# Consumption of Chinese herbal medicines during pregnancy and postpartum: A prospective cohort study in China

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## ARTICLE INFO

## ABSTRACT

*Objective:* to investigate usage patterns and factors associated with maternal consumption of Chinese herbal medicines in China.
*Design:* prospective cohort study. Information on the use of Chinese herbal medicines was collected from mothers by personal interview at hospital discharge and followed up by telephone at one, three and six months postpartum.
*Setting:* seven hospitals in Jiangyou, Sichuan Province of China.
*Participants:* 695 mothers who gave birth to a singleton infant.
*Measurements:* prevalence, type, frequency and duration of herbal medicine usage. Logistic mixed regression analyses were performed to determine factors affecting the use.
*Findings:* a total of 43.5% and 45.0% of mothers consumed Chinese herbal medicines during pregnancy and postpartum, respectively. Angelica sinensis was the most popular herbal medicine among the participants (pregnancy 28.8%, postpartum 26.8%). Although herbal medicines were taken more regularly by postpartum users, the median usage duration varied from two to three months during pregnancy but 1–1.6 months postpartum. The majority of users (pregnancy 42.9%, postpartum 55.1%) were advised by their mother or mother-in-law to take Chinese herbal medicines. Antenatal alcohol drinking (adjusted odds ratio 2.75, 95% confidence interval 1.01–7.53) was associated with a marginally higher prevalence of herbal consumption during pregnancy, whereas mothers with a lower family income (adjusted odds ratio 1.52, 95% confidence interval 1.12–2.04) were more likely to consume Chinese herbal medicines in the postpartum period.
*Key conclusions and implications for practice:* consumption of Chinese herbal medicines appears to be prevalent among Chinese mothers, especially those drinking alcohol whilst pregnant and women from a lower income household. Maternity health professionals need to be aware of the lack of evidence to support the use of Chinese herbal medicines during pregnancy and postpartum, and to provide their clients with scientifically based advice regarding herbal medicine use.

## Introduction

Herbal medicines are often regarded as 'natural' and therefore 'safe', although there is little scientific basis for this belief. World-wide, studies have documented that maternal consumption of herbal medicines is common during pregnancy and the postpartum period (Rahman et al., 2008; Chuang et al., 2009; Holst et al., 2009; Hall et al., 2011; Nordeng et al., 2011). The reported prevalence of herbal intake during pregnancy ranged from 12% to 44% in Australia (Pinn and Pallett, 2002; Forster et al., 2006; Frawley et al., 2013; Kennedy et al., 2013) and from 36% to 58% in European countries (Nordeng and Havnen, 2004; Holst et al., 2009; Nordeng et al., 2011). The herbal consumption rate among Asian women was similarly high at 51% in Malaysia and 40% in Palestine (Rahman et al., 2008; Al-Ramahi et al., 2013). Recent studies of Chinese communities suggested that 34% of Taiwanese women consumed at

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least one type of Chinese herbal medicine during pregnancy (Chuang et al., 2009), and the corresponding rate was 56% in Hong Kong (Ong et al., 2005). With regard to herbal medicine usage after childbirth, data were scarce and the published prevalence appeared to vary widely between societies. For instance, nearly 14% of 3354 Canadian women in a survey reported herbal products consumption during their first year after childbirth (Moussally et al., 2009), much lower than the prevalence of 88% (within six months postpartum) observed in a population-based study from Taiwan ($n=21,248$) (Chuang et al., 2009).

Different herbal medicines are used between ethnic groups due to the diversity in cultural background and traditional beliefs (Rahman et al., 2008; Chuang et al., 2009; Nordeng et al., 2011). Their potential adverse effects on mother and fetus, such as hepatotoxic and carcinogenic effects, fetal distress, low birth-weight and birth defects, have been documented extensively (Mabina et al., 1997; Ernst, 2002; Chuang et al., 2006; Wang et al., 2013). Nevertheless, very few published randomised clinical trials have evaluated the therapeutic effects of herbal products (Guo et al., 2007), and even less data are available concerning their efficacy for pregnant or lactating women (Holst et al., 2011; Smeriglio et al., 2014).

Factors that influence maternal consumption of herbal medicines also vary across populations. For example, a survey in the United Kingdom revealed that women who had been pregnant before and those with a university degree tended to use herbal remedies during pregnancy (Holst et al., 2009), yet primiparous mothers in Australia were more likely to take herbal supplements during pregnancy than their multiparous counterparts (Forster et al., 2006). Moreover, while an inverse association was found between education and use of Chinese herbal medicines among Hong Kong pregnant women (Ong et al., 2005), higher educational level was linked to a higher prevalence of herbal consumption by pregnant and postnatal mothers in Taiwan (Chuang et al., 2009).

