



## Research Article

# Traditional Chinese Pregnancy Restrictions, Health-Related Quality of Life and Perceived Stress among Pregnant Women in Macao, China

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## SUMMARY

**Purpose:** The objectives of this study were to identify the prevalence and rationales of traditional Chinese pregnancy restrictions and to investigate the relationship between pregnancy restriction, health-related quality of life, and perceived stress level at a two-stage design.

**Methods:** Stage I consisted of exploring the traditional Chinese pregnancy restrictions and their underlying beliefs based on extensive literature review followed by in-depth interviews with 30 pregnant women. Stage II investigated the relationship between pregnancy restrictions, health-related quality of life, and perceived stress among 1,151 women. Self-developed traditional Chinese pregnancy restrictions lists were measured on adherence towards the traditional Chinese pregnancy restriction. Perceived stress and health-related quality of life were measured by the Perceived Stress Scale and the Short Form-12 (SF-12) Health Survey, respectively.

**Results:** The majority of the women adhered to traditional Chinese pregnancy restrictions in order to protect the unborn child from danger and to avoid the problems associated pregnancy and birth, such as miscarriage, stillbirth, death of the mother, and imperfections in the newborn. Pregnant women who adhered to behavioral restrictions were more likely to associate with poor physical component of health-related quality of life. However, there was no significant difference between pregnancy restrictions and Perceived Stress Scale scores.

**Conclusion:** The findings provided cultural rationales of pregnancy restrictions within a Macao context that may assist health professionals to better understand women from different cultures. It is essential in the development of culturally appropriate healthcare to support women in making a healthy transition to motherhood.

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## Introduction

Traditional practices during pregnancy are still applied worldwide in countries such as Turkey (Ayaz & Efe, 2008), Africa (Kaaya et al., 2010), Thailand (Liamputtong, Yimyam, Parisunyakul, Baosoung, & Sansiriphun, 2005), and China (Lee et al., 2009). What constitutes the appropriate management of pregnancy varies cross-culturally, from numerous mandates for behavioral changes and a long list of restrictions to minor modifications to the diet or activity patterns of pregnant women (Lee et al.; Martin, 2001). During pregnancy, the need to reassure women about normal pregnancy outcomes seems universal. However, the means of reassuring women differ depending on the local context and the meaning of pregnancy (Ayaz & Efe). The question of whether or not

these traditional practices protect women's health during pregnancy has yet to be answered. Evidence suggests the possibility that following traditional practices during pregnancy has both therapeutic (Manyande & Grabowska, 2009) and harmful (Ayaz & Efe; Lee et al.) consequences. However, with regard to pregnancy restrictions, there are no significant differences among different socioeconomic groups (Martin). Some women, despite their skepticism about traditional customs, still follow the advice of the older generation (Liamputtong et al.), and some women may alter their social behaviors (Ip, 2009; Lee et al.) in order to safeguard their unborn baby from danger (Ip). We argue that this may also be true of Chinese childbearing women in Macao.

In Chinese culture, there are traditional pregnancy restrictions to protect the child from "malign influences" and to avoid the problems associated pregnancy and birth, such as miscarriage, stillbirth, death of the mother, and imperfections in the newborn (Ip, 2009). The basic concepts of these restrictions come from the concept of *yin* and *yang* in traditional Chinese medicine (TCM), a highly respected system of medical knowledge in China since

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2000 BC (Kong & Liang, 2005; West, 2008). TCM originates from the Taoist philosophy on one's harmony with the universe (Roemer, 2005). According to this theory, the human body, like the cosmos, can be fundamentally divided into a positive force (*yang*) and a negative force (*yin*) which are complementary to each other. Health is thus seen as a harmonious equilibrium between the *yin* and *yang* (Kong, 2010). TCM has certain key concepts, including the *qi* (vital energy), which is believed to circulate along 14 channels or meridians, 12 of which influence or are influenced by the major internal organs. The *qi* is kept in balance by the dual polarities of *yin* and *yang* (Kong & Liang), and the disturbance of the *qi* in a pregnant woman is thought to cause miscarriage or fetal malformation (Yeh, Chen, Chou, Chen, & Hwang, 2009).

#### *Chinese traditional beliefs about pregnancy restrictions*

TCM places great emphasis on dietary and behavioral restrictions to restore physical and emotional harmony (Xuan, 2006). In TCM, the body and mind are inseparable, each affecting the other seamlessly (Wolfe, 1993). Therefore, anything that influences a woman's mind or spirit affects the heart and can affect the fetus in the uterus. Emotional problems are the result of an imbalance between *yin* and *yang* and disharmony in the flow of *qi*. Worry, fear, and anger may lead to *qi* stagnation, which in turn, will affect the organs (West, 2008). For example, grief affects the heart and liver, too much joy impairs the heart, and fright causes systemic diseases. Also, strenuous physical work (e.g., moving home or home renovations) depletes the *qi* (West & Maciocia, 2001). Some conservative women also worry about certain symbolic activities (e.g., using scissors in bed or hammering nails) that will destabilize the *qi* of the fetus (Ip, 2009).

In order to maintain harmony within the body, pregnant women avoid eating foods with *yin* qualities: "Cold foods" (e.g., ice cream, watermelon, mung bean, and banana) are associated with miscarriage or bleeding because such foods will induce poor blood circulation in the uterus (Jones, 2006; West, 2008), and "wet-hot foods" (e.g., shrimp, mango, lychee, longan, and pineapple) will produce a "poisonous" energy which will manifest itself as allergic reactions or skin eruptions in the baby (Martin, 2001; Schott & Henley, 1996). Moreover, some symbolic foods are avoided because they will affect the baby's character or appearance: Snack can be bad for the baby's skin, making it take on a scaly appearance; mutton will cause epilepsy because the disease is sheep-like (*faat yeung*); and dark foods (fermented soybeans, chocolate, coffee, and Coca Cola) are thought to give a baby a dark complexion (Martin). Although some evidence exists about the common practice of pregnancy restrictions among the Chinese population in Hong Kong (Lee et al., 2009), Australia (Hoang & Kilpatrick, 2009) and Canada (Brathwaite & William, 2004), only scanty investigations were examined how pregnant women perceived and reacted to the cultural tradition.

