with CAM, typically 50%, and next year again 50% of the patients that was not cured first year etc. most patients will eventually be cured, and the accumulated expenses per cured patient is therefore modest. In biomedicine most patients continue to be chronic patients, and year after year the cost accumulates. After 10 years, biomedicine is about 17 times as expensive as biomedicine per cured patient. Most chronic patients are still ill with biomedicine after 10 years, whereas most patients are cured with holistic CAM therapy. There are very few long term studies following patients for 40 years, but we find it likely that most patients stay chronically ill for life if not cured. If there were a strong tendency of spontaneous healing and recovery every second citizen in Denmark would not be chronically ill. Some types of CAM are even more expensive than biomedicine per cured patient, so it is highly important to pick the right type of CAM to secure efficient and affordable medicine.

Table 5 lists some established CAM treatments for a number of diseases to document the efficacy in CAM. Table 6 compares the cost of some known CAM treatments to the cost of the traditional biomedical treatment. Please notice that the cost varies much from country to country; the numbers listed are typical European and American numbers.

**LIMITATIONS OF THIS STUDY**

In this paper we wanted to investigate the relative cost-efficacy of CAM and biomedicine by comparing the first year cost and also the accumulated cost through year two, ten and 50 years for one patient cured with CAM and biomedicine respectively. As most chronically ill patients according to the experience from the biomedical health system of Denmark actually live for at least 40 years with their health issues unchanged in spite of continuous medical treatment we believe that the accumulated differences in cost are five times what we have calculated for the ten year period, but as some of the most ill patients will go to hospital, which is

Table 5. *Estimated NNT-numbers of the CAM treatments of physical, mental, existential and sexual health issues and working disability (mostly based on clinical studies using chronic patients as their own control, see text) (based on 17)*

| Treatment | NNT | References |
|---|---|---|
| CAM for physical health | | |
| Subjectively poor physical health | 3 | (7-10,13,17-23,39,46,59) |
| Coronary heart disease | 2-4 | (71,72) |
| Cancer (QOL, survival, pain) | 2,7,3 | (73,74,82,83-88) |
| Chronic pain | 2-3 | (14,17,20-22,33,39,46,49,51,54,59,82) |
| CAM for mental health | | |
| Subjectively poor mental health | 2-3 | (7-13,17-22,40,50,55,64-66) |
| Schizophrenia | 3-5 | (9,11,21-23,40,52,64-66,89) |
| Borderline | 3 | (9,11,21-23,40,52,64-66,76,89) |
| Major depression | 2-3 | (6-10,20-23,35,40,50,57,64-66) |
| Anorexia Nervosa | 3 | (6,20-22,40,41,42,43,64-66) |
| Anxiety | 3 | (7-10,12,13,17-22,40,57,64-66) |
| Social phobia | 3 | (7-10,13,17-22,40,57,64-66) |
| CAM for sexual dysfunctions | | |
| Subjectively poor sexual functioning | 2 | (16-22,41,46,47,51,55,61,62,64-70) |
| Male erectile dysfunction | 2 | (41,68) |
| Female orgasmic dysfunction | 1 | (41,68,69) |
| Female lack of desire | 2 | (16-22,41,46,47,51,55,61,62,64-70) |
| Female dyspareunia | 2 | (41,46,47,51,55,61,62,64-70) |
| Vaginismus | 2 | (41,46,47,51,55,61,62,64-70) |
| Vulvodynia | 2 | (41,46,47,51,55,61,62,64-70) |
| CAM for psychological and existential problems | | |
| Subjectively poor quality of life | 2 | (7-10,12,13,17-22,42,47,51,57,64-66,73,74,85) |
| Sense of coherence | 2-3 | (7-10,12,13,17-22,42,47,51,57,64-66,73,74,85) |
| Suicidal prevention (with decisions) | 1 | (18,19,20) |
| Low self esteem | 2 | (6,20-22,43,64-66) |
| CAM for low working ability | | |
| Subjectively poor working ability | 2 | (20-22,60) |

much more costly and eventually will die in a long and costly process this estimate is not as certain as the one, two and ten year estimates.

