

Postpartum Dietary Intakes and Food Taboos Among Chinese Women Attending Maternal and Child Health Clinics and Maternity Hospital, Kuala Lumpur

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ABSTRACT

Traditionally, Chinese women adhere to special dietary practices during the month following childbirth. This paper discusses the dietary practices and food taboos practised by Chinese women in Kuala Lumpur. A total of 134 Chinese mothers of children below one year were recruited from three Maternal and Child Health Clinics and Maternity Hospital, Kuala Lumpur. Questionnaires and in-depth interviews were used to obtain information on socioeconomic background, dietary practices, food taboos and cooking methods during the confinement period. Food intake was assessed by multiple 24-hour dietary recall among 34 mothers during their confinement month (*zuo yuezi*). Body weight and height were measured, and body mass index calculated. Majority of the respondents had secondary school education (77.6%), household income between RM1001 and RM3000 (64%), and were homemakers (48.5%). The women were aged 18 – 39 years, and 68% were of normal weight. Most women (82%) practised 30 days of confinement, during which they adhered to special dietary practices. The diet was directed at attaining *yin-yang* (cold-hot) balance, whereby “hot” foods were most commonly used and “cold” foods were avoided. Ginger, rice wine and sesame seed oil, considered “hot” foods, were used in large amounts in the cooking. Rice, chicken and pork were also consumed in large amounts. Most vegetables and fruits were considered “cold” and were prohibited during confinement. Most mothers drank specially-prepared teas boiled from Chinese herbs. Mean energy intake was 19% below RNI, while mean protein intake was 93% above RNI (NCCFN, 2005). Mean intakes of thiamin, riboflavin and niacin were above 75% of RNI, while vitamins A and C were at half of RNI or less. Mean iron and calcium intakes were at 222% and 67% of RNI, respectively. It is concluded that most Chinese women in Kuala Lumpur do conform to special dietary practices during *zuo yuezi*.

INTRODUCTION

According to Chinese beliefs, the mother and child are extremely vulnerable to illness and potential death during the month after birth. Traditionally, Chinese women follow a set of well-defined cultural practices designed to reduce this danger (Pillsbury, 1978). Women who follow the traditions are said to be in confinement or "doing the month" (*zuo yuezi*).

Zuo yuezi serves as a physical convalescence, a preventative measure, a social sanction to rest, a consolation, and a prompt for Chinese women to concentrate on their baby and their role of breastfeeding. It also serves as an occasion to strengthen intra-family ties, especially between the woman and her mother or mother-in-law (Cheung, 1997).

The mother must also restore the balance of *yin* (cold) and *yang* (hot) in her body. During the postpartum period, the mother is in the period of strongest *yin*, and accordingly her diet should be based upon *yang* foods, which are typically those high in energy and protein (Hwu, Coates & Boore, 2001). Several foods, called galactagogues, are encouraged during lactation in the belief that their consumption will increase the mother's breast milk production (Pillsbury, 1978). These foods include chicken, pork, rice wine, fish, and wheat noodles with egg. Strength-providing foods and medicinal products, such as chicken, ginger and ginseng (*Panax ginseng*) are also encouraged so that the mother recovers quickly from the exertion of labour.

Zuo yuezi is embedded in the culture of the Chinese and is practised not only in China, but also by Chinese living in other parts of the world. Studies in Hong Kong (Holroyd *et al.*, 1997), Taiwan (Heh, Fu & Chin, 2001), Scotland (Cheung, 1997), California (Fishman, Evans & Jenks, 1988), Australia (Matthey, Panasetis & Barnett, 2002), and Malaysia (Ngin, 1985) have found that Chinese mothers practice *zuo*

yuezi to a certain extent after childbirth.

In Malaysia, Chinese women do conform to some if not all *zuo yuezi* practices (Ngin, 1985). The Malaysian Chinese women are also known to have a *pei yue* who keeps company with the mother for a month after childbirth (Dixon, 1993). The *pei yue*, sometimes the woman's own mother, mother-in-law, or a paid professional, is an experienced woman whose job is to cook and care for the the mother, baby and other children throughout the confinement. The *zuo yuezi* practices, however, are usually modified to suit the modern mother's lifestyle, beliefs, and financial status. The dietary aspects of the *zuo yuezi* may also be modified but are usually followed.

A literature search of available resources found very few studies specifically relating to the dietary aspects of confinement after childbirth carried out in Malaysia in recent years. Several papers relevant to this topic were published in the 1950s to early 1980s: Millis (1958) reported modifications in food selection observed by Malays women during pregnancy and confinement, Jensen (1967) discussed various aspects of Iban birth, Kuah (1972) studied Malay customs in relation to childbirth, Chen (1973) analysed customs related to childbirth in rural Malay culture, and Manderson (1981a) reported Malay confinement practices of roasting, smoking and dieting. Lee, Janet & Ravindran (1997) in a study on the incidence of postnatal depression among women of Malay, Chinese and Indian ethnicities in Seremban reported that 64.3% followed "*pantang larang*" and 85.7% took special diets, but did not elaborate on these aspects. Apart from Ngin's (1985) study among Chinese women of Hokkien dialect in Selangor, there is no other known publication on confinement and its special dietary practices among Chinese women in Malaysia.

With this background in mind, this study was carried out to determine the

dietary practices of Chinese mothers during confinement. This paper reports the dietary intakes and food taboos of Chinese mothers attending government clinics and hospitals in Kuala Lumpur.