#### *Traditional Chinese pregnancy restrictions and health-related quality of life*

Health-related quality of life is an increasingly important issue. It is a broad, multifactorial construct that assesses the degree of well-being felt by individuals and can vary as a result of different cultural influences (Salter, Moses, Foley, & Teasell, 2008). Health-related quality of life is one aspect of this construct (Salter et al., 2008), and concerns the effect of an individual's health status on his or her subjective physical, mental, emotional and social well-being. It includes both physical and mental domains, which has focused on specific issues such as a person's experiences, beliefs, expectations and perceptions (Olsson & Nilsson-Wikmar, 2004).

During pregnancy, hormonal and organ-specific changes alter physical functioning and sometimes mental well-being. As a consequence, the perception of quality of life may change (Forger, Ostensen, Schumacher, & Villiger, 2005).

Theoretically, pregnancy restrictions may be seen as having both positive and negative impacts on health-related quality of life. These restrictions may be associated with a series of positive antenatal health behaviors during pregnancy that encourage women to have positive attitudes toward pregnancy, to prepare for parenting, and to acknowledge this life transition (Haslam, Lawrence, & Haefeli, 2003). One study found that more positive attitudes were associated with better quality of life (Mancuso, Sayles, & Allegrante, 2010). On the other hand, pregnancy tradition may restrict women's physical activities and diet; as a result, women lose some of their freedom (Lee et al., 2009). One study found that health-related quality of life was lower in pregnant than in nonpregnant (Mota, Cox, Enns, Calhoun, & Sareen, 2008). Therefore, the practice of pregnancy restrictions can further limit physical and mental functioning (Lee et al.). One study found that following traditional Chinese practices during the perinatal period may have a positive effect on women's health-related quality of life but that the continuous use of these practices may have a negative effect on women's quality of life (Chang, Kenney, & Chao, 2010). Hence, the influence of pregnancy restrictions on health-related quality of life is equivocal.

#### *Traditional Chinese pregnancy restrictions and perceived stress*

Perceived stress is ambiguous as multiple factors affect the perception of stress (Pfeifer, Kranz, & Scoggin, 2008). In relation to daily performance, sleep, appetite, and mood, stress can be either a motivating force or, in excess, an interference in people's lives (Canals-Gonzales, Kranz, Granberry, & Tanguma, 2008). Research suggests that women perceived stress during pregnancy (Woods, Melville, Guo, Fan, & Gavin, 2010) and transition to parenthood (Halford & Petch, 2010).

Macao women may find themselves caught up in a struggle (Chang, Kenney et al., 2010; Chang, Tseng et al., 2010) between western and eastern styles of pregnancy care (e.g., autonomy vs. control); this may induce stress (Cheng, 2002). One study found that women feel stressed when social activities are curtailed during pregnancy (Furber, Garrod, Maloney, Lovell, & McGowan, 2009). Moreover, when pregnancy restrictions are imposed by older members of the family, intergenerational disputes can also put women under stress (Lee et al., 2009). One study suggested that older members of family still likely hold traditional beliefs about antenatal care and pregnant women may have struggled in silence to control their frustration and lack of decision-making power among Chinese population (Lau & Wong, 2007). As a result, pregnancy restrictions may be perceived as stress during pregnancy. To the best of our knowledge, the existing evidence about this issue is scant, and further studies are warranted.

In sum, the effects of traditional restrictions on women's health are inconclusive. This has caused difficulties for health care professionals in terms of convincing people to abandon some of these practices. In addition, there has been a growing conflict between modern medical practice and traditional beliefs during pregnancy (e.g., a balanced diet vs. *yin* and *yang* food precautions, or regular exercise versus behavioral restrictions). In contrast to postpartum customs, little is known about the practice of traditional restrictions in pregnancy (Lee et al., 2009). Research of this nature is important as it informs health-care practitioners about the provision of culturally sensitive antenatal care (Williamson & Harrison, 2010) that optimizes maternal health. Given the paucity of research into exploring traditional Chinese pregnancy restriction

and examining the relationship between pregnancy restriction, health-related quality of life, and perceived stress among Asians, the purpose of this study is to add to and inform the emerging literature. To our knowledge, this is the first study that aims to identify the prevalence and rationales of traditional Chinese pregnancy restrictions and to investigate the relationship between pregnancy restriction, health-related quality of life, and perceived stress levels.

## Methods

### Ethical considerations

Ethical approval that complied with the Declaration of Helsinki was obtained in December 2007 from the institutional review board of the hospital involved. Informed consent was obtained from the participating woman after the investigator had explained the nature, purpose, and potential risks of the study. Participation was entirely voluntary, and each participant had the right to withdraw or refuse to give information at any time during the study without incurring any penalties or being deprived of health services. The women's anonymity and the confidentiality of the information they provided were strictly maintained.

### Stage I: Exploring the traditional Chinese pregnancy restrictions

The research setting was an outpatient clinic in a public hospital, S. Januário Hospital, in the Macao Special Administrative Region. Macao covers an area of 29.2 km<sup>2</sup> and comprises the Macao Peninsula and the islands of Taipa and Coloane. Macao was a Portuguese colony from the 16th century to 1999 and is a crossroads between East and West. Its total population was estimated to be 549,200 in 2008. About 94% of the population is ethnic Chinese from the provinces of Guangdong and Fujian; the remaining 6% are Portuguese and other nationalities (Macao Government Tourist Office, 2009).

