

PRIMAL HEALTH RESEARCH

A NEW ERA IN HEALTH RESEARCH

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SHOULD PREGNANT WOMEN EAT CHOCOLATE?

In 1991-1992, at Whipps Cross, a hospital in east London, in the framework of a study about nutrition in pregnancy, I interviewed at random 500 pregnant women (¹). Although it was not the primary objective of our study, I asked all of them if they had feelings of intense craving for one particular food. I asked the same question to thousands of women when I was doing pre-natal consultations in a French hospital. I cannot make a complete review of the many strange answers I was given on both side of the Channel... from toothpaste to vinegar and cucumber, etc. It would be too long. The point is that everywhere chocolate was the most common answer.

Magnesium

Until recently, when commenting on these findings, I was just focusing on magnesium. Chocolate is particularly rich in this mineral (approximately 60 mg/100g of milk chocolate) and pregnant women have increased needs in magnesium.

Magnesium is an important catalyst of the metabolism of fatty acids. By facilitating certain metabolic pathways, it helps the maternal body to provide the great amount of long chain polyunsaturated fatty acids that are needed for the development of the human fetal brain. Furthermore suppression of chocolate cravings by magnesium supplementation has been reported (^{2,3}).

There is a danger to focus on one only plausible interpretation. It is to anesthetize our curiosity about such a complex food as chocolate. We must be grateful to the serious and highly authoritative 'Journal of American Medical Association' (JAMA) for constantly re-enhancing our interest for chocolate.

Chocolate and pre-eclampsia

In the issue of May 1st 2002 JAMA published a 'research letter' about the effect of chocolate consumption on platelet function (⁴). This was first a way to recall that

serotonin, and phenylethylamines have a great variety of physiological effects. Cocoa butter contains a high level of saturated fatty acids (approximately 62%), yet no elevation of plasma total cholesterol or LDL-cholesterol (the 'bad one') was observed in studies in which individuals were given high dosages of cocoa butter or chocolate. Cocoa butter is rich in stearic acid which, due to inefficient digestion, does not increase plasma LDL concentrations and may account for the neutral effects of chocolate on cholesterol levels⁽⁶⁾.

Historical sketch

A Man Scraping Chocolate was also an opportunity to recall some important

flavonoid-rich foods and beverages have vascular health benefits and that tea, grapes, apples, and cocoa contain a class of flavonoids known as flavanols. Because epicatechin is the predominant flavanol found in chocolate, the authors had good reasons to demonstrate its increased plasma concentration 2 and 6 hours after the consumption of 25g of semisweet chocolate chips by healthy adults. This increase in plasma flavanol was associated with an increased concentration in prostacyclin, compared with the other metabolites of arachidonic acid. For those who are not familiar with this jargon, let us just recall that the most serious disease in pregnancy (preeclampsia-eclampsia) is associated with a low concentration of prostacyclin. In other words pregnant women who eat chocolate tend to prevent or moderate the shift towards metabolic disturbances associated with a life-threatening disease. These considerations, although purely theoretical, lead to practical conclusions: there are no scientific reasons to refrain pregnant women from eating chocolate.

The future

The editor of JAMA probably thought that a discreet research letter by experts in flavonoids was not strong enough to make chocolate more topical than ever. Two weeks later, the eye-catching coloured cover of the journal was a reproduction of *A Man Scraping Chocolate*, a painting from 18th century Spain by an unknown artist. This was an opportunity to underline that there is a future for studies interpreting the time-tested fascination with chocolate⁽⁵⁾. Ingredients such as flavonoids, catechins, serotonin, and phenylethylamines have a great variety of physiological effects. Cocoa butter contains a high level of saturated fatty acids (approximately 62%), yet no elevation of plasma total cholesterol or LDL-cholesterol (the 'bad one') was observed in studies in which individuals were given high dosages of cocoa butter or chocolate. Cocoa butter is rich in stearic acid which, due to inefficient digestion, does not increase plasma LDL concentrations and may account for the neutral effects of chocolate on cholesterol levels⁽⁶⁾.

Historical sketch

A Man Scraping Chocolate was also an opportunity to recall some important phases of the history of chocolate. Chocolate existed in the Mesoamerican cultures of the Olmec, Maya, Aztec, and Toltec, as early as 1500 BCE. The Aztec people drank xocoalt, a beverage made from ground cacao beans; Emperor Montezuma reportedly drank over 500 cups of chocolate each day. Spanish conquistador Hernan de Cortes, the first European to taste chocolate, explored Mesoamerica in the first decade of the 16th century. Once this New World delicacy was introduced to the Iberian aristocracy, the habit of drinking chocolate spread from Spain to Italy. From Italy, chocolate's delights travelled to England and France, where Madame de Maintenon, mistress of Louis XIV, favoured serving chocolate at the court at Versailles. Later, Marie Antoinette had her own private chocolatier.