METHODS

Respondents

A total of 134 Chinese mothers volunteered to participate in this study. A mother was chosen if she had a child below 1 year old. If the mother had more than one child, then the questionnaire was directed at the practices for the youngest.

A hundred respondents were mothers with a child below one year old who attended three Maternal and Child Health Clinics in Kuala Lumpur, namely those at Jalan Tun Ismail, Taman Sri Sinar, and Jalan Cheras. These mothers were interviewed during their clinic visit.

Thirty-four mothers had given birth at the Maternity Hospital in Kuala Lumpur Hospital and were in confinement during the survey. These mothers were interviewed during their stay in the hospital after delivery and their socio-demographic data and contact numbers were obtained. The mothers also gave permission to be interviewed by telephone during their confinement at home.

Questionnaire and interview

A set of questionnaires was used to collect data on the socio-demographic background of the respondents, dietary practices and food taboos observed during confinement after childbirth. The questionnaire was interview-administered by two trained university students, who could speak Mandarin, English and several Chinese dialects. Interviews were conducted in Mandarin or English, and supported by the use of Cantonese, Hokkien or Teochew dialects, depending

on the fluency of the respondents.

A small proportion of the women from each dialect group, namely Cantonese, Hakka, Hokkien, and Teochew, were also interviewed in detail as to the food taboos, dietary practices and cooking methods that they observed during their confinement.

Food Intake

Food intake was assessed by multiple 24-hour dietary recall method in 34 mothers during their confinement month. The respondents were interviewed via telephone for three days, namely two weekdays and one weekend day. They had been taught, when met during their hospital stay, on how to estimate food intake using common household measurements, such as plates, spoons and cups.

The food intake data was then converted to nutrient intake using a computer package based on the Nutrient Composition of Malaysian Foods (Tee *et al.*, 1997). Foods not found in the Malaysian database were obtained from the food composition tables of China, Singapore and ASEAN (Preventive Medical Science Centre & Research Centre of Nutrition and Food Health, China, 1999; Ministry of Health, Singapore, 1993; Ministry of Health, Singapore, 1998; Puwastien *et al.*, 2000).

Anthropometry

Body weight and height were measured in 100 women who attended the Maternal and Child Health Clinics. Body weight and height were measured in light clothing and without shoes; using Tanita digital scale to the nearest 0.2kg and SECA bodymeter 208 to the nearest 0.1cm, respectively. Body mass index (BMI) in kg/m² was calculated for each subject.

The 34 respondents who were telephone-interviewed during confinement were not measured. Self-reported

weight and height at one month after childbirth were used. According to Kuczmarski, Kuczmarski & Najjar (2001), self-reported heights and weights can be used with younger adults, but have limitations for older adults aged 60 years and above. Since the respondents of this study were women in their reproductive years, self-reported weight and height should be acceptable.

Data Analysis

Data analyses were performed using SPSS Version 10.0 (Statistical Package for the Social Sciences). A statistical description of the population was made. Dietary intake was analysed using the Diet 4 program and compared with the Recommended Nutrient Intakes (RNI) for Malaysia (NCCFN, 2005).

RESULTS AND DISCUSSION

Sociodemographic Characteristics

Table 1 shows the demographic and socio-economic characteristics of the respondents. The women were mostly from Hokkien (36.6%), Cantonese (28.3%) and Hakka (24.6%) dialect groups. Teochew formed 6.0% of the pool and the rest were from other dialect groups, such as Hainan, Guangxi and Fuchow.

The majority of the women (77.6%) had secondary school education, 12.7% had tertiary education, 9% primary school education, and only one (0.7%) had no formal education. A large proportion of the women (48.5%) were homemakers, with a similar proportion (44.0%) working in the private sector. A minority were self-employed (5.2%) or worked in the government sector (2.3%).

The majority of the women who were homemakers did not have a personal income. Most of the women who were employed had a monthly personal income

of RM1500 and below (38.0%), 12.0% earned between RM1500 and RM3000, while only 1.5% had an income above RM3000. The women's personal income, however, may not be reflective of their financial situation. It would be more accurately represented by taking into account their spouse's income.

A majority of the respondents' spouses (79.1%) worked in the private sector. Another 20.1% were self-employed and the remaining 0.8% worked in the government sector. The majority of the spouses (76.9%) had an income of between RM1001 and RM3000. Of the remaining, a similar percentage had incomes RM1000 and below (11.9%), and above RM3000 (11.2%).

The combined income of the respondents and their spouse is reported as household income in Table 1. A majority of the women (63.4%) had a household income of RM1001 - RM3000. Another 28.4% had household income of between RM3001 - RM10,000; while only 1.5% had household income above RM10,000, and 6.7% had household income RM1000 and below. This proportion reflects the lower to middle income segment of patients who usually attend government clinics as the more affluent would usually seek treatment at private hospitals (Chan, 1996).

Physical Characteristics

Mean age of the women was 28.7 ± 5.0 years, and ranged from 18 to 39 years at the time of the interview (Table 2). Mean body weight, height and BMI were 55.8 ± 8.7 kg, 158.8 ± 5.6 cm, and 22.2 ± 3.7 kg/m², respectively.

Figure 1 shows that a majority of the women were of normal weight (68%). Another 15% were categorised as overweight, 4% were obese Grade I, and none were categorised as obese Grades II or III. A smaller percentage suffered from chronic energy deficiency (13%).

