THE CHINESE DIET AND PREGNANCY

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Given the concern that obstetricians, nutritionists, and public health professionals have had regarding maternal nutrition during pregnancy and the relationships that have been noted between infant mortality and the growth and development of the fetus, a study of the diet prescribed by an ethnic group and the possible effect that diet might have on pregnancy outcome may be of some interest. The focus of this paper is the diet and system of beliefs surrounding pregnancy for Chinese women. I will restrict myself mainly to the beliefs of women who would have been bearing children during the immediate pre- and post-war (World War II) years, since the knowledge and experience of my informants was gained during this time. I will be looking at the content of the prescribed diet for pregnancy and comparing it with the regimen presently prescribed in the United States for pregnant mothers. A consideration of the adequacy of the prescribed diet as reflected by infant and prenatal mortality rates that are available will be included as will a hypothesis about possible associations of the Chinese diet with pregnancy outcome.

To determine the type of diet recommended for pregnancy, I relied upon two informants, my mother and my landlady. They are both from middle-class families in China. Their knowledge would then draw from the beliefs shared by middle income, educated women reaching childbearing age in the 1940s. My mother was born and raised in Amoy, a coastal city in southern China, and educated in Shanghai; my landlady was born and educated in Shanghai.

Chinese food habits have traditionally reflected a holistic approach to food. A good diet balanced with respect to "hot" and "cold" foods was not only a requisite for good health but could also be used selectively in illness for therapeutic purposes.

My mother classified foods a little differently from Mrs. Lin. She used three categories: liang, hwo chi, and bu. Mrs. Lin used only liang and hwo chi. The Chinese word liang is used to characterize the "cold" foods and means cool or cold. My mother said that liang foods were light, cooling, and suggested a cleansing property. These foods include most vegetables and fruits as well as bamboo shoots, water chestnuts, bean curd, and others. In the hwo chi, or "hot", category she grouped deep fried foods, roasted or fried peanuts, and sesame candy. Bu means to repair or mend and has the added meaning of remediation; rice, sweet potatoes, noodles, taro root, and soybeans were considered neutral foods. In the bu group my mother also listed all meats, eggs, fish, milk, most dried fruits, ginger, molasses, and others. Most of these foods would be included in Mrs. Lin's "hot" category.

Pregnancy: Diet and beliefs.

Pregnancy is viewed as a "delicate" period by the Chinese. The Dream of the red chamber, a famous novel of Chinese family life, gives a description of the behavior and activity of a pregnant woman of the gentry which has come to be regarded as a norm for all pregnant women. Chiang Yee, in his autobiographical account of his childhood in the early years of this century as a member of an extended family, offers an interesting vignette of his sister-in-law's confinement.

> Boys and girls were by no means forbidden to mix, but the separation seemed to arise naturally. So I did not see my sister-in-law every day during the first few years of her marriage. But I knew that she delighted my elders, as she had been brought up in all the old traditions. Each New Year's Day my grandmother and aunts greeted her with the hope that she would have a beautiful baby during the year. But nobody seemed greatly concerned when four years passed and still she had no baby.
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> Then one day she did not dine with us, and later I heard someone say that she was not feeling well and that the third great-uncle would have to be consulted. During the following days she was frequently missing from our dinner table, and I heard that she was having hot and bitter things to eat such as preserved ginger roots, ku-kua (bitter melon or Momordica charantia) and La-chiao (capsicum) and Yan-mei (Myrica rubra, very sour). Then my third great-uncle told Grandmother that sister-in-law was Yu-hsi, "having happiness".
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> The news spread rapidly through the house and everybody was pleased, although there was no excitement. My younger cousins were warned not to make any peculiar noise near sister-in-law's chamber. Grandmother, I noticed, went in and out of the room very frequently. Under normal circumstances sister-in-law had to look after her own room, with the help of a maid shared with two or three girl-cousins: now she was given a maid to herself and was forbidden to do any housework. She was not to sit in draughty spots, nor on part of a chair; she was to walk slowly to and fro in front of or inside her chamber for some time every day. Two older girl-cousins kept her company and took their meals with her in case she should want anything. They were warned not to discuss unusual matters which might over-excite sister-in-law, and on no account to mention funerals, ghosts or spirits, as these would affect the baby. Above all, they were not to tire her.[1]

Chiang goes on to relate how his father painted some scrolls to hang on the walls of his sister-in-law's chamber, as part of the education of the baby before birth.