The traditional Chinese pregnancy restrictions exploration began with intensive literature review (Ip, 2009; Jones, 2006; Lee et al., 2009; Martin, 2001; West, 2008; Wolfe, 1993). Semi-structure interviews were conducted among 30 pregnant women to obtain information regarding why women practice traditional Chinese pregnancy restriction and their underlying rationales. The questions used included (a) what were your views/experiences for traditional Chinese pregnancy restriction; (b) what kind of behavioral and dietary restriction you will adhere to during pregnancy; (c) what were your rationales/reasons/interpretations to practice these traditional Chinese pregnancy restriction; (d) is there anything else you would like to share about the traditional Chinese pregnancy restriction. Each interview took place in a private room of the antenatal outpatient clinic from December 2007 to March 2008 by the researcher who was an experienced researcher with a PhD qualification in social science in University of Hong Kong since 2006. An in-depth interviewing technique was used to elicit information (Liamputtong & Ezzy, 2005). This is appropriated to uncover and understand the women's subjective experience. Each woman was interviewed once and the interview lasted for 25–35 minutes, depend on her responses. Video recording and field notes of observation were taken during each interview. Interview visual films were transcribed fully, checked and annotated with pauses, overlaps and nonverbal expression. All transcribed material was analyzed sentence by sentence and coded for the women's rationales. Initial opening coding of the data used differing codes, which were repeated and re-analyzed to reassess the content and confirm the findings. Transcripts were analyzed using thematic analysis to identify recurrent themes, similarities and differences

across the samples (Taylor & Bogdan, 1998). Interpretations of the finding were given to the women as a means of cross-checking of data. A list of 28 traditional Chinese pregnancy restrictions under two categories (behavioral and dietary restrictions) and the entailed traditional health beliefs were found (Table 1).

**Table 1** Cultural Belief about Behavioral and Dietary Restrictions during Pregnancy

Traditional Chinese pregnancy restrictions lists	Cultural belief
<b>Behavioral Restrictions (BR)</b>	
1 Not moving home	These actions will destabilize the vital energy of the fetus ( <i>dong tai qi</i> ) and will cause spontaneous miscarriage and fetal malformation
2 No home renovations	
3 No moving heavy objects	
4 No hammering nails into the wall	The nails could make holes into the wall and these actions will cause fetal malformation.
5 No participation in wedding celebrations	These actions are very happy events and too much joy impairs the heart. If the excitement is too powerful, abnormal uterine contractions, which oppress the fetus and impede its physiological development, may occur.
6 No participation in birthday celebrations	
7 No use of needles in or on bed	This will cause fetal malformation, such as a cleft lip or cleft palate, or marks on the face
8 No preparation of the new baby's bed before the baby is born.	It is bad luck to have an empty baby bed within the house.
9 No attendance at funerals	Attending a funeral and visiting sick people in hospital are upsetting occasions and grief affects the heart and liver. Negative emotions can considerably intensify the activity of the vegetative nervous system and liberate harmful particles that will affect the development of the fetus.
10 No visits to tombs	
11 No visits to sick people	
12 No touching coffins	
13 No disclosure of the pregnancy during the first trimester.	Early disclosure within the first trimester will threaten the stability of the pregnancy.
14 No use of scissors in or on the bed	This will cause fetal malformation, such as a cleft lip or cleft palate, or having marks on its face
15 No cutting the wings and legs off a chicken	Cutting the wings and legs off a chicken when preparing food may harm the integrity of the baby.
16 No raising of hands above the shoulders	Such actions will destabilize the vital energy of the fetus ( <i>dong tai qi</i> ) and is thought to cause spontaneous miscarriage.
17 No watching horrible films	Horrible films will induce fear and fright. The excessive excitement will cause systemic diseases.
<b>Dietary Restrictions (DR)</b>	
1 No watermelon	These foods are cold foods that will slow down the blood circulation, thus affecting the absorption of nutrients by the fetus. They must not be eaten in early pregnancy for fear that they will cause a miscarriage.
2 No mung beans	
3 No rabbit meat	This food will cause a cleft lip or cleft palate in newborn babies.
4 No dark food	The baby will be dark-complexioned, whereas as a light skin is desired.
5 No snake	This food is bad for the baby's skin, making it take on a scaly appearance.
6 No mango	These foods are wet-hot foods and will cause the baby to have allergies, eczema, and other skin problems.
7 No lychee	
8 No mutton	The fetus will get epilepsy; indeed, the term for the disease is <i>faat yeung</i> (like a sheep), which is a reference to the juddering movement of a sheep's teeth.
9 No shrimp	This food will cause the baby to have allergies, eczema, and other skin problems.
10 No ice cream	These foods are cold foods that will cause a miscarriage if eaten in early pregnancy and will increase the likelihood of convulsions in babyhood.
11 No banana	

On the basis of the restriction elicited, the list was constructed to enquire about adherence to these antenatal restrictions (Appendix 1) that included the two summative items of “behavioral restrictions” (BR) and “dietary restrictions” (DR), 17 items for BR, and 11 items for DR. Each item was rated on a dichotomous response, where “Yes” meant adhering to this practice during pregnancy (score = 1), “No” meant not adhering to this practice during pregnancy (score = 0). After summing up all of the traditional practice items, we obtained a total traditional score for each woman. The higher the score, the more likely it was that the participant adhered to traditional restrictions. This list, together with two validated measures on health-related quality of life and perceived stress level, would be used in stage II of this study.

#### *Stage II: Correlates of the traditional Chinese pregnancy restrictions*

In Stage II, the association between the traditional Chinese pregnancy restrictions, health-related quality of life, and perceived stress was assessed.

#### *Sampling*

We adopted convenience sampling of the target population, namely pregnant Chinese women living in Macao, because of resource constraints. Macao is served by three hospitals, one public and two private; the research setting was an outpatient clinic at the public hospital. Despite the fact that the recruitment of participants was conducted at one hospital, the sample is nonetheless population-based because all pregnant women must come to this hospital for screening of Down syndrome in a current national program, the sample was thus representative of pregnant women in the general population since it included all women from different clusters of Macao covering different demographic and socioeconomic divisions (Macao Health Center, 2004).

Assuming that the prevalence rate, found in a previous similar study (Lee et al., 2009) is accurate ( $\pm 1.98\%$ ), a sample size of 1,000 would achieve a low error factor (Altman, 2006). This degree of error is approximately a quarter of the size of the prevalence estimate and is therefore sufficiently small enough to be used with confidence for planning purposes in the health care service system. A sample size of 1,151 antenatal women was used; this was considered adequate for the detection of women who adhere to traditional practices. The exclusion criteria were as follows; (a) did not supply written informed consent, (b) carrying a baby with a congenital abnormality because those pregnant women may experience negative affective state, and (c) personal or family history of severe psychiatric problems because of cooperativeness and medication issues.