We want to investigate the general numbers for all patients and all clinical conditions which are connected with a number of technical problems. First of all the goal of CAM is primarily improve the quality of life of the patient, which can be done for every single patient, despite the concrete disorder, health problem, existential problem or sexual dysfunction. Thus every single patient can be treated with CAM. Even if the patient cannot talk, the CAM therapist can still provide therapeutic touch. Biomedicine has the problem that many disorders cannot be understood biochemically, so the treatments are only symptomatic, not curative for most diseases. CAM is according to its own theory working on the causal level of the diseases, and in accordance with this view CAM therapist intent to cure the patients. These discrepancies mean that biomedicine looks for improved symptoms while CAM looks for normalized quality of life, self-rated health, physically or mentally, and normalized ability of functioning.

The two different set of outcomes make it difficult to compare biomedicine and CAM, but most researchers

Table 6. *Estimated first year treatment cost per cured patient with physical, mental, existential and sexual health issues and working disability (mostly based on clinical studies using chronic patients as their own control, see text). As many patients not cured will die it is often difficult to make the long term estimates (based on table 4 and (17)*

| Treatment | Cost per cured patient € | |
|---|---|---|
| | CAM | Biomedicine |
| CAM for physical health | | |
| Subjectively poor physical health | 6,000 | 200,000 |
| Coronary heart disease | 4,000-8,000 | 1,000,000 |
| Cancer (QOL, survival, pain) | 4,000;14,000 | 20,000,000 |
| Chronic pain | 4,000-6,000 | 500,000 |
| CAM for mental health | | |
| Subjectively poor mental health | 4,000-6,000 | 200,000 |
| Schizophrenia | 6,000-10,000 | 20,000,000* |
| Major depression | 4,000-6,000 | 200,000 |
| Anorexia Nervosa | 6,000 | 100,000 |
| Anxiety | 6,000 | 100,000 |
| Social phobia | 6,000 | 100,000 |
| CAM for sexual dysfunctions | | |
| Subjectively poor sexual functioning | 4,000 | no cure |
| Male erectile dysfunction | 4,000 | 20,000 |
| Female orgasmic dysfunction | 2,000 | no cure |
| Female lack of desire | 4,000 | no cure |
| Female dyspareunia | 4,000 | no cure |
| Vaginismus | 4,000 | no cure |
| Vulvodynia | 4,000 | no cure |
| Infertility | 12,000 | 20,000 |
| CAM for psychological and existential problems | 4,000 | no cure |
| Subjectively poor quality of life | 4,000-6000 | no cure |
| Sense of coherence | 4,000 | no cure |
| Suicidal prevention (with decisions) | 2,000 | no cure |
| Low self esteem | 4,000 | no cure |
| CAM for low working ability | | |
| Subjectively poor working ability | 4,000 | no cure |

* no antipsychotic drug cures schizophrenia, and the mental state of patients are in general no improved but hallucinogenic behaviour is reduced (NNT = 4) (75)

find that the global outcome measures used in CAM are more likely to document cure than the local outcomes of biomedicine. To put this in another way, the different outcome measures are likely to favor biomedicine, not CAM. If we therefore find CAM to be superior to biomedicine this is done in spite of the system of measuring outcomes strongly favorites biomedicine. When it comes to the NNT figures, these are often meaningful for CAM treatments because of the global outcomes, while they are often of much less value in biomedicine where some symptoms are more or less improved. Therefore we have not been able to find useful NNTs for this study for most of the pharmaceutical drugs. Where we have found them, i.e. in the treatment of antipsychotics (75-77), the NNT numbers for improved mental state has often been so large (around 1000

estimated from (75)) that using them would make the table look hard to believe. Instead of using this data source we have made judgments from our clinical experience. We apologize if a more thorough analysis based on better data at a later point in time will review our estimates to be deviating much from reality.

In CAM it is possible to treat and cure the most severely mentally ill patients like the schizophrenic patients (50,83), which according to the most recent Cochrane meta-analysis not be helped even to improve their mental state with biomedicine (56). Similarly we know from Ulrich Abels' famous analysis in 1992 that chemotherapy is likely to shorten life and destroy quality of life for most types of cancers (78-81), while it seems that CAM can actually help patients to experience less pain (82), improve quality of life (72,73), survival (72,73,81,83-85), and even sometimes get a complete remission of the cancer (87-88), the same way as we have observe some schizophrenic patients spontaneously recover (89).