Traditional Chinese medicine has been practiced in China since ancient times, with Chinese herbal medicine being the most frequently used category (Liu et al., 2012). However, a comprehensive literature search found only one published study documenting maternal use of Chinese herbal medicines in mainland China. This cross-sectional survey of 306 women, conducted in the south eastern city of Hangzhou, reported that one in five women used Chinese herbal medicines during pregnancy, childbirth or within 42 days postpartum (Zeng et al., 2014). In view of the lack of epidemiological information on herbal consumption, the present study aimed to determine the prevalence and pattern of Chinese herbal medicines usage by Chinese women during pregnancy and the first six months postpartum, and to identify the commonly consumed herbal medicines. Factors associated with Chinese herbal usage, as well as their sources of recommendation, were also investigated.

## Methods

### Study design and setting

A prospective cohort study was undertaken during 2010–2011 in Jiangyou, Sichuan Province of China. Sichuan is a large province in Western China with a population of 80 million people. According to its provincial Health and Family Planning Commission, the hospital delivery rate was approximately 95% in 2011. Jiangyou, a typical county-level town with a population of 880,000, is located 160 km north of the provincial capital city Chengdu. Between March and November 2010, mothers aged $\geq 18$ years, who gave birth to a singleton infant at one of the seven hospitals in Jiangyou, were invited to participate in this study before discharge. Exclusion criteria were unable to answer the questions due to limited understanding or deemed unwell to participate as advised by hospital health professionals. This study planned to recruit a sample of 650 women at baseline. The sample size was calculated by assuming a prevalence of herbal consumption between 51% and 60% in the first six months postpartum (at 5% level of significance) and accounting for a 10% non-response rate and a 20% drop-out rate. Of the total 723 eligible women invited to participate, 695 consented, yielding a response rate of 96%.

### Questionnaire and procedure

At discharge, all consented women were interviewed face-to-face by the first author or one of the trained hospital staff using a structured questionnaire. Chinese herbal medicine was defined as a locally available herb (the whole or part of a plant) or herbal processed product which had been empirically known to be effective in treating disorders and maintaining good health. Information on the frequency and duration of usage was recorded for each Chinese herbal medicine. In addition, the referral sources for herbal medicine consumption were documented among users.

The baseline survey also collected information on socio-demographic (age, educational level, employment status, household income), health-related (parity, attendance at antenatal classes) and antenatal lifestyle (smoking status, alcohol drinking, tea drinking) characteristics. Follow-up interviews by telephone were then conducted at one, three and six months postpartum to obtain detailed information on subsequent usage pattern and lifestyle habits. To determine antenatal smoking status, participants who reported smoking any cigarette during pregnancy were classified as smokers and otherwise as non-smokers. Likewise, postnatal smokers were those who smoked any cigarette within the six months postpartum. Both alcohol drinking and tea drinking were defined in a similar manner.

The content validity of questions regarding herbal medicines usage was verified through a pilot study involving 30 pregnant women from the same catchment area. Other questions used in this study had been previously validated for Chinese mothers (Qiu et al., 2010). By six months postpartum, 599 women (86.2%) remained in the cohort. Among the dropouts, 55 mothers (57.3%) could no longer be reached by telephone, 39 (40.6%) decided to withdraw, whereas two women (2.1%) declined to be interviewed because their infants were severely ill. A flowchart of participant recruitment and follow-up is presented in Fig. 1.

### Statistical analysis

Users of Chinese herbal medicine during pregnancy were defined as women who had consumed at least one type of Chinese herbal medicines between the estimated conception date and the date of childbirth. Similarly, users in the postpartum period were mothers who had taken any Chinese herbal medicine within the first six months postpartum. Descriptive statistics were first applied to profile and compare the sample characteristics between users and non-users. The prevalence of Chinese herbal medicine consumption was next tabulated, along with the frequency and duration of usage for each type of herbal medicine among users. Ordinary logistic and logistic mixed regression models were then performed to ascertain factors associated with herbal consumption during pregnancy and the postnatal period, respectively. The latter model incorporated random subject effects to specifically account for the correlation of the repeated measures. Corresponding antenatal and postnatal lifestyle variables were included in the analyses for the two periods. All data analyses were conducted using the SPSS package version 22 (IBM, Armonk, NY, USA).