On the basis of their obstetric records, all of the women who attended the antenatal clinic within the data collection period of June 2008 to January 2009 were eligible to participate in the study. Before inviting the women to participate, the investigator approached them individually to confirm that they met the selection criteria. Data were collected in the second trimester because the physiological discomfort and stress level is comparatively lower in this trimester than in others. They completed the self-reported instrument in approximately 10–15 minutes while waiting for blood testing of Down syndrome at the antenatal outpatient clinic.

#### *Instruments*

We measured health-related quality of life using the 12-item standard SF-12 Health Survey (SF-12), which is used to assess the physical and psychological aspects of quality of life (Ware, Kosinski, Turner-Bowker, & Gandek, 2005). The items, which are in the form

of questions, explain more than 90% of the variance of the original SF-36. The SF-12 is useful in measuring two components, namely physical health (PCS) and mental health (MCS) functioning, without substantial loss of information. The PCS items include a self-reported assessment of the level of limitation experienced in performing moderate activities (e.g., climbing stairs), questions on accomplishing less due to experiences of body pain, and a rating of general health. The MCS items include questions on feeling calm and peaceful or downhearted and blue, accomplishing less, and taking less care than usual when carrying out activities because of one’s mental health (Ware et al.). A higher score in the respective summary scales represents a higher level of functioning. The reliability and validity tests of the SF-12 have been proven to be satisfactory (Pezzilli, Morselli-Labate, Fantini, Campana, & Corinaldesi, 2007). A Chinese version of the SF-12 survey form with satisfactory content validity was adopted in this study (Lam, Tse, & Gandek, 2005).

The Perceived Stress Scale (PSS) measures the degree to which situations in one’s life are regarded as stressful (Cohen, Kamarck, & Mermelstein, 1983). The version we used has 14 items, each rated on a 5-point Likert-type scale ranging from 0 (*never*) to 4 (*very frequently*). PSS items are designed to ascertain the degree to which respondents find their lives unpredictable, uncontrollable, and overwhelming. These three factors have consistently been found to be the central components of the experience of stress. Respondents are asked how often, in the last month, they have experienced specific feelings of stress. Reverse scoring is used for items describing negative experiences or responses. Total possible scores range from 0 to 56, with higher scores representing higher levels of perceived stress. The internal consistency reliability (Mimura & Griffith, 2004), predictive and concurrent validity (Cohen et al.), and factor structure (Ramirez & Hernandez, 2007) of the PSS have all been found to be satisfactory. A Chinese version of the PSS, with satisfactory content validity and reliability, was adopted in this study (Chu, 2005).

#### *Data analysis*

The SPSS 17.0 software package (SPSS Inc., Chicago, IL, USA) was used for statistical analysis. Descriptive statistics were used to present the demographic, socioeconomic, and obstetric data of the participants. Multiple linear regression models were used to explore the traditional Chinese pregnancy restriction that influence health-related quality of life and perceived stress while adjusting for the demographic, socioeconomic, obstetric, and medical variables. Linear regression was used to calculate the standardized coefficients ( $\beta$ ) and 95% confidence intervals (CI) for the unstandardized coefficient ( $B$ ) in order to estimate the association between the potential variables and the outcomes of pregnancy restriction. The coefficient of determination, with explained variance ( $R^2$ ), was used to assess the goodness of fit of the regression model. The  $F$  value is the test statistic used to decide whether the model as a whole has statistically significant predictive capability. To prevent multicollinearity among the variables, principal component analysis was performed with a multicollinearity diagnostic statistics in the linear regression analysis by examining Variance Inflation Factor (VIF) for each variable (Stine, 1995). VIF showed the variance of the coefficient estimate was being inflated by multicollinearity. VIF was used to analyze the magnitude of multicollinearity, with  $VIF < 5$  set as the acceptable level (O’Brien, 2007). The  $p < .05$  was considered statistically significant.

#### **Results**

A total of 1,613 women were invited to join Stage II of this study, 462 of whom chose not to participate. The primary reasons for

refusal were being too busy, tiredness, and a reluctance to disclose information. The remaining 1,151 women (response rate = 71.4%) completed the questionnaire. Table 2 shows the demographic, socioeconomic, and obstetric characteristics, the health-related quality of life, and the perceived stress level of the participants. The majority of the women were over 25 years of age (69.9%), married (91.1%), and Chinese (90.7%). Almost half (44.7%) of them had attained tertiary-level or above education. Most (78.0%) had full-time jobs and total monthly family incomes of more than MOP \$10,000 (87.1%). More than half of the women (52.5%) were expecting their first baby, and the majority (74.2%) had received antenatal care in the corresponding hospital before 12 weeks' gestation. For about one quarter (27.5%) of women, the pregnancy was unplanned. The majority of them had no current personal medical problems (91.1%) or allergy history (91.3%).

**Table 2** Demographic, Socioeconomic, Obstetric and Medical Characteristics of Participants in Stage II (N = 1,151)

Demographic, Socioeconomic characteristics	Categories	n	%
Age	>25	804	69.9
	≤25	347	30.1
Marital status	Married	1,048	91.1
	Single/divorced/separated/cohabited	103	8.9
Educational level	>Secondary	514	44.7
	≤Secondary	637	55.3
Nationality	Chinese	1,044	90.7
	Others	107	9.3
Occupational status	Full-time/self-employed	898	78.0
	Housewife/part time / unemployed	253	22.0
Daily working hours	≤10 hr	1,117	97.0
	>10 hr	34	3.0
Family total monthly income <sup>a</sup>	≤MOP \$10,000	1,002	87.1
	>MOP \$10,000	149	12.9
Size of residence <sup>b</sup>	> 500 square feet	846	73.5
	≤ 500 square feet	305	26.5
Type of residence	Private house	851	73.9
	Public house	300	26.1
<b>Obstetric characteristics</b>			
No. of pregnancies (Gravid)	First pregnancy	480	41.7
	≥Second pregnancy	671	58.3
No. of babies (Parity)	First baby	604	52.5
	≥Second baby	547	47.5
History of abortion	No	739	64.2
	Yes	412	35.8
Antenatal care <sup>c</sup>	≤First trimester	854	74.2
	>Second trimester	297	25.8
Past adverse obstetric complication	No	1,045	90.8
	Yes	106	9.2
Present obstetric complication	No	1,024	89.0
	Yes	127	11.0
Intention of pregnancy	Planned/natural	834	72.5
	Accidental/unintended	317	27.5
<b>Medical characteristics</b>			
Family medical history	Yes	492	42.7
	No	659	57.3
Personal medical history	Yes	223	19.4
	No	928	80.6
Current personal medical problem	Yes	102	8.9
	No	1049	91.1
Food or drug allergy	Yes	100	8.7
	No	1051	91.3

<sup>a</sup> MOP stands for Macao Pataca, the local currency. MOP \$10,000 is considered as a cut-off because this monthly income is the median monthly domestic household income in Macao. MOP \$10,000 is about US \$1,420.