Table 1. Socio-demographic characteristics of mothers (n=134)

<i>Characteristic</i>	<i>Number of subjects</i>	
	<i>No.</i>	<i>Percentage</i>
Dialect group		
Hokkien	49	36.6
Cantonese	38	28.3
Hakka	33	24.6
Teochew	8	6.0
Other dialects	6	4.5
Level of education		
No formal schooling	1	0.7
Primary	12	9.0
Secondary	104	77.6
Tertiary	17	12.7
Employment		
Government	3	2.3
Private	59	44.0
Homemaker	65	48.5
Self-employed	7	5.2
Personal income		
RM0	65	48.5
RM 1 - RM 1000	31	23.1
RM 1001 - RM 1500	20	14.9
RM 1501 - RM 2000	8	6.0
RM 2001 - RM 3000	8	6.0
> RM 3000	2	1.5
Spouse's employment		
Government	1	0.8
Private	106	79.1
Self-employed	27	20.1
Spouse's income		
RM 1000 and below	16	11.9
RM 1001 - RM 1500	45	33.6
RM 1501 - RM 2000	25	18.7
RM 2001 - RM 3000	33	24.6
> RM 3000	15	11.2
Household income		
RM 1000 and below	9	6.7
RM 1001 - RM 2000	48	35.8
RM 2001 - RM 3000	37	27.6
RM 3001 - RM 5000	24	17.9
RM 5001 - RM 10000	14	10.5
> RM 10000	2	1.5

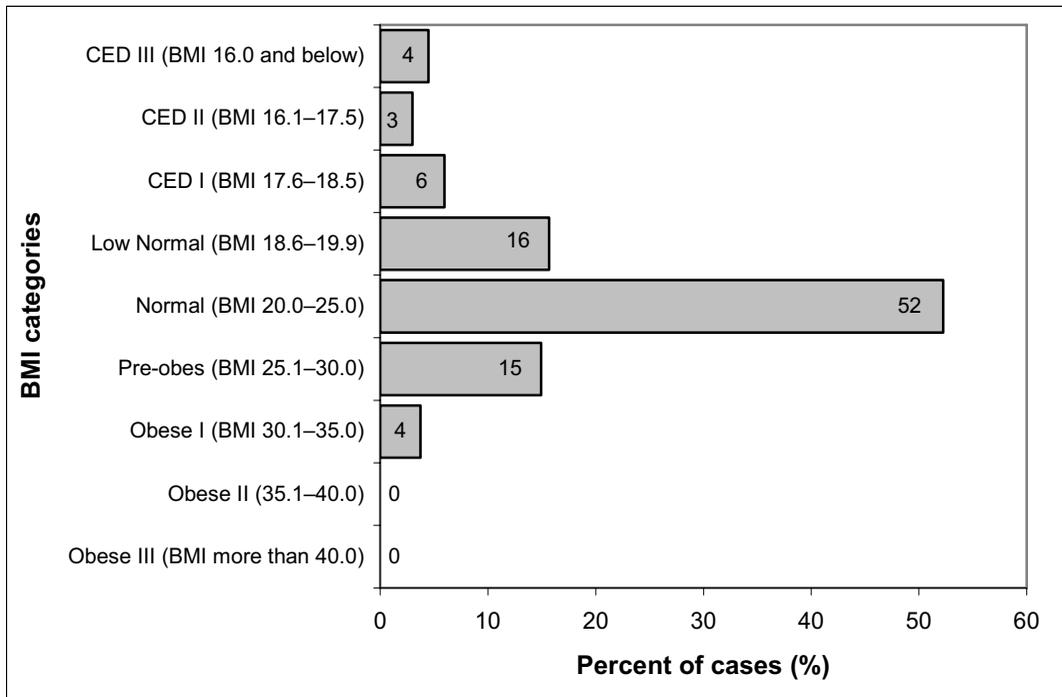


Figure 1. Distribution of respondents according to BMI categories

Ismail *et al.* (1995) reported similar prevalence in their study on 979 Malaysian Chinese women, with 71% normal weight, 12.9% overweight, 4.3% obese, and 11.8% CED. A more recent report from the National Health and Morbidity Survey completed in 1996 also showed similar trends among Chinese women, that is 62.7% normal weight, 18.7% overweight, and 5.3% obese, while 13.3% were underweight (Lim *et al.*, 2000).

As in the two nation-wide studies, the dual problems of under- and over-nutrition, which prevail in the Malaysian population (Noor, 2002), were also evident in the women who participated in this study.

Dietary practices during confinement

Duration of confinement period

Figure 2 shows the duration of confinement as practised by the respondents after their latest childbirth. The majority of Chinese women (82%) were in confinement for 30 days. Twelve percent practised confinement for 40 - 45 days, 5% were in confinement for 60 days, and only 1% practised it for 90 days. The practice of confinement for 30 days is in accordance with traditional Chinese custom, which stipulates that a woman should be confined to the home for one full month of convalescence after giving birth (Pillsbury, 1978). Reports from other countries showed that Chinese women who live in Sydney, Australia (Matthey *et al.*, 2002)