Chiang's description of what is proper activity and behavior for pregnancy is not unlike my mother's comments about what she thought ought to be done during pregnancy. As to diet, my mother and Mrs. Lin both

expressed the opinion that there was no elaborate diet that was traditionally adhered to other than one that was high in "hot" foods (for Mrs. Lin) or bu foods (for my mother). They agreed that too many "cold" or liang foods were undesirable. Mrs. Lin understood that too many liang foods were to be avoided for fear of bleeding and/or miscarriage. For her, an ideal diet for pregnancy contained a great deal of meat. Drinking wine was also considered to be a healthy practice.

It is generally accepted that during the first trimester morning sickness interferes with proper nutrition. There is a salted, extremely sour plum which pregnant Chinese women eat to settle the stomach and help stimulate appetite. This sour plum is quite popular among non-pregnant women as well, but as far as I was able to determine is not eaten by men. The eating of the sour plum is regarded by my informants not as a craving, but merely as a response to morning sickness.

If, during pregnancy, the expectant mother fancies some food it is almost always obtained for her when possible, especially during the first trimester when appetite may be poor. I could elicit no reports of odd cravings or pica (earth-eating). My mother admitted after some thought that she did crave salted fish and that this was a popular food for some pregnant women.

In the passage cited above from Chiang, bitter melon, peppers, sour plum, and ginger root were part of the sister-in-law's diet. All these foods have very strong, very distinct tastes. In China, it is commonly believed that spicy, hot condiments and sauces will increase appetite. Hytten reports a study performed by Hansen and Langer in 1935, on 28 preg-

nant and 12 non-pregnant women. They found that the threshold for all types of taste--salt, sweet, sour, and bitter, was raised in the pregnant women. Taggart, studying pregnant women in Aberdeen, found that they favored highly flavored foods such as kippers, pickles, and cheese.[2] It is interesting to speculate whether for pregnant women the eating of hot, spicy foods reflects preferences, constitutes a response to physiological needs, or is a fairly arbitrary cultural dictum or some combination of these factors.

Although there was some pampering and catering to the gastronomic whims of the expectant mother, there were also controls placed on the types of food which were thought appropriate for the expectant mother besides encouraging "hot", or bu foods. Some foods were considered du, or toxic for pregnant women. During the war, my mother was pregnant with my brother. She was away from her home and relied heavily on the advice of her Swatow amah, or servant. Food supplies were limited and she ate mostly vegetables and salted fish, but little meat or other bu foods. A few days after my brother was born he developed a strange weeping lesion on his head. The Swatow amah was positive that it was the result of my mother's having eaten the salted fish which she considered toxic for pregnancy.

Fresh and not salted or otherwise preserved foods were mandatory during pregnancy. Under normal circumstances Chinese are insistent that only the freshest meats and vegetables be served. Without refrigerators at home, it was common practice for a household to market daily. Salted fish and cured meats, though popular, are thought to be of lower quality.

In view of the questions that are being raised about preservatives, smoked foods and their association with the occurrence of certain cancerous conditions, and in view of the link which some investigators feel exists between the incidence of meningo-myelocoele and ingestion of a potato fungus, the proscription of salted fish and cured foods may be a wise one.

The special emphasis given to a pregnant woman's diet was particularly important for, under normal conditions, an adult woman receives the poorest share at meals. In the Chinese tradition, a good mother is one who pushes food toward the family. This is outlined in the Classics and according to my mother there is also a famous painting which captures this idea. A good mother is one who eats "least and poorest". The choice and best food is offered to the husband. Then, the male children, female children, and lastly the mother. The conditions of pregnancy and lactation, however, justified eating better food. The notion of feeding two is well accepted. As I mentioned earlier, food fancies are indulged. Money from housekeeping funds, or which the bride brought with her when she joined her husbands family could be used to supplement the food budget during pregnancy.