<sup>b</sup> Size of residence of 500 square feet is considered as a cut-off because this size is the median size of residence in Macao.

<sup>c</sup> First antenatal care before or on 12 weeks' gestation is considered as early booking.

### Pregnancy restrictions among Macao pregnant women

Table 3 shows that 73.7% and 79.1% of the participants had adhered to behavioral and dietary restrictions, respectively. Avoidance of some behaviors during pregnancy was comparatively common, such as moving heavy objects (31.0%) and using scissors in or on the bed (29.6%). The dietary restriction most commonly adhered to during pregnancy was the avoidance of cold foods, including watermelon (48%), mung beans (37.6%), and banana (34.2%) as shown in Table 3.

Table 4 shows the results of multiple linear regression models of the behavioral and dietary restrictions score on health-related quality of life and the perceived stress score after controlling for demographic, socioeconomic, obstetric and medical variables. Among the variables, only the Physical health component (PCS) of Health-related quality of life (SF-12) was significant ( $\beta = -.127$ ,  $p < .001$ ); the pregnant women who adhered to behavioral restrictions were more likely to be those who had poor physical health. However, there was no significant difference in PSS scores ( $p > .05$ ) between the pregnant women who had adhered to pregnancy restrictions and those who had not.

## Discussion

### Pregnancy restrictions among Macao pregnant women

Our findings showed that traditional pregnancy restrictions are still commonly adhered to by contemporary Macao Chinese women. Some behavioral restrictions, such as moving heavy objects and using scissors in or on the bed, are prohibited. A

**Table 3** Prevalence of Traditional Chinese Pregnancy Restrictions among Participant (N = 1,151)

Traditional Chinese pregnancy restrictions lists	Adherence	Nonadherence
	n (%)	n (%)
<b>Behavioral restrictions</b>	848 (73.7)	303 (26.3)
1 No moving home	252 (21.9)	547 (47.5)
2 No home renovations	290 (25.2)	504 (43.8)
3 No moving heavy objects	357 (31.0)	459 (39.9)
4 No hammering nails into the wall	277 (24.1)	513 (44.6)
5 No participation in wedding celebrations	198 (17.2)	632 (54.9)
6 No participation in birthday celebrations	78 (6.8)	755 (65.6)
7 No use of needles in or on bed	204 (17.7)	617 (53.6)
8 No preparation of the new baby's bed before the baby is born	192 (16.7)	646 (56.1)
9 No attendance at funerals	256 (22.2)	538 (46.7)
10 No visits to tombs	221 (19.2)	584 (50.7)
11 No visits to sick people	158 (13.7)	657 (57.1)
12 No touching coffins	182 (15.8)	585 (50.8)
13 No disclosure of the pregnancy during the first trimester	211 (18.3)	611 (53.1)
14 No use of scissors in or on the bed	341 (29.6)	499 (43.4)
15 No cutting the wings and legs off a chicken	312 (27.1)	530 (46.0)
16 No raising of hands above the shoulders	323 (28.1)	517 (44.9)
17 No watching horrible films	270 (23.5)	537 (46.7)
<b>Dietary restrictions</b>	911 (79.1)	240 (20.9)
1 No watermelon	553 (48.0)	335 (29.1)
2 No mung beans	433 (37.6)	456 (39.6)
3 No rabbit meat	212 (18.4)	562 (48.8)
4 No dark food	233 (20.2)	530 (46.0)
5 No snake	138 (12.0)	727 (63.2)
6 No mango	89 (7.7)	776 (67.4)
7 No lychee	115 (10.0)	760 (66.0)
8 No mutton	241 (20.9)	598 (52.0)
9 No shrimp	159 (13.8)	732 (63.6)
10 No ice cream	294 (25.5)	600 (52.1)
11 No banana	394 (34.2)	481 (41.8)

**Table 4** Multiple Linear Regression Models of Behavioral and Dietary Restrictions during Pregnancy on Health-Related Quality of Life and Perceived Stress Scale among Macao Pregnant Women (N = 1,151)

Traditional Chinese pregnancy restrictions	Health-related quality of life (SF-12)						Perceived stress (PSS)		
	Physical health component (PCS)			Mental health component (MCS)			B	SE	$\beta$
	B	SE	$\beta$	B	SE	$\beta$			
Behavioral Restrictions Total score	-.256*	.062	-.127	-.095	.082	-.036	.065	.057	.034
Dietary Restrictions Total score	.066	0.046	.043	.019	.061	.009	-.011	.042	-.008
F		2.704*			3.974*			6.999*	
R <sup>2</sup>		.068			.096			.158	
VIF		1.024–3.943			1.044–3.926			1.024–3.939	

Notes. Results from three multiple linear regression models after adjusting for demographic, socioeconomic and obstetric variables. B = unstandardized coefficient;  $\beta$  = beta, standardized coefficient; SE = standard error; SF-12 = The Short Form -12 Health Survey; PCS = Physical Component of Health-related Quality of Life; MCS = Mental Component of Health-related Quality of Life; PSS = Perceived Stress Scale Score. R<sup>2</sup> = explained variance. VIF = Variance inflation factor

\*p < .001.

reasonable explanation for avoiding moving heavy objects is that it prevents pregnant women from becoming overtired (Martin, 2001) to prevent a miscarriage. Symbolically, the action of using scissors in or on the bed is believed to produce a cleft lip or cleft palate in babies. Although such a restriction appears to be unscientific and to be logically unconnected with the outcome, some women still believe in the possibility of such behavior in producing unfortunate consequences (Martin).