Today, even at the age of the 'Scientification of Chocolate', there are still all over the world true chocolate lovers who don't try to know about the biochemical properties of the food that makes them feel good. It is significant that the authoritative botanist Carl Von Linne bestowed on the cacao plant the name *Theobroma cacao*, 'food of the gods'. It is also significant that Linne was Swedish. In order to understand this allusion to Sweden, you need to know 'where the truth come from'.

WHERE DOES THE TRUTH COME FROM?

There are many ways to classify the studies included in our data bank. One of them is according to the country where they were conducted. Since Primal Health Research appears as a fast developing and highly fruitful branch of epidemiology, one can immediately conclude from an overview of the data bank that certain countries are more effective than others at transforming our understanding of health, diseases and behavioural patterns.

Quantitative evaluation

In order to make such a classification meaningful we must take into account the population of the different countries that participate in "Primal Health Research". For example the data bank contains 53 studies conducted in Sweden versus 62 in USA. If we recall that the population of Sweden is around 9 million and the population of the USA around 287 million, it appears that the Swedish are much more active than the Americans in terms of Primal Health Research. That is why I found it necessary to use a coefficient in order to compare the activity of researchers in different countries and in different groups of countries. The "Primal Health Research coefficient" (K) indicates the number of published studies (included in our data bank) per one million inhabitants. In Sweden the coefficient (K) is 5.9 (53/9) while it is 0.22 in USA (62/287). According to our criteria, Swedish researchers are 27 times more active in this field than their American colleagues.

By using such working tools, one can realize how unequal the geographical origin of studies participating in this new framework is. This huge disparity – even among countries with comparable standards of living – is in itself intriguing and curiosity enhancing. This young generation of studies does not develop at the same speed in different parts of the world. An overview of the bank makes it possible and convenient to divide the world in three main groups of countries. These three groups represent more than 80% of the entries in the bank.

In the first group (Northern Europe) we include all the Scandinavian countries (counting Finland and Iceland), Holland, the UK and Ireland. In the second group (Western continental Europe) we include Germany, Austria, France, Belgium, Switzerland, Italy, Spain, Portugal and Greece. The third group (North America) includes USA and Canada.

Northern Europe is undoubtedly the most active part of the world, where Primal Health Research is concerned. Every single country in Northern Europe has a K above (or equal to) 1: Sweden (K 5.9), Finland (17/5 = K 3.4), Denmark (13/5 = K 2.6), UK (82/60 = K 1.37), Norway (5/4 = K 1.25), Holland (19/16 = K 1.19), Ireland (4/4 = K 1). Iceland, with a quarter of a million inhabitants, provided one study. The UK is the country that provided the greatest number of studies in the world (82) but, after adjusting for the population (around 60 million), it appears that the K (1.37) is significantly lower than in Sweden, Finland and Denmark.

Western continental Europe, on the other hand, appears as the less active of the three groups. Only 35 studies were conducted in this region, for a population of about 286 million (K 0.12). The four largest countries in this group have a K far below 1: Germany (K 0.13), France (K 0.12) Italy (0.17) and Spain (K 0.025).

North America is hardly more active than Western continental Europe. The overall K is 79/317 (= 0.25). It is higher for Canada (0.57) than for the USA (0.22).

Before interpreting such spectacular differences, one must wonder what sort of bias might favour the Scandinavian countries, particularly Sweden. It is commonplace to underline the handicap of researchers whose mother tongue is not English. In fact the publication ratio is higher in the Scandinavian countries than in countries such as the USA, Canada, the UK, Ireland, and also Australia (K = 0.25) and New Zealand (0.80). Yet English is a second language in Scandinavia. I also regularly screen the French medical journals. I never found a valuable study published in French, which had not been published in English as well.

It is much more difficult to know what is happening in Japan (5 entries in the bank) and China (2 entries). We probably miss many Japanese studies. It is noticeable that I found by chance the study by J Tsujino (entry 0180) while lecturing in Japan. In June I'll present our data bank in Canton and Shanghai. It might be an opportunity to discover that Primal Health Research is more alive than we think in China. This should not come as a surprise in a part of the world where the concept of embryonic education and the guidelines by Queen Jin have been transmitted from generation to generation for over 3,000 years.⁽⁷⁾

Qualitative evaluation

One might also argue that our investigation of what is still the beginning of the history of Primal Health Research should include other criteria than the number of studies per million of inhabitants. A qualitative evaluation is undoubtedly needed. Several criteria can be used to assess the importance and the quality of a study. Originality should be taken into account. When a research protocol has never been used previously and leads to unexpected results, the study is considered useful. The dimension of the study is another key factor. We tend to trust easily studies involving a large population. We must add that the publication in an authoritative medical or scientific journal by a well-known team of researchers is usually a guarantee of seriousness. However, valuable, but politically incorrect research can have difficulties to go through the process of peer review adopted by most medical journals. Primal Health Research, as an avant-garde approach, tends to generate political incorrectness.