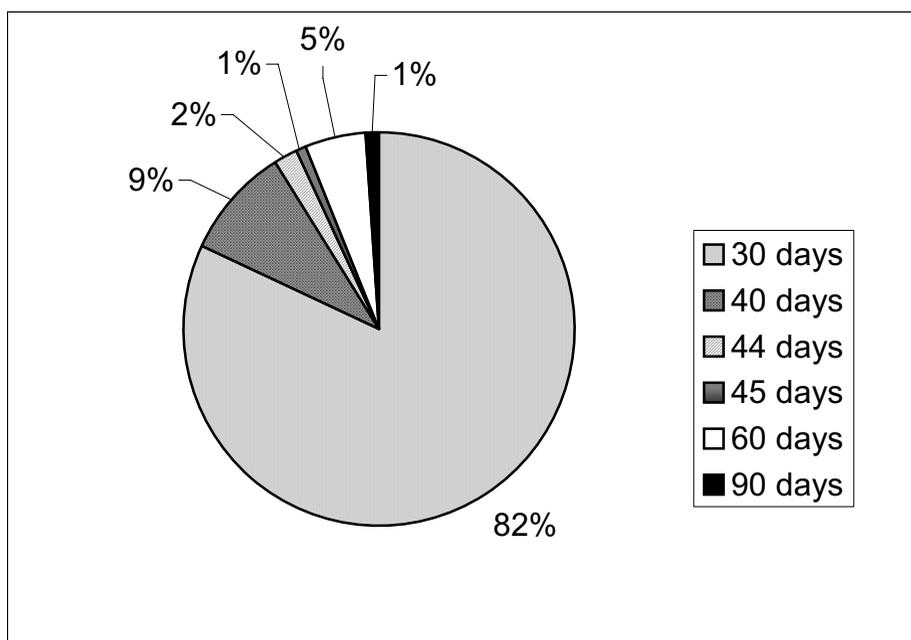


Figure 2. Duration of confinement period

and Scotland (Cheung, 1997) also practised 30 days confinement.

It is also common for women of other ethnicities in Malaysia to practice confinement after childbirth. Malay women are confined for 40 days (Laderman, 1982) to 44 days (Chen, 1973), while Indian women practised 30 days of confinement (Colley, 1978).

Women originating from other Southeast Asian countries are also reported to have special practices in the postpartum period. Rice (2000) reported that Hmong women originating from Laos and Thailand practices *nyo dua hli* for 30 days after childbirth. Fishman *et al.* (1988) on the other hand reported that Cambodian, Chinese and Vietnamese women living in California had special dietary practices for 100 days postpartum.

Cooking methods and special ingredients

The cooking styles and special ingredients used in the diet of women in con-

finement were obtained from detailed interviews with a small proportion of the respondents. Table 3 summarises the special ingredients commonly used and cooking methods adopted by the various Chinese dialect groups for mothers in confinement.

The use of matured ginger as an ingredient for cooking foods for mothers in confinement is common in all dialect groups. Ginger is known as a "hot" or warming food and is believed to enhance blood circulation and have carminative properties (Lu, 1990).

The Cantonese and Hakka dialect groups have very similar cooking styles, whereby chicken is simmered in rice wine and ginger without the addition of water. Another common dish is pig trotters simmered in black vinegar and ginger. These dishes are alternately prepared and served almost every day during confinement.

The Hokkien and Teochew dialect groups also have many similarities,

Table 2. Physical characteristics of respondents (n=134)

Variable	Mean \pm SD	Range
Age (years)	28.7 \pm 5.0	18.0 – 39.0
Height (cm)	158.8 \pm 5.6	142.0 – 175.0
Body weight (kg)	55.8 \pm 8.7	38.0 – 80.0
BMI (kg/m ²)	22.2 \pm 3.7	14.8 – 32.0

Table 3. Cooking methods and ingredients commonly used by various Chinese dialects

Dialect Groups	Ingredients	Cooking methods
Cantonese, Hakka	C Ginger (matured)	C Chicken simmered with ginger in wine, without adding water.
	C Rice wine	
	C Chinese tonic wine	C Pig's trotters simmered with ginger in black vinegar
	C Black vinegar	
Hokkien, Teochew	C Ginger (matured)	C Chicken simmered with ginger in wine and water mixture.
	C Sesame seed oil	
	C Rice wine	C Meat stir-fried with sesame seed oil.

whereby sesame seed oil is commonly added to stir-fried dishes, and water may be added while cooking. Matured ginger, sesame oil and rice wine are believed to reinforce the warming elements of food. This is the reason the confinement diet uses an excessive amount of these three ingredients. Meat is served every day, usually rotating between chicken, pork, pig liver and kidney.

Chinese herbs were also frequently used in the foods and drinks prepared for the mother in confinement. Red and black dates, dried longans, *kei zhi* (boxthorn fruits), *tong kuei* (angelica) and *dang shen* (*Codonopsis pilosula*) are commonly used. These herbs are reported to nourish blood, improve energy levels and revitalise health (Lu, 1990). Specially-prepared teas made from various combinations of the above-mentioned herbs were drunk for the whole duration of the confinement. These teas are consumed in place of plain water, which is believed to give a lot of "wind".

In general, vegetables and fruits are not encouraged. Depending on the *pei yue's* beliefs, only certain types of vegetables that are not considered "cold", such as mushrooms, french beans, string beans and Chinese kale, were served. Some mothers were prohibited from all types of vegetables and fruits during confinement.

Mothers were encouraged to eat plenty of rice and as much of the specially-prepared dishes as they possibly could during confinement, in order to recover from the exhaustion of childbirth and to encourage breastmilk production. The majority of the women were breastfeeding during confinement (77%), while 23% were not.