The consumption of cold foods, such as watermelon, mung beans, and banana, is avoided by pregnant women in Macao. According to Chinese tradition, diet is very important to ensuring a healthy pregnancy (Jones, 2006). The theory of *yin* and *yang* or cold and hot foods dominates food choices during pregnancy (Ip, 2009) because diet is regarded as the source of *qi*. During pregnancy, Macao Chinese women avoid eating food with *yin* qualities, such as cold foods that may require more energy or expenditure of heat to warm them (Jones). Women may associate cold foods with miscarriage, as it is believed that these foods will make the uterus cold and subsequently induce poor blood circulation in the uterus (West, 2008). These behavioral and dietary restrictions may therefore serve to protect women from danger, giving them the best possible chance of carrying their pregnancy to term. However, more in-depth studies are needed to understand why women prefer subscribing to pregnancy restrictions.

#### Behavioral restrictions and poor physical health-related quality of life

Our findings showed that women adhere more closely to behavioral restrictions when their physical health-related quality of life is impaired. A possible explanation for this may be related to excessive gestational weight gain (Stuebe, Oken, & Gillman, 2009) or obesity (Amador, Juarez, Guizar, & Linares, 2008), which are associated with a low level of social participation by women in happy or sad events and symbolic activities (Lee et al., 2009; Liamputtong et al., 2005) and are positively related to a decrease in the physical component score (Amador et al.). Another possibility is that a higher level of depressive symptoms is found among women who adhere to behavioral restrictions (Lee et al.). These symptoms have cumulative negative effects on the physical component score of health-related quality of life (Gallegos-Carrillo et al., 2009). It is perhaps not surprising that women who adhere to behavioral restrictions are more likely to have poor physical functioning.

However, the direction of causality between the two variables is not clear. It could easily be argued that, in terms of health-related quality of life, poor physical functioning predates their adherence

to behavioral restrictions. Empirical evidence shows that women who experience poor health-related quality of life are more likely to report pregnancy complications (Moyer et al., 2008). This may in turn increase their adherence to the rules of pregnancy restrictions in order to safeguard themselves from danger (Chang, Tseng et al., 2010). Another possible explanation for our findings may be related to the relationship between health-related quality of life and women's perceived personal control over birth outcomes (Weisman et al., 2008). Women with poor health-related quality of life are more likely to perceive that they have little control over the birth outcome, and this may mean that they will be more likely to take actions to influence future events, such as following traditional customs (Ip, 2009; Lee et al., 2009) in order to gain more control over birth outcomes (Weisman et al.) and to prevent any potential harm to their baby (Ip).

#### Pregnancy restrictions and perceived stress

Contrary to expectation following a review of the previous literature (Furber et al., 2009; Martin, 2001), no significant relationship was found between pregnancy restrictions and perceived stress. One possible explanation for this is that pregnancy restrictions shape the transformation of self-identity by accepting the traditional right of Macao pregnant women (Chang, Kenney et al., 2010). However, in the findings of this study, the majority of women described their adherence to pregnancy restrictions. These particular pregnancy restrictions are accepted as the norm in the host culture (Kaaya et al., 2010), and so adherence to them may not be perceived as stress. Another possible explanation is that the women's families have a close attachment to Confucian values in Asian families (Park & Chesia, 2007; Yan & Sorenson, 2006). Confucian culture reinforces the focus on the family with the perspective that family was the central operating unit of society (Tu, 1984). Chinese family members are holding strong familism value and give preference to family membership in terms of support (Freeberg & Stein, 1996). Family social support may play an important role in alleviating stress among Chinese pregnant women (Lau, & Wong, 2008; Nierop, Wirtz, Bratsikas, Zimmermann, & Ehlert, 2008). Besides, harmony and filial piety are features more emphasized in Chinese family. Personal conflicts among members are discouraged and a peaceful solution for any disagreement according to the elaborate codes of Confucian ethics built around patriarchal principles are emphasized (Cheung et al., 2001). Therefore, pregnant women may seek a certain degree of balance and harmony between their own interests and the traditional Chinese pregnancy restrictions that the older women in the family have to achieve a harmonious family (Zhu & Yao, 2008). The malleability of

perceived stress in relation to pregnancy restrictions merits further investigation.

## Conclusion

This study has several possible limitations. First, the traditional Chinese pregnancy restrictions list was a preliminary inventory so further studies that test the psychometric properties of this inventory among different regions of the Chinese populations are needed. Second, although the study examines two possible variables in relation to pregnancy restriction, it may have overlooked a number of other variables, such as depressive symptoms, the quality of family relationships, and social networks or support groups. Further studies are therefore warranted. Finally, the use of a cross-sectional design in this study could not capture the causal relationship among pregnancy restriction, health-related quality of life and perceived stress. Such relationships can be much more clearly examined through a longitudinal design.

However, despite these limitations, the study makes a number of contributions to the literature. We provide readers with cultural rationales of pregnancy restrictions within a Macao context that may assist health professionals to better understand women from different cultures. This study provides a list of restrictions that nurses could use in the clinical situation to acquire more comprehensive views of Chinese women. Moreover, this study provides insight into the association between behavioral restrictions and poor physical health. It is essential in the development of culturally appropriate care (Williamson & Harrison, 2010) to support women in making a healthy transition to motherhood. The health care professional need to be aware of their own cultural beliefs, attitudes and feelings to facilitate their understanding of people who may be from a different background and belief system with regard to pregnancy. They can then adjust their practice to meet the needs of these individuals and incorporate cultural sensitivity into their practice. However, the health care professional may emphasize the concept of cultural safety (Kruske, Kildea, & Barclay, 2006) among pregnant women to prevent potential negative impact of pregnancy restriction on their physical health.