I realize in retrospect that when I am asked to illustrate through examples the potential of this new generation of research, the high quality studies which spontaneously come to my mind were conducted in... Sweden. I like to mention, for example, the study about anorexia nervosa published in 'Archives of General Psychiatry' in 1999 (entry 0262). Researchers were able to collect data about the perinatal period of all Swedish girls born between 1973 and 1984. They also had at their disposal the medical files of 781 young Swedish persons who have been hospitalized with the final diagnosis of anorexia nervosa. For each of them they selected five controls. With this method they detected risk factors nobody had thought of previously. Statistically speaking, one of the most significant risk factor was the fact of being born with a cephalhaematoma, that is a bloody collection of blood inside one of the bones of the skull. It indicates that the birth was difficult from a mechanical point of view. This is probably the most authoritative study that has ever been published about the genesis of anorexia nervosa.

I also like to mention how Swedish researchers found that when a woman had a pre-eclampsia or an eclampsia while expecting a boy, her son will probably never have prostate cancer (entry 0025). The researchers had at their disposal the birth records of

Swedish researchers also studied the risk of having a prostate cancer in relation to birthweight by looking at the medical files of 366 men born in 1913 (entry 0263). Those who had the highest birthweight were at increased risk of having a prostate cancer. They also studied the risk of having a prostate cancer in relation to the duration of gestation (entry 0312) by looking at the medical files of 834 cases born between 1884 and 1941. When bringing together all these studies it becomes clear that the risk of having a prostate cancer is to a great extent influenced by prenatal environmental factors. Other entries in the bank can reinforce the conclusion that any qualitative evaluation would also direct our attention towards Northern Europe and particularly Sweden.

One can discuss the reasons for such huge geographical differences. The interest for this family of studies might be a symptom of an interest for the health of the unborn generations and therefore an expression of the capacity to look towards the future. There are also practical reasons. In Sweden, it is possible to find out detailed birth records of people born as early as 1874 and, with the early advent of socialised medicine, certain diseases have been seriously recorded for many decades. In Great Britain, since the time of John Snow (around 1850), there has been a long tradition for epidemiology. Snow detected a correlation between having the cholera and drinking the water of a well in Soho.

Second edition

I think it is useful to offer this overview of the bank from a geographical perspective on the very year when we plan to publish a second edition of "Primal Health". When the first edition was published, in 1986, we anticipated a new phenomenon and we introduced new concepts. Using an analogy we might say that it was the time when this new generation of research was conceived and was at the dawn of its 'primal period'.

At the beginning of the 21st century, 'Primal Health Research' is entering childhood. It is reaching the end of its own 'primal period'. Today our aim is to observe its development and to draw preliminary conclusions. It is to compare the scientific contexts of the mid – 1980s and of the beginning of the 21st century. That will be the role of the 2002 introduction to the new edition and its 2002 postscript. The original text will be reproduced without any alteration... in spite of strong temptations to introduce corrections and additions.

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GLOSSARY

We propose a vocabulary adapted to the scientific context⁽⁸⁾.

Primal - first in time and first in importance.

Primal period - the time which included fetal life, perinatal period and early infancy. It is during the primal period that the adaptive systems involved in what we commonly call health reach maturity. It is the time of close dependence on the mother. One can anticipate that any kind of event happening during this period can have irreversible effects.

Primal adaptive system - the subcortical nervous system, the endocrine system and the immune system should no longer be separated and should be understood as a whole (e.g. the brain is a gland, insulin is a neuromediator, lymphocytes can release endorphins, etc.). We call this network the 'primal adaptive system'. Phrases used in the medical literature, such as 'psychoneuroimmuno endocrinological system', 'psychoneuro immunology', 'immuno endocrinology', etc., should be expressed in simpler terms. A recent review-article in the *New England Journal of Medicine* gave a perfect updated description of what we call the 'primal adaptive system'.⁽⁹⁾

Health - is how well the primal adaptive system works (it is not the absence of disease). At the end the primal period we are in a basic state of health called **primal health**. The objective of **primal health research** is to explore correlations between the Primal period and what will happen later on

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