Food taboos and food acceptance

Tables 4a – 4e show the acceptance of various types of foods and beverages during confinement, and their properties according to the respondents' beliefs.

The majority of Chinese women considered most vegetables and fruits "cold" and did not eat them during confinement (Tables 4a and 4b). Top of the list of prohibited vegetables were *kangkung*, bean sprouts, cucumber, cabbage, watercress, brinjal, *siew pak choy* and lettuce - with more than 70% of the respondents citing that they were not allowed to eat these vegetables during confinement. The list of vegetables that were encouraged was shorter - string beans, sawi, mushroom, french beans, Chinese kale, and carrot. Only 30 - 43% of the women reported that these vegetables were encouraged, while 45 - 60% of the women cited these same vegetables as prohibited.

Many commonly eaten local and imported fruits were reported to be prohibited during confinement by 61 - 86% of the women, with watermelon, pineapple, *nangka*, *cempedak*, starfruit and papaya topping the list at above 80% prohibited. A more acceptable fruit was apple with 42% citing it as encouraged or "must eat a lot" and 49% citing it as prohibited. Only 2 - 4% of the mothers cited all fruits as "must eat a lot".

Table 4c shows that 58 - 96% of the respondents consider seafood (including squid, cockles, prawn and crab) and most fish (including *kembung*, *pari*, tuna, sardine and *bilis*) as "poison" and were prohibited from eating these foods. Ikan haruan were reported to be "encouraged" or "must eat a lot" by about a quarter of the women. Ikan haruan is reported to enhance dermal wound healing (Baie & Sheikh, 2000), and is especially encouraged for women who underwent caesarean section.

Table 4c also shows that sources of protein that were considered "hot" such as pork and chicken were most encouraged and were eaten every day by all the women (99 - 100%). Eggs and organ foods were also encouraged (56 - 75%). Although mutton and beef were categorised as "hot" food by more than half the women, the majority (42 - 48%) of

them were neutral on the acceptance of these two types of meat, and 27 - 32% said they were prohibited from eating them. These could be due to the cultural practice of the Malaysian Chinese where the majority eats pork, chicken or fish daily, but mutton and beef are less commonly eaten.

Rice was categorised as a "hot" food by 76% of the respondents, and was the most widely accepted food among the five listed under carbohydrate sources (Table 4d). Potato appears to be more accepted than sweet potato and tapioca. Yam on the other hand, was listed as "poison" by 73%, and 90% were prohibited from eating yam. According to Lu (1990), Chinese yam and sweet potatoes are classified as *yin* foods.

Most spices were listed as "hot" foods by more than 50% of the respondents (Table 4d). Ginger and sesame seed oil, the most commonly used items in Chinese cooking for women in confinement, were also listed as "hot" by 84 - 86% of the respondents and more than 90% cited them as encouraged or "must eat a lot".

Most of the beverages listed were classified as "cold" by 59 - 88% of the respondents (Table 4e). Top of the list of drinks prohibited were carbonated water, ice, grass jelly, sugar cane and tea. The only drink that was classified as "hot" was chocolate and 90% said it was "encouraged" or "must drink a lot". Many of the women drank specially prepared teas in place of plain water.

In a study reported by Noor Aini *et al.* (1994) among pregnant women of Malay, Chinese and Indian ethnicities in Kuala Selangor, most vegetables and fruits were also cited by the respondents to be "cold", while most tubers were considered "windy", with yam being cited also as "itchy". Most protein foods were considered "poison" except for chicken and mutton, while most spices were cited as "hot". The traditional beliefs related to the properties of food among the respondents of the present study appear to be similar to the report of Noor Aini *et al.* (1994).

Table 4a. Acceptance of various vegetables and their properties according to respondents' beliefs (n = 100)

Type of vegetable	Acceptance				Properties					
	Prohibited	Not encouraged	Neutral	Encouraged	Must eat a lot	Cold	Hot	Poison	Windy	Do not know
<i>Kangkung</i>	86	4	2	8	0	51	1	2	31	15
Bean sprouts	83	7	5	5	0	64	0	2	10	24
Cucumber	81	5	1	13	0	71	1	0	4	24
Cabbage	79	8	4	8	1	56	2	0	9	33
Watercress (<i>sai yong choy</i>)	78	6	6	7	3	61	3	0	6	30
Brinjal	76	6	10	8	0	59	4	5	6	26
<i>Siew pak choy</i>	73	7	3	16	1	51	5	0	9	35
Lettuce (<i>sang choy</i>)	71	3	6	18	2	52	6	0	8	34
Pumpkin	68	7	11	13	1	55	5	0	17	23
Lady's finger	60	6	11	23	0	47	22	8	6	17
Spinach	59	3	6	26	6	46	8	0	5	41
Carrot	57	7	6	30	0	45	12	0	11	32
Chinese kale	53	2	7	36	2	51	17	5	13	14
French beans (<i>kacang buncis</i>)	52	3	9	36	0	50	19	0	12	19
Mushroom	52	4	8	36	0	38	34	4	3	21
String beans (<i>kacang panjang</i>)	50	2	6	42	0	47	15	3	7	28
<i>Sawi</i>	46	8	3	39	4	58	6	0	6	30

Table 4b. Acceptance of various fruits and their properties according to respondents' beliefs (n = 100)