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## References

- Altman, D. G. (2006). *Practical statistics for medical research* (2nd ed.). London: Chapman & Hall.
- Amador, N., Juarez, J. M., Guizar, J. M., & Linares, B. (2008). Quality of life in obese pregnant women: a longitudinal study. *American Journal of Obstetrics and Gynecology*, *198*, e201–e205.
- Ayaz, S., & Efe, S. Y. (2008). Potentially harmful traditional practices during pregnancy and postpartum. *The European Journal of Contraception and Reproductive Health Care*, *13*, 282–288.
- Brathwaite, A. C., & William, C. C. (2004). Childbirth experiences of professional Chinese Canadian women. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, *33*, 748–755.
- Canals-Gonzales, P. L., Kranz, P. L., Granberry, M., & Tanguma, J. (2008). An assessment of stress experienced by students in a prepharmacy curriculum. *Journal of Instructional Psychology*, *35*, 19–22.
- Chang, P. J., Tseng, Y. C., Chuang, C. H., Chen, Y. C., Hsieh, W. S., Hurng, B. S., et al. (2010). Using of Sheng-Hua-Tang and health-related quality of life in postpartum women: A population-based cohort study in Taiwan. *International Journal of Nursing Studies*, *47*, 13–19.
- Chang, S. R., Kenney, N. J., & Chao, Y. M. Y. (2010). Transformation in self-identity amongst Taiwanese women in late pregnancy: A quality study. *International Journal of Nursing Studies*, *47*, 60–66.
- Cheng, N. F. (2002). The cultural and social meanings of childbearing for Chinese and Scottish women in Scotland. *Midwifery*, *18*, 279–295.
- Cheung, F. M., Leung, K., Zhang, J., Sun, H., Gan, Y., Song, W., et al. (2001). Indigenous Chinese personality constructs. Is the five-factor model complete? *Journal of Cross-Cultural Psychology*, *32*, 407–433.
- Chu, L. C. (2005). Chinese version of perceived stress scale. *Chinese Journal of Psychology*, *47*, 157–179.
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, *24*, 385–396.
- Forger, F., Ostensen, M., Schumacher, A., & Villiger, P. M. (2005). Impact of pregnancy on health related quality of life evaluated prospectively in pregnant women with rheumatic diseases by the SF-36 health survey. *Annals of the Rheumatic Diseases*, *64*, 1494–1499.
- Freeberg, A. L., & Stein, C. H. (1996). Felt obligation towards parents in Mexican-American and Anglo-American young adults. *Journal of Social and Personal Relationships*, *13*, 457–471.
- Furber, C. M., Garrod, D., Maloney, E., Lovell, K., & McGowan, L. (2009). A qualitative study of mild to moderate psychological distress during pregnancy. *International Journal of Nursing Studies*, *46*, 669–677.
- Gallegos-Carrillo, K., Garca-Pena, C., Mudgal, J., Romero, X., Duran-Arenas, L., & Salmeron, J. (2009). Role of depressive symptoms and comorbid chronic disease on health-related quality of life among community-dwelling older adults. *Journal of Psychosomatic Research*, *66*, 127–135.
- Halford, K., & Petch, J. (2010). Couple psychoeducation for new parents: observed and potential effects on parenting. *Clinical Child Family Psychology Review*, *13*, 164–180.
- Haslam, C., Lawrence, W., & Haefeli, K. (2003). Intention to breastfeed and other important health-related behavior and belief during pregnancy. *Family Practice*, *20*, 528–530.
- Hoang, H. T. Q. L., & Kilpatrick, S. (2009). Having a baby in the new land: A qualitative exploration of the experiences of Asian migrants in rural Tasmania, Australia. *Rural and Remote Health*, *9*(1084), 1–11.
- Ip, W. Y. (2009). Childbirth among Hong Kong Chinese. In H. Selin (Ed.), *Childbirth across cultures: Ideas and practices of pregnancy, childbirth and the postpartum* (pp. 71–76). New York: Springer.
- Jones, M. E. (2006). Diet and nutrition in traditional Chinese medicine. In C. S. Yuan, E. J. Bieber, & B. A. Bauer (Eds.), *Textbook of complementary and alternative medicine* (2nd ed.). (pp. 211–224). London, UK: Informa Healthcare.
- Kaaya, S. F., Mbwambo, J. K., Fawzi, M. C. S., Borne, H. V. D., Schaalma, H., & Leshabari, M. T. (2010). Understanding women's experiences of distress during pregnancy in Dar es Salaam, Tanzania. *Tanzania Journal of Health Research*, *12*, 1–12.
- Kong, Y. C. (2010). *Huangdi Neijing: A synopsis with commentaries*. Hong Kong: The Chinese University Press.
- Kong, Y. C., & Liang, S. (2005). *The cultural fabric of Chinese medicine: How to know your body through Chinese medicine*. Hong Kong: The Commercial Press.
- Kruske, S., Kildea, S., & Barclay, L. (2006). Cultural safety and maternity care for Aboriginal and Torres Strait Islander Australians. *Women and Birth*, *19*(3), 73–77.
- Lam, C. L., Tse, E. Y., & Gandek, B. (2005). Is the standard SF-12 health survey valid and equivalent for a Chinese population? *Quality of Life Research*, *14*, 539–547.
- Lau, Y., & Wong, D. F. (2008). The role of social support in helping Chinese women with perinatal depressive symptoms cope with family conflict. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, *37*, 556–571.
- Lau, Y., & Wong, F. K. D. (2007). Correlates of depressive symptomatology during the second trimester of pregnancy among Hong Kong Chinese. *Social Science and Medicine*, *64*, 1802–1811.
- Lee, D. T., Ngai, I. S., Ng, M. M., Lok, I. H., Yip, A. S., & Chung, T. K. (2009). Antenatal taboos among Chinese women in Hong Kong. *Midwifery*, *25*, 104–113.
- Liamputtong, P., & Ezzy, D. (2005). *Qualitative research methods* (2nd ed.). Melbourne: Oxford University Press.
- Liamputtong, P., Yimyam, S., Parisunyakul, S., Baosoung, C., & Sansiriphun, N. (2005). Traditional beliefs about pregnancy and child birth among women from Chiang Mai, North Thailand. *Midwifery*, *21*, 139–153.
- Macao Government Tourist Office. (2009). <http://www.macoutourism.gov.mo/en/info/inf.php>
- Macao Health Center. (2004). *Health indicator and primary care in Macau*. Macau: Services of Health Centers.
- Mancuso, C. A., Sayles, W., & Allegrante, J. P. (2010). Knowledge, attitude and self-efficacy in asthma self-management and quality of life. *Journal of Asthma*, *47*, 883–888.
- Manyande, A., & Grabowska, C. (2009). Factors affecting the success of moxibustion in the management of a breech presentation as a preliminary treatment of external cephalic version. *Midwifery*, *25*, 774–780.
- Martin, D. (2001). Food restrictions in pregnancy among Hong Kong mothers. In D. Y. H. Wu, & C. B. Tan (Eds.), *Changing Chinese foodways in Asia*. Hong Kong: The Chinese University Press.
- Mimura, C., & Griffith, P. (2004). A Japanese version of the perceived stress scale: Translation and preliminary test. *International Journal of Nursing Studies*, *41*, 379–385.
- Mota, N., Cox, B. J., Enns, M. W., Calhoun, L., & Sareen, J. (2008). The relationship between mental disorders, quality of life, and pregnancy: Findings from a nationally representative sample. *Journal of Affective Disorders*, *109*, 300–304.
- Moyer, C. A., Ekpo, G., Calhoun, C. L., Greene, J., Naik, S., Sippola, E., et al. (2008). Quality of life, optimism/pessimism, and knowledge and attitudes toward HIV screening among pregnant women in Ghana. *Women's Health Issues*, *18*, 301–309.

