# Use of traditional Chinese medicine in Singapore children: perceptions of parents and paediatricians

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## ABSTRACT

**Introduction: In a country dominated by western healthcare, interest in traditional Chinese medicine (TCM) is growing. The increasing popularity of TCM, occasionally used with conventional medicine, needs to be assessed, especially in a vulnerable paediatric population. This paper sought to evaluate the use of TCM in children, mainly to determine the common conditions they seek TCM, the pattern of acupuncture or herbal usage for various age groups, the extent of concurrent usage of TCM and conventional medicine, and the reasons for TCM use. Paediatricians' perceptions of TCM will allow us to gauge the acceptability of TCM by those who practise conventional medicine. These are assessed in another arm of this study, with a set of predictive characteristics for their personal TCM use, their perceptions of herb/acupuncture safety, and their own referral to TCM eventually determined.**

**Methods: An anonymous questionnaire was administered on 300 parents awaiting consultation at a large TCM clinic. Next, a separate qualitative questionnaire survey form was posted to 100 paediatricians.**

**Results: Herb usage in children is very common (84.3 percent) and 80 percent of parents admitted concurrent usage of TCM and conventional medicine for their children. Drug-herb interactions was an issue of concern for paediatricians. Paediatricians with a higher level of self-reported TCM knowledge were more likely to refer for a cure.**

**Conclusion: This was the first study to determine the characteristics of children attending a large TCM clinic in a country which is dominated by western healthcare. It also provided insight into the perceptions of TCM among paediatricians in Singapore. Specifically, it gave us an idea of the predictor traits that determine their referral patterns to TCM and their perceptions of herb and acupuncture safety.**


**Keywords: acupuncture, children medication, Chinese herbal medicine, herb usage, traditional Chinese medicine**

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## INTRODUCTION

Singapore has a population of 4.5 million, which is predominantly Chinese (77%).[1] Healthcare is mainly Western-based, but different ethnic groups occasionally consult traditional medicine practitioners for their medical illnesses. The most popular form locally is traditional Chinese medicine (TCM), which originated in China more than 2,000 years ago and mainly includes Chinese herbal medicine and acupuncture. There have been studies on the potential of acupuncture as a treatment in children for a wide range of medical conditions, such as chronic pain, migraines, enuresis, constipation, allergies and postoperative vomiting. The limitations of these studies include small sample sizes and a lack of control groups.

TCM usage is high in Singapore. In 2001, in a survey involving 500 respondents, 67% of Singaporeans admitted to having received TCM.[2] Since 2004, hospitals in Singapore have been offering TCM services such as acupuncture and herbs, to complement conventional medical treatment. Moreover, another survey found that 20% of the population were predominant TCM users.[3] However, while many studies have estimated the usage of complementary/alternative medicine (CAM) in paediatrics,[4] there is little in the literature on the extent of children using TCM.

There is only one known study on TCM/CAM usage in Singapore children, in which the paediatric oncology service in Singapore found that few patients (8%) had consulted a CAM practitioner. Perception of CAM effectiveness and dissatisfaction with conventional treatment were identified among a few positive predictors

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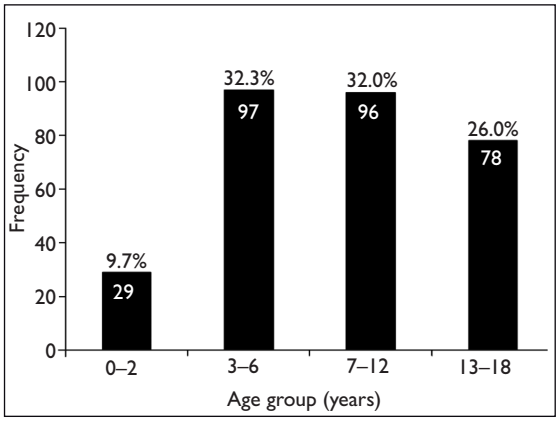