A built-in means of assuring the adequacy of the pregnant woman's diet was the practice among traditional gentry families of checking whether or not their daughters were receiving proper treatment, especially during pregnancy. These kinship responsibilities continued after marriage, despite the fact that the daughter belonged to another family. Apparently the traditional courts heard many suits which were the consequence of these kinship duties. Suits frequently resulted between inlaws when the

daughter/wife committed suicide. Less commonly, suit would be brought for inadequate care during pregnancy. Usually this action was not necessary, since the one time a daughter-in-law was elevated to a more favored status was when she was pregnant and possibly producing an heir.

As is clear from Chiang's account and the comments of my informants, a relationship is considered to exist between diet, activity, and mental outlook during pregnancy and the outcome of the pregnancy. This belief is certainly consistent with the current concepts of obstetrical risk for mother and child.

The prescribed diet and current concepts of maternal nutrition.

How does the prescribed diet as outlined by my informants compare with that regarded as optimal for pregnancy in the U.S.?

Current practice in the U.S. in the management of most pregnancies is to advocate a high protein diet, up to 100 grams of protein per day. The average protein intake in the U.S. is estimated to be 55 grams per day.[3] An estimate of the protein content of the Taiwanese diet is approximately 45 grams per day.[4] It seems not improbable that if the expectant mother were able to follow the dietary prescription for pregnancy she could nearly double the protein intake by increasing "hot" or bu foods from animal sources.

It seems important to consider the type and quality of diet from which this high protein, nutritious diet recommended for pregnancy arose. Given the size of China, an accurate estimate of levels of nutrients in the usual diet consumed was probably impossible to obtain. It is generally agreed, however, that the diet was probably close to meeting caloric

requirements for a majority of the people, although there was variation in adequacy with locale and year. The diet was largely vegetarian with 98% of calories from plant sources and only 2-4% from animal sources, mostly pork.[5] Thus, protein was mainly derived from vegetable sources. Maynard and Swen, writing about farm families in China, felt from their sample survey that on the average, the intake of protein could be considered adequate both in quantity and quality. They cautioned that this average concealed "enormous inequalities between regions and between families".[6]

The Chinese diet was thought to be conspicuously low in calcium. However, fairly good sources of calcium in the Chinese vegetarian-type diet were green, leafy vegetables, some fruits, soybeans, bean curd and peanuts. Iron, the other very crucial mineral for which requirements increase greatly during pregnancy, was generally thought to be adequate in the usual diet.[7] The diet of "hot" or bu foods advocated for pregnancy would not only increase the amount of good quality protein but also add calcium necessary to meet the higher nutritional requirements of pregnancy.

It is obvious that the type of high quality, protein-rich diet advocated for pregnancy was inaccessible for the poor. When 60% of the family income is being spent for a diet which is almost entirely vegetarian, it is unlikely even with the most ardent conviction that a diet is desireable, that resources could be made available for obtaining it.[8] Horn gives a description of the deplorable living conditions of the poor in pre-liberation China.

> Poverty and ignorance were reflected in a complete lack of sanitation as a result of which fly- and water-borne disease, such as typhoid, cholera, dysentery, took a heavy toll. Worm infestation was practically universal, for untreated human and animal manure was the main and essential soil fertilizer. The people lived on the fringe of starvation and this also lowered their resistance to disease so that epidemics carried off thousands every year. The average life expectancy in China was stated to be about 28 years. Reliable health statistics for pre-liberation China are hard to come by, but conservative estimates put the crude death rate in times of peace at between 30 and 40 per thousand and the infant mortality rate at between 160 and 170 per thousand live births. The plight of women and children was bad beyond description. The men had to have what grain there was to give them strength to work in the fields. The women, especially those who stayed at home to look after the children, ate only thin gruel, grass and leaves. They were so ill-nourished that by the time they reached middle age, they were toothless and decrepit. Many adolescent girls, lacking calcium and vitamin D, developed softening and narrowing of the pelvic bones so the normal birth became either impossible or so dangerous that 6 to 8 percent of all deaths among women were due to childbirth. Babies were breast fed for three or four years, for no other food was available. This threw a heavy strain on the mothers and also resulted in child malnutrition and such vitamin deficiency as rickets and scurvy.[9]

The lot of the pregnant poor in China was such that a woman in labor was commonly referred to as having "one foot in the grave and one foot out".[10]

Nutritional effect and perinatal and infant mortality rates.