- Nierop, A., Wirtz, P. H., Bratsikas, A., Zimmermann, R., & Ehlert, U. (2008). Stress-buffering effects of psychosocial resources on physiological and psychological stress response in pregnant women. *Biological Psychology*, 78, 261–268.
- O'Brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality and Quantity*, 41, 673–690.
- Olsson, C., & Nilsson-Wikmar, L. (2004). Health-related quality of life and physical ability among pregnant women with and without back pain in late pregnancy. *Acta Obstetrica et Gynecologica Scandinavica*, 83, 351–357.
- Park, M., & Chesia, C. (2007). Revisiting Confucianism as a conceptual framework for Asian family study. *Journal of Family Nursing*, 13, 293–311.
- Pezzilli, R., Morselli-Labate, A. M., Fantini, L., Campana, D., & Corinaldesi, R. (2007). Assessment of the quality of life in chronic pancreatitis using Sf-12 and European Organisation for Research and Treatment of Cancer Quality of life Questionnaire (EORTC) QLQ-C30 questionnaires. *Digestive and Liver Disease*, 39, 1077–1086.
- Pfeifer, T. A., Kranz, P. L., & Scoggin, A. E. (2008). Perceived stress in occupational therapy students. *Occupational Therapy International*, 15, 221–231.
- Ramirez, M. T. G., & Hernandez, R. L. (2007). Factor structure of the Perceived Stress Scale (PSS) in a sample from Mexico. *The Spanish Journal of Psychology*, 10, 199–206.
- Roemer, A. T. (2005). *Medical acupuncture in pregnancy: a textbook*. New York: Thieme.
- Salter, K. L., Moses, M. B., Foley, N. C., & Teasell, R. W. (2008). Health-related quality of life after stroke: What are we measuring? *International Journal of Rehabilitation Research*, 31, 111–117.
- Schott, J., & Henley, A. (1996). *Culture, religion and childbearing in multiracial society: A handbook for health professionals*. Oxford, United Kingdom: Butterworth Heinemann.
- Stine, R. A. (1995). Graphical interpretation of variance inflation factors. *The American Statistician*, 49, 53–56.
- Stuebe, A. M., Oken, E., & Gillman, M. W. (2009). Associations of diet and physical activity during pregnancy with risk for excessive gestational weight gain. *American Journal of Obstetrics and Gynecology*, 201, e51–58.
- Taylor, S. J., & Bogdan, R. (1998). *Introduction to qualitative research methods: The search for meanings* (3rd ed.). New York: John Wiley & Sons.
- Tu, W. M. (1984). *Confucian ethics today: The Singapore challenge*. Singapore: Curriculum Development Institute of Singapore.
- Ware, J. E., Kosinski, M., Turner-Bowker, D. M., & Gandek, B. (2005). *How to score version 2 of the SF-12 Health Survey*. Lincoln, RI: QualityMetric.
- Weisman, C. S., Hillemeier, M. M., Chase, G. A., Misra, D. P., Chuang, C. H., Parrott, R., et al. (2008). Women's perceived control of their birth outcomes in the Central Pennsylvania Women's Health Study: Implications for the use of preconception care. *Womens Health Issues*, 18, 17–25.
- West, Z. (2008). *Acupuncture in pregnancy and childbirth* (2nd ed.). London: Churchill Livingstone.
- West, Z., & Maciocia, G. (2001). *Acupuncture in pregnancy and childbirth*. Edinburgh, UK: Churchill Livingstone.
- Williamson, M., & Harrison, L. (2010). Providing culturally appropriate care: a literature review. *International Journal of Nursing Studies*, 47, 761–769.
- Wolfe, H. L. (1993). *How to have a healthy pregnancy, healthy birth: With traditional Chinese medicine*. Boulder, CO: Blue Poppy Press.
- Woods, S. M., Melville, J. L., Guo, Y., Fan, M. Y., & Gavin, A. (2010). Psychosocial stress during pregnancy. *American Journal of Obstetrics and Gynecology*, 202(61), e1–e7.
- Xuan, W. (2006). Traditional Chinese medicine. In C. S. Yuan, E. J. Bieber, & B. A. Bauer (Eds.), *Textbook of complementary and alternative medicine* (2nd ed.). London: Informa Healthcare.
- Yan, J., & Sorenson, R. (2006). The effect of Confucian value on succession in family business. *Family Business Review*, 19, 235–250.
- Yeh, H. Y., Chen, Y. C. C. F. P., Chou, L. F., Chen, T. J., & Hwang, S. J. (2009). Using of traditional Chinese medicine among pregnant women in Taiwan. *International Journal of Gynaecology and Obstetrics*, 107, 147–150.
- Zhu, W., & Yao, Y. (2008). On the value of traditional Confucian culture and the value of modern corporate social responsibility. *International Journal of Business and Management*, 3, 58–62.