In these comparisons we have a severe problem of the quality of the studies. The biomedical studies are often paid for big money by the industry, whereas the CAM studies are conducted for almost no money by CAM researchers that want to document that their medicine can help. Both types of studies are likely to be biased as both groups have inters in a positive outcome, but the pharmaceutical industry is much more likely to be smart in the way that they introduce bias making these biases much more difficult to detect.

Most people believe today, due to massive mis-information in the media and not due to thorough scientific investigations that have yet to be made, that biomedicine cures cancer and schizophrenia, whereas CAM is inefficient in these regards. Just analyzing the existing data becomes difficult when everyone seems to know how things are even before the facts have been introduced. Manipulation of the public happens every day though the appearance in the media of physicians closely connected to the industry telling success-stories of cured patients, but forgetting to inform the public that the statistical picture tells a completely different and much more depressing story when the cancer or schizophrenia treatment is compared with no treatment or with placebo.

## DISCUSSION

Every year the cost of the Danish biomedical health care system is about 50 billion DKR or 7 billion EURO, or 10,000 DKr per capita (1,200 EURO). Half of the population is chronically ill (1). Half of these patients use the public health care system (5), making the cost for each of these patients about 40,000 DKr in average (6,000 EURO). This figure is about twice the figure we have estimated in the tables above, indicating that the cost of examination and hospitalization is about the same as the cost of the drugs. The cost of 50 years of treatment is therefore known to be about 2,000,000 million DK, or about 250,000 EURO, not 100,000 EURO as listed in the table. We therefore know that the figures listed in the tables are realistic and likely to be too small in spite of their impressive size.

Most unfortunately, the CAM treatments listed in table 4 have been documented only on chronic patients using themselves as their own control. Very few CAM studies are clinically controlled randomized studies. One reason for this is that CAM treatments are placebo cures, so it is not possible to control them against placebo. Another reason is that CAM studies often are low budget studies, of variable quality. On the other hand, the industrial studies of biomedicine are often severely biased (90), as we have also seen above, making these studies highly problematic despite excellent formal quality (performed according to the industrial standard). As a matter of fact, it is difficult to say if such a small effect like NNT = 20 or 50 is caused solely by bias; just a small bias would introduce such an effect of this size. Another serious problem is that we lack NNT-numbers for the outcome "cured" for most drugs as the industrial design often uses much less improvement to make it easier to get their products approved. The national authorities that should have forced the industry to document the long term effect on the patient's global health has most definitely failed to do so.

Non-drug CAM has, as we have seen, practically no significant side (adverse) effects (7-22), which makes them very attractive compared with biomedical drugs. Quite surprisingly to people believing that CAM was inefficient, the mind-body type has in almost all studies been found highly efficient not only in improving quality of life but also in improving health, ability, and survival (NNT = 2).

If one compares the cost of treating one patient for one year with biomedicine (drugs) and with CAM (talk and touch), the two treatments are often comparable in prize. But if you include the number of patients needed to treat for one to be cured (NNT), the whole picture changes dramatically in favor of CAM.

If you then follow the development over time, this difference grows further year for year, making bio-medicine 100 times as expensive per cured patient as CAM in the long run. If you include expenses for examinations like CT scans and hospitalizations often

needed in biomedicine, and rarely needed in CAM, this difference is most likely to grow 2.5 times more. If you include the sufferings from being chronically ill and not able to work much this figure simply explodes. W found most cost-effective types of CAM to be about 100 times as cost-efficient as biomedicine if we just looked at the cost of the basic treatment (drugs versus talk and touch).

The classic shamanistic cures using mind-expanding drugs and one session healing, which according to the rich literature seem to last for life, seems to be about 10 times as efficient as non-drug CAM, thereby explaining the ubiquitous presence of shamanism in almost all pre-modern medical systems, except for some reason the European Hippocratic holistic medicine. For cultural and political reasons, we do not find it possible to turn back to these dramatic rituals of highly efficient shamanistic one session healings, but these healing events are still academically interesting and therefore included in the present analysis. We always like to think that we are better today than a thousand years ago, but when it comes to medicine we would benefit largely from looking back.

Most importantly, shamanism shows us that CAM can be further developed to be even more efficient than it is today, making it in the end an efficient cure for every ill patient on the planet, including cures for cancer patients and schizophrenic patients, a great theoretical possibility to be explored in the new millennium.