The use of perinatal and infant mortality rates in the analysis of various maternal factors during pregnancy is well established. The effect of nutrition on pregnancy outcome has received a great deal of attention. Some of the data collected with reference to this problem illuminate the question of the adequacy of the Chinese pregnancy diet.

Cases of food deprivation during World War II suggest the validity of examining the relationship of nutrition and perinatal and infant mortality rates. For a decade or more prior to 1940, perinatal mortality in

Great Britain was stationary, but between the years 1940 and 1945, there was a rapid decline in this rate despite wartime stresses. During this period, although there was some food shortage, pregnant and lactating mothers were given priority in the distribution of food. The 18 month siege of Leningrad in 1942, a period of starvation, was associated with an increase in perinatal mortality and a doubling of the still birth rate.[11]

Infant mortality rates for China for the 1930's were estimated to be approximately 160 per 1,000 live births. This estimate may be quite low, considering that it was equal to the rate for Japan during this period. Japan's economic situation was certainly far better than that prevailing in China. For the period in question the U.S. had a rate of 50-60 per 1,000 live births.[12]

In view of the important social, symbolic role of food and the high priority it is given in Chinese society and the sound nutritional precepts governing diet during pregnancy, together with the great value placed on children (the most common reason for divorce in traditional China was having a wife who was barren), I would hypothesize that once the economic barriers to the realization of the ideal diet for pregnancy, the maternal diet would be excellent and would be reflected in measures of pregnancy outcome. Consequently, a decrease in perinatal and infant mortality would be expected. Of course, I am making the assumption that the diet as outlined by my informants is commonly acknowledged as the ideal diet for expectant mothers. Specifically, that the low income, less educated also acknowledge this diet.[13]

My hypothesis receives some support from several statistical cases. 1. In the U.S. in 1966, the infant mortality rate for the nation was 23.7. When the figures were broken down according to subgroups, Negro babies had an infant mortality rate (I.M.R.) of 40.1/1,000 live births, Indians 36.8/1,000, whites 20.6/1,000, and amazingly, the Chinese had an I.M.R. of 9.9/1,000 live births. The possibility of under-reporting in accounting for the very low rate must be considered. Even allowing for such an error, it still seems quite impressive,[14] and suggests that a factor, like better nutrition, is responsible for the difference.

2. Thomson, Chun, and Baird examined stillbirth and perinatal mortality rates from Hong Kong and Aberdeen, Scotland, and found that the stillbirth rates for 1958 were 16.4/1,000 and 23/1,000 respectively. The perinatal mortality rate for a Hong Kong hospital serving high risk cases from lower socioeconomic class was 16/1,000 while for Aberdeen the rate was almost twice that, 28/1,000. Attempting to account for this remarkable difference, they compare the obstetrical standards of the Hong Kong hospital studied with the standards in Aberdeen and feel they are comparable.[14]

Thompson, Chun, and Baird reject nutrition as a factor in this difference.

> Nor can the results be explained in terms of exceptionally high standards of health and nutrition among the Chinese patients. The great majority of the . . . patients come from poor homes. A survey of 512 patients made a few years ago (unpublished) showed that "the majority belong to the low income group," the husbands of most being coolies, hawkers, boatmen, factory workers and the like. In the group of primiparae studied in this present report, roughly 1 in 50 suffered from pulmonary tuberculosis. It would not be profitable to speculate as to the reasons for the remarkable

results obtained with such a population.[16]

Earlier in the article the authors mention that although there are "wide extremes of wealth and poverty" the economy was booming and in fact a shortage of labor was noted.

> Food is varied and plentiful. The markets and shops are stocked with a wide variety of meats, fish, vegetables, and fruits and purchasing power in general now seems to be sufficient to prevent serious under-nutrition or malnutrition. Qualitative defects in the diet, which has rice as the staple, are related to traditional habits of feeding rather to availability of food.[17]

My comment would be that perhaps traditional habits of feeding governing pregnancy when relative economic security is achieved, may not lead to "qualitative defects in the diet," but may well be contributing to the remarkable difference in perinatal mortality cited in his report.