Type of fruit	Acceptance				Properties					
	Prohibited	Not encouraged	Neutral	Encouraged	Must eat a lot	Cold	Hot	Poison	Windy	Do not know
Watermelon	86	7	4	1	2	72	0	0	2	26
Pineapple	86	6	5	1	2	67	0	1	2	30
Jackfruit (<i>nangka</i>)	84	6	6	2	2	62	4	0	1	33
Jackfruit (<i>cempedak</i>)	84	6	6	2	2	61	4	0	3	32
Starfruit	81	7	5	5	2	65	0	0	1	34
Papaya	80	3	2	13	2	63	0	0	3	34
Mango	79	9	6	4	2	65	1	1	1	32
Pear	78	5	7	8	2	62	1	0	1	36
Rambutan	74	10	11	3	2	54	14	0	1	31
Kiwi fruit	73	6	9	9	3	54	2	0	1	43
Banana	71	8	7	12	2	56	0	0	5	39
Guava	69	10	10	9	2	59	1	0	1	39
Orange	67	7	5	18	3	54	1	0	3	42
Durian	61	10	7	18	4	41	28	0	1	30
Apple	49	3	6	39	3	40	50	0	1	9

Table 4c. Acceptance of protein foods and their properties according to respondents' beliefs (n = 100)

Type of protein food	Acceptance				Properties					
	Prohibited	Not encouraged	Neutral	Encouraged	Must eat a lot	Cold	Hot	Poison	Windy	Do not know
Squid	96	2	0	2	0	1	0	87	1	12
<i>Ikan kembung</i>	94	2	0	4	0	1	0	81	1	17
Cockles	94	2	0	4	0	1	0	85	1	13
Prawn	94	2	1	3	0	1	0	87	1	12
Crab	93	2	2	3	0	0	0	86	1	13
Seafood	91	2	2	5	0	1	0	85	1	13
<i>Ikan pari</i>	89	1	7	3	0	0	1	79	1	19
Tuna	79	4	10	6	1	0	1	68	1	30
Sardine	79	5	8	6	2	1	1	69	1	28
Anchovy	72	2	8	17	1	0	2	65	1	32
<i>Ikan haruan</i>	58	2	16	23	1	0	5	51	1	43
Green beans	51	3	26	18	2	15	15	39	12	13
Beef	32	4	48	11	5	0	49	20	0	31
Organ	22	2	20	44	12	2	60	15	0	23
Egg	11	3	11	57	18	1	57	19	0	23
Chicken	1	0	0	13	86	0	88	1	1	10
Pork	0	0	0	12	88	0	90	0	0	10

Table 4d. Acceptance of carbohydrate and other foods and their properties according to respondents' beliefs (n = 100)

Type of food	Acceptance				Properties					
	Prohibited	Not encouraged	Neutral	Encouraged	Must eat a lot	Cold	Hot	Poison	Windy	Do not know
Carbohydrate foods										
Yam	90	3	6	1	0	4	0	73	4	19
Tapioca	59	9	19	13	0	11	12	18	17	42
Sweet potato	51	9	19	20	1	12	27	29	18	16
Potato	32	9	16	41	2	2	29	14	10	45
Rice	1	0	3	6	90	1	76	0	0	23
Spices and others										
Curry powder	45	8	18	27	2	1	55	17	1	26
Chilli	44	10	21	23	2	1	54	19	0	27
White pepper	34	3	11	41	11	1	50	7	1	41
Vinegar	20	1	12	33	34	0	62	1	0	37
Ginger	7	0	0	9	84	0	86	0	0	14
Sesame seed oil	3	2	3	18	74	0	84	0	0	16

Table 4d. Acceptance of beverages and their properties according to respondents' beliefs (n = 100)

<i>Type of beverage</i>	<i>Acceptance</i>				<i>Properties</i>					
	<i>Prohibited</i>	<i>Not encouraged</i>	<i>Neutral</i>	<i>Encouraged</i>	<i>Must eat a lot</i>	<i>Cold</i>	<i>Hot</i>	<i>Poison</i>	<i>Windy</i>	<i>Do not know</i>
Carbonated water	96	4	0	0	0	85	0	1	8	6
Ice	95	5	0	0	0	66	0	2	20	12
Grass jelly (<i>cincau</i>)	93	5	0	2	0	88	0	0	5	7
Sugar cane water	86	7	5	2	0	80	0	0	5	15
Tea	85	10	0	5	0	75	5	0	7	13
Fruit juice	54	7	26	12	1	59	0	0	4	37
Sugar	47	12	12	29	0	18	10	4	25	43
Coffee	35	14	12	37	2	7	51	3	8	31
Chocolate beverage	2	2	6	67	23	0	79	0	0	21

Malay dietary practices during confinement appear to be based on similar principles as Chinese practices, that is to avoid "cold" foods and favour "hot" foods to restore the desired humoral balance (Laderman, 1983; Manderson, 1981a; Wilson, 1973). However, for Malays, there are more categories of food than simply "hot" and "cold" foods, and there appears to be disagreement in Malay society as to which foods fit into which category (Dixon, 1993). The main agreements appear to be the classification of pineapples as "sharp" and prawns as "itchy" (Manderson, 1981b).