**Fig. 1** Bar chart shows the age distribution of the children studied.

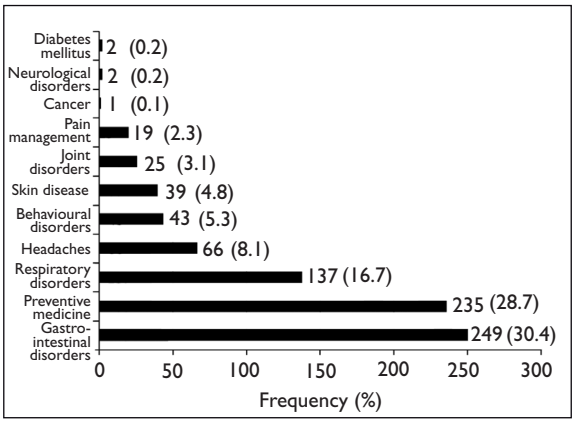


**Fig. 2** Bar chart shows the distribution of disease presentation of the study population.

of referral. Of note, 55% of the parents had not discussed their CAM usage with their child's doctor.[5] Moreover, though it is widely perceived that "natural" products are safe, concurrent use of prescription drugs and herbal medicines may cause drug-herb interactions. This is one big area of concern for doctors practising conventional medicine. However, besides a paper published in 1998 on the perceptions of paediatricians towards CAM in general,[6] there is no research about the perceptions of paediatricians toward TCM.

The purpose of this paper was therefore twofold: (1) to evaluate the use of TCM in children, mainly to determine the common conditions where TCM was sought, the pattern of acupuncture or herb usage for various age groups, the extent of concurrent usage of TCM and conventional medicine, and the reasons for TCM use; and (2) to determine from paediatricians whether there were predictive characteristics for personal TCM use, herb/acupuncture safety and referral to TCM.

## METHODS

A literature review of TCM use in paediatrics and views of the public towards TCM was conducted via PubMed with the keywords, "traditional Chinese medicine", "Singapore", "paediatrics", "children", "herbs", "acupuncture" and "safety". This was a cross-sectional study, where an anonymous self-designed questionnaire survey (Appendix 1) was administered on 300 parents awaiting consultation at Chung Hwa TCM Clinic, a large TCM clinic in Singapore, during the paediatric specialty slot on Saturday evenings. The questionnaire survey had been translated to reach out to parents who were more comfortable with the Chinese language. Next, a qualitative questionnaire survey form (Appendix 2) with a stamped self-addressed return envelope enclosed, was sent to 100 paediatricians in Singapore, with an inclusion criterion that participants were consultants, of the Chinese race, and working in either public or private hospitals. An accompanying letter was attached with the survey, briefly explaining the purpose of the study and restricting the study of TCM to herbs and acupuncture only.

Statistical analysis was performed using the Statistical Package for Social Sciences version 15.0 (SPSS Inc, Chicago, IL, USA). Univariate analysis was performed to obtain the crude odds ratio and to look for significant associations of (1) TCM usage, (2) herb/acupuncture safety, and (3) referral for a chronic disease or condition without cure. A p-value $< 0.05$ was considered significant. The 95% confidence intervals were also calculated. As some of these variables were associated with one another, the significant variables that independently predict TCM use were identified via forward stepwise selection procedures using multiple logistic regression. This was to estimate the adjusted odds ratios of association, after adjusting for all potential confounders ($p < 0.05$ for entry and $p < 0.10$ for removal from the model).

## RESULTS

300 parents were surveyed in the TCM clinic, and they included those with children aged 1–18 years. The mean age of children surveyed was 8.25 years. Gender distribution was fairly balanced, where 156 (52.0%) were male and 144 (48.0%) were female. Children aged 0–2 years made up the smallest proportion of attendees (9.7%) at the clinic, while those in the age groups 3–6 and 7–12 years each formed about one-third of the total number of attendees (Fig. 1). The type of TCM used (herb only, acupuncture only or both) was assessed, and it was found that 253 (84.3%) of the children used herbs and 131 (43.7%) used acupuncture. Of these, 131 (43.7%) used herbs only, 9 (3.0%) used acupuncture only, while 122 (40.7%) used both herbs and acupuncture. Hence, herb usage in children was very common, while the