The interested reader will find the works of the LSDs gurus Stanislav Grof and Timothy Leary interesting, and will also enjoy spending lots of time reading also Anderson, Mumey, Castaneda, Luna, and White (91-98). The philosophy of shamanism is quite profound and good introductions to this kind of “magic thinking” are Saint-Exupéry, Huxley, and Castaneda while the advanced reader will benefit from reading The I Ching and The Tibetan Book of the Dead (99-103). Studying shamanism was what made us understand the depth of holistic philosophy so despite its time consuming and surprisingly strange nature we can strongly recommend it to physicians interested in CAM and holistic medicine.

## CONCLUSION

In this comparative analysis of the cost-effectiveness of CAM and biomedicine, we found that CAM and biomedicine cost about the same per year per treated patient. Despite this, we found CAM to be of much higher value for the patient. The value of CAM comes from a surprisingly low NNT number (NNT = 2-3) and a surprisingly high NNH number (NNH = 100.000). Most biomedical drugs have a NNT about 10-50, and many adverse effects.

When we use these figures (NNT = 2 and NNT = 10) to calculate the number of patients cured through time, we found that most patients are cured with CAM whereas with biomedical drugs most patients turn into chronic patients. This makes biomedicine extremely expensive per cured patient as most patients continue to get treatment that does not really help them, often for many years or even, in countries with free socialized biomedicine, for life. In our model, we find CAM about 100 times cheaper per cured patient than biomedicine (drugs). To make the analysis more accurate, one should also include the cost of biomedical examination using highly developed technology and of many days of biomedical hospitalisation for examination and treatment, which is not used in CAM.

We found the difference in cost per cured patient to be about a factor 100, when the most cost-effective types of CAM (mind-body medicine, holistic mind-body medicine) compared with biomedical drugs. A number of uncertainty factors give us a total estimated uncertainty of a factor of 5 on this result, which means that the result seems to be a robust finding. From the present analysis, it is quite clear that we need to go back to the original type of medicine, the Hippocratic holistic mind-body medicine, if we are to have an effective and affordable medicine, and a healthy population, in the future.

Biomedicine is simply not the answer to growing general health problems of the western countries. It is more likely to be the other way round: that the poor health of the population is caused by the treatment of patients with pharmaceutical drugs that only cures (actually improves specific symptoms of) one in ten, and at the same time give so many severe side effects.

Luckily for America, CAM seems to have won the race against biomedicine and is now dominating the health system and seems to be the future medicine here with biomedicine playing only a minor role (104,105). In Europe, things are more conservative. The choice of CAM as the basic service in socialized medicine instead of biomedicine could turn the high number of chronically ill patients—in Denmark 50% of the population after 40 years of socialised biomedicine—into a healthier, happier, and abler population. At the same time, the cost of the health care system is likely to be reduced to a small fraction of the present. Physicians would again start to deliver health by clinical medicine, using talk and touch as the primary tools of medicine, and drugs only when the patients failed to cure themselves with the support of the physician.

Biomedicine is leading to massive pollution of the oceans and other waters with highly biologically active molecules, which would be stopped this way. The loss of healing power of antibiotics would also not be lost if complementary treatment were tried first (106). The cost of surgery could be dramatically reduced as well (see 7,8 for a review). Money now used on inefficient biomedicine could be used to solve some of the true problems of the world. A more healthy population would also take better care of the planet and of each other making the world a better place.

We strongly encourage all governments of the world to shift the medical systems of their countries to the most cost-effective types of CAM, and pharmaceutical drugs only used when CAM cannot cure the disease. All universities should teach CAM, and bio-medicine should be reduced to it proper place in the curriculum: a minor subject of medicine, not unimportant for the treatment of specific disorders, but definitely not the central core of medicine.

Strict laws should be introduced immediately to control the pharmaceutical industries campaigns in the media and elsewhere in favor of drugs and against CAM, as these campaigns are not evidence-based but highly manipulative. CAM researchers, who in these years experience severe attacks from the pharmaceutical industry and its allied physicians (28) seemingly in an effort to eliminate CAM on an international level, should be supported and protected against these attacks from the medical-industrial complex. Such laws should also address the national organs to stop biomedically oriented physicians working in these organs to abuse the power of the Nation to repress CAM.

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