Among Malaysian Indians, the majority of whom are of South Indian descent, "cold" foods, such as tomatoes, cucumbers, coconut milk and mutton, are avoided during confinement. Foods considered good during confinement include very spicy curries, shark and sting-ray, chicken and salted fish (Colley, 1978). Choudhry (1997) who studied Indian women in Canada also reported the balancing of "hot" versus "cold" foods during confinement after childbirth.

Another study carried out among Chinese mothers in Scotland also reported similar findings, whereby "cold" foods such as fresh fruits were avoided. Similar to the findings of the present study, the most commonly consumed "hot" foods reported by Cheung (1997) were chicken, wine, dried longan, brown sugar and sesame oil.

Women from many cultures throughout the world practise some sort of food avoidance after childbirth for various reasons (Sundararaj & Pereira, 1975; Manderson & Mathews, 1981; Fernandez & Guthrie, 1984; Fishman *et al.*, 1988; Odebiyi, 1989; Harrison *et al.*, 1993; Mahmood *et al.*, 1997; Kaewsarn, Moyle & Creedy, 2003; Santos-Torres & Vasques-Garibay, 2003). The underlying explanation is that birth is a moment of extreme vulnerability accompanied by excessive loss of blood during delivery. The mother

should follow certain precautions which prohibit or encourage the consumption of certain foods to restore the mother to good health and to aid the flow of breastmilk. Although there are specific differences in the types of foods avoided during confinement, vegetables and fruits are generally avoided by many cultures, with the exception of Thai practices (Kaewsarn *et al.*, 2003).

Nutrient intakes during confinement

Table 5 shows the mean daily energy and nutrient intakes of the 34 women who were in confinement during the study. Energy intake varies from 1390 kcal/day to 2541 kcal/day. Mean energy intake was 19% below RNI (Figure 3). Protein intake, on the other hand, was high and mean protein intake was 93% above RNI. Mean intake of calcium was below RNI, at 67% of RNI, while mean intake of iron was 222% of RNI at 15% iron bioavailability. Mean intakes of the B vitamins were above 75% of RNI, whereas vitamins A and C were at half of RNI or less.

This is typical of a Chinese confinement diet, where mothers ate a high protein diet, including pork and chicken, and intakes of vegetables and fruits were limited. This is clearly shown in Figure 4, where carbohydrate, protein and fat contributed 40%, 25% and 35% to total daily energy intake. This proportion differs from the recommendation by the Technical Subcommittee on RNI for Energy and Macronutrients (NCCFN, 2005), whereby total carbohydrate should contribute 55 – 70%, protein 10 – 15%, and total fat 20 – 30% to total daily energy intake. The protein intake of the respondents was proportionally much higher due to the high intake of meats, and the high intake of fats could be due to the relatively high content of fat in pork.

Mean calcium intake (672 mg/day) reported in the present study is comparatively higher than the 273 mg/day

Table 5. Daily energy and nutrient intakes of Chinese women in confinement (n = 34)

<i>Nutrients</i>	<i>RNI¹</i>	<i>Mean ± SD</i>	<i>Range</i>	<i>%RNI²</i>	<i>%<RNI³</i>
Energy (kcal)	2500	2033 ± 246	1390 – 2541	81	97
Protein (g)	62.5	121 ± 25	57 – 176	193	3
Fat (g)	-	77 ± 12	45 – 104	-	-
Carbohydrate (g)	-	209 ± 36	119 – 276	-	-
Calcium (mg)	1000	672 ± 220	330 – 1428	67	97
Iron (mg)	10	22 ± 14	4 – 75	222	9
Vitamin A (µg RE)	850	437 ± 249	135 – 1160	51	94
Thiamin (mg)	1.5	1.19 ± 0.42	0.20 – 2.22	79	79
Riboflavin (mg)	1.6	1.56 ± 0.48	0.53 – 2.56	98	53
Niacin (mg NE)	17	18.6 ± 5.7	9.6 – 32.0	110	44
Vitamin C (mg)	95	39 ± 34	8 – 193	41	94

¹ RNI Malaysia (NCCFN, 2005), RNI value for iron is based on 15% bioavailability due to high intake of meat in confinement diet.