However, when one scrutinizes the data from Thomson's report closely, the implications are far from illuminating and are not as compelling as one would wish. For instance, while the overall stillbirth rate for Hong Kong for 1958 was 16.4/1,000 total births, the rate at one of the hospitals serving the poorest sector of the population (not the hospital Thomson used for his perinatal data) was 31.8/1,000. The hospital which Thomson studied, also serving a poor section of Hong Kong, had a stillbirth rate of 13.8/1,000. Obviously, much more reliable data on perinatal deaths must be available before real difference in mortality between Hong Kong and Aberdeen can be said to exist. The data, admittedly incomplete, is very interesting.

3. Also of interest is the infant mortality rate for Taiwan of 18/1,000 live births which compares favorably with Canada and the U.S.,

both with an I.M.R. of 19/1,000 live births, for 1972. The I.M.R. of 9.9/1,000 for Chinese in the U.S. in 1966 gives some support to my hypothesis.

Conclusion.

These statistics are suggestive of my hypothesis, but more controlled nutrition research would be necessary to support it. If an assessment of the Chinese women in this country showed the persistence of the prescription of "hot" or bu foods for pregnancy, this would help buttress my argument. When data is readily available from the People's Republic of China, it will allow a more thorough consideration of the subject.

In summary, the prescriptions and proscriptions of the Chinese diet for pregnancy as outlined by my informants have been examined and some speculation regarding their possible scientific basis has been offered. The diet advocated for the expectant mother appears to be sound nutritionally and augments the amount of protein and calcium in the diet, two nutrients which are present in barely adequate or reduced amounts in the traditional vegetarian diet. Although the culture grants a favored nutritional status to the pregnant woman, permitting her intake to be better than her usual "least and poorest" ration, economic circumstances determine whether she is able to take advantage of this favored status. A hypothesis was ventured that given the importance of food in Chinese culture and the value traditionally placed upon having children, that when economic stability is obtained, an optimum diet for pregnancy would be realized and favorable consequences in terms of decreased perinatal and infant mortality rates would occur. The evidence cited is limited but suggestive.

NOTES

[1]Chiang, 1952, pp. 193-194.

[2]Hytten, 1971, p. 165ff.

[3]Nutrition in maternal health services, 1973.

[4]Blackwell and Chow, 1973.

[5]Buck, 1937, pp. 16-17.

[6]Maynard and Swen, 1937, pp. 417-421.

[7]Maynard and Swen, 1937, p. 425.

[8]Low, 1937, p. 437.

[9]Yeh and Chow, 1973, p. 216.

[10]Salaff, 1973, p. 33.

[11]Stillbirth rate, also called fetal mortality rate, is defined as the number of fetal deaths occurring after 20 or more weeks of gestation per 1,000 total births (stillbirths plus live births). Perinatal mortality rate is the number of fetal deaths plus the deaths of infants under 1 week of age per 1,000 total births. Infant mortality is the number of deaths under 1 year of age per 1,000 live births. Siegel and Morris suggest the association of starvation during the siege of Leningrad with increased perinatal mortality and a doubling of the stillbirth rate; 1970, pp. 20-21.

[12]Notestein and Chiao, 1937, pp 189-190.

[13]In interpreting mortality data I realize that infant mortality rates are a very crude and indirect indicator of nutritional effect, and that

with improvement in economic status there is usually a concurrent improvement in a whole host of other factors which impinge upon infant mortality, such as housing, sanitation, and obstetrical care. Nevertheless, the statistics are impressive.

[14]Wallace and others, 1973, p. 100.

[15]Although there is fairly satisfactory registration of births, the certificate being required for school and employment, the accuracy of the statistics on infant deaths is unknown. Deaths are not registered and official returns are from notifications by undertakers and cemeteries; thus, it is possible that a significant under-reporting of deaths accounts for the lower stillbirth and perinatal mortality rates. Thomson and others argue that in such a densely populated area, it is difficult to dispose of a body, and there is little evidence for unrecorded disposals; 1963.

[16]Thomson and others, 1963, pp. 876-877.

[17]Thomson and others, 1963, pp. 871-872.

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