² Mean percentage of RNI requirement

³ Percentage of respondents taking below RNI

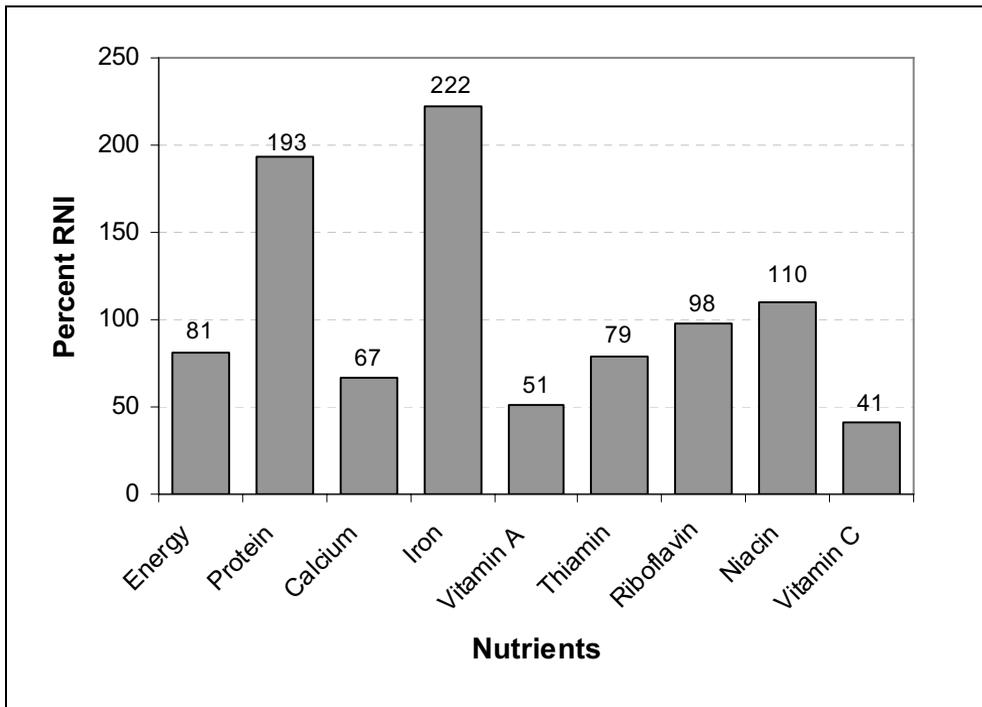


Figure 3. Mean nutrient intakes of respondents as a percentage of RNI

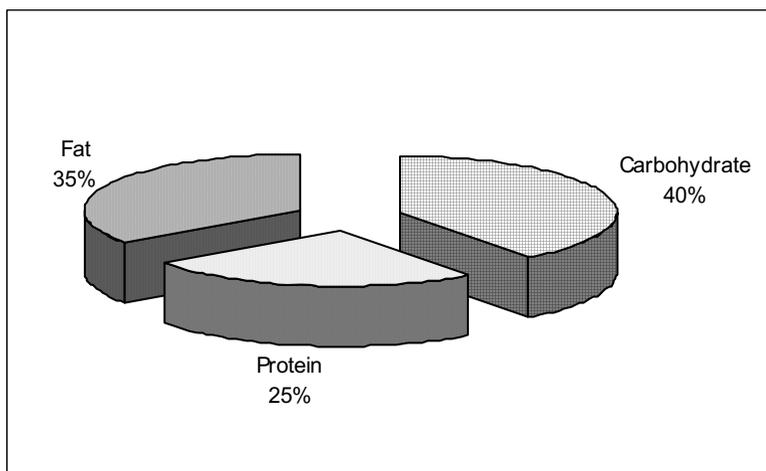


Figure 4. Contribution of macronutrients to total daily energy intake

reported by Chee *et al.* (1996) for female estate workers, and 241 mg/day reported by Zamaliah, Shamsul & Kandiah (1999) for university students. However, it is still way below the RNI for lactation.

The mean iron intake (22 mg/day) reported in the present study is much higher than the 8.6 mg/day reported by Chee *et al.* (1996) and 15.1 mg/day reported by Zamaliah *et al.* (1999). The comparatively high intake of iron reflects the high intake of meat that in turn has a high iron content (specifically lean pork and pig liver and kidney) in Chinese confinement diets. The high content of B vitamins in these meats may also explain the relatively high intakes of thiamin, riboflavin, and niacin among the subjects of this study.

Mean Vitamin C intakes as reported by Chee *et al.* (1996) and Zamaliah *et al.* (1999) were 25 mg/day and 30.1 mg/day, respectively. The mean vitamin C intake reported in the present study (39 mg/day) appears to be higher than the other two studies, although the subjects of the present study tended to avoid fruits and vegetables in their diets. Nevertheless, mean Vitamin C intake does not meet RNI.

Other studies carried out among lactating women during the postpartum period also reported low intakes of energy and various vitamins and minerals. Rivera *et al.* (2001) reported that the diets of nursing mothers of low socioeconomic status in Mexico are deficient in iron, zinc, and vitamins A and C. Another study carried out among low-income women in Ontario, Canada who were breastfeeding, also found that intakes of energy, calcium, iron, thiamin, vitamin A and zinc were below recommended values for lactating women (Doran & Evers, 1997). Mackey *et al.* (1998) reported that lactating women at three months postpartum living in a university community in Pennsylvania, USA, had mean energy, zinc, vitamins D and E intakes that did not meet USRDA.

CONCLUSIONS

The results of this study revealed that the majority of Chinese mothers studied do conform to some, if not all, traditional *zuo yuezi* practices. The dietary aspects of these *zuo yuezi* practices were adhered to for the most part, and this rather limited the food choices of the mothers. Of most concern is the lack of fruits and vegetables, which provides fiber as well as many vitamins and minerals, in these women's diets. On the other hand, these women consume a lot of red meat and chicken, which ensures a high intake of iron.

A more balanced diet should be recommended for Chinese mothers in confinement. Bearing in mind beneficial traditional practices, especially the emphasis on meats which helps to ensure that the confinement diet consists of good quality protein and a high intake of iron and the B vitamins, the mothers should also be encouraged to eat more fruits and vegetables, in order to ensure adequate intake of fiber, vitamins and minerals. In view of the low intake of calcium amongst the subjects, mothers in confinement, especially those breastfeeding, should also be encouraged to consume milk as well as other milk products to enhance calcium intake.

ACKNOWLEDGEMENTS

The authors thank all participants for their support and cooperation. We are grateful to Ms Wong Yuen Peng and Ms Leong Huey Ling for conducting the interviews with all respondents. The authors would like to acknowledge the three Maternal and Child Health Clinics and the Maternity Hospital Kuala Lumpur for granting permission to conduct the study.

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