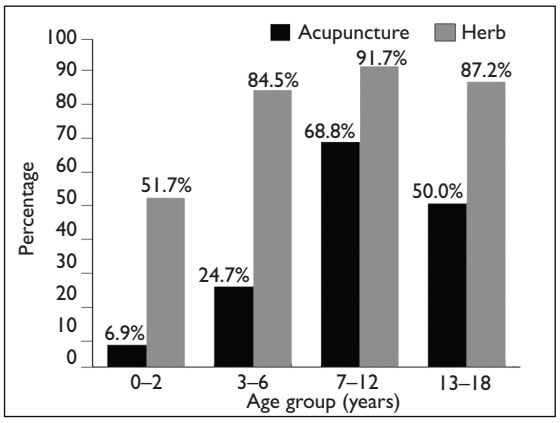


**Fig. 3** Bar chart shows the percentage of traditional Chinese medicine usage according to age groups.

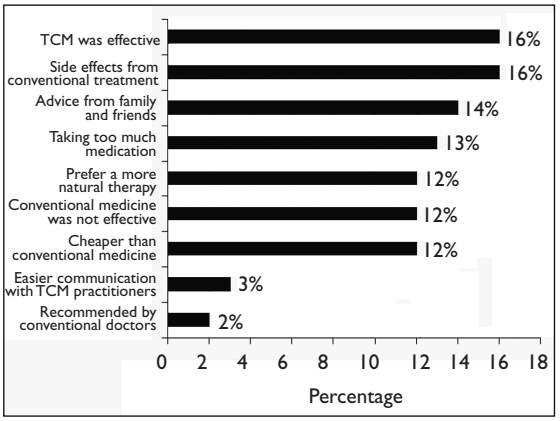


**Fig. 4** Bar chart shows the reasons why parents sought traditional Chinese medicine for their children.

usage of acupuncture alone was uncommon.

The most common conditions where children sought TCM treatment were gastrointestinal (GI) disorders (30.4%), preventive reasons (28.7%) and respiratory conditions (16.7%) (Fig. 2). Many visited the clinic for common self-limiting ailments like gastroenteritis and a short duration of "cough and cold". GI disease (including colic) was also the top condition seen for CAM usage in other studies.[7] When interpreting these results, the prevalence of the disease among the general population had to be taken into consideration. Cancer and neurological disorders are rare in the general population so they would not present as much as the more common diseases like GI disorders in the TCM clinic.

The role of TCM was seen by many Chinese people as being preventive. It was perceived to treat the whole person rather than the disease alone, hence TCM involving herbs and acupuncture tend to work on restoring the bodily balance and "boost the immune system" (translated literally from the Chinese language). Therefore, it was not surprising to note that preventive TCM was a common presentation at the clinic. Thus, the use of TCM in Singapore is different from CAM use in the West, which according to a systemic review, sees a high prevalence of children suffering from chronic conditions.[4] In our study, it was astonishing to note that 241 (80.3%) parents admitted concurrent usage of TCM and conventional medicine for their children. When this was broken down by age groups, it was observed that concurrent usage was less prevalent among patients aged 13–18 years (71.8%) compared to the other age groups, i.e. 0–2 years 82.2%, 3–6 years 86.6% and 7–12 years 80.2%. In contrast, the most common age group using TCM only was 7–12 years, where 68.8% of them used acupuncture and 91.7% used herbs. The age distribution of acupuncture and herb usage is shown in Fig. 3.

In terms of perceived effectiveness, 75% of the parents felt there was much improvement, while 24% felt there was some improvement. Only 1% felt there was no change in their child's condition. The belief that TCM had improved their child's condition was one of the popular reasons why parents used TCM for their children. Parents were given eight reasons why they used TCM and asked to choose their top five. The most common reasons were: TCM was effective, and conventional medicine had too many side effects (Fig. 4). This was consistent with other studies looking at reasons for CAM use in children. 97% felt that TCM had less side effects compared to conventional medicine. Only 2% chose TCM because of recommendations from conventional doctors.

The postal response rate from the paediatricians was 41.0% (41 replies). The mean age of the participants surveyed was 44 years. More males (25, 61.0%) compared to females (16, 39.0%) responded to the survey. Most (70.7%) of the paediatricians surveyed worked in public hospitals, and the rest (29.3%) were from private hospitals. 24 (58.5%) paediatricians admitted to using TCM themselves, of which one (2.4%) had used acupuncture and 23 (56.1%) had used herbs. Variables thought to predict TCM usage include gender, type of hospital, age, perceptions of herb/acupuncture safety and level of TCM knowledge. These were tested in a univariate analysis to obtain individual crude odds ratios. None of these variables showed a significant association with paediatrician use of TCM ($p > 0.05$) (Table I).

Paediatricians were asked to rate their knowledge of TCM on a scale of 0–10 (0 to denote no knowledge and 10 the most knowledge). Many assessed themselves as 3/10. The median rating was 2.63. Four rated their TCM knowledge as 6, and attributed this to having attended or participated in TCM lectures, or having acquired the knowledge from medical colleagues who

had studied TCM or from medical journals. 39% of the paediatricians felt herbs were safe for use in children, while 42% felt acupuncture to be safe. Gender, age, type of hospital (public or private), personal usage of herbs/acupuncture and TCM usage in general, perceptions of herb/acupuncture safety and level of TCM knowledge, were postulated to be associated with the perceptions of herb/acupuncture safety. These were studied using a univariate analysis, and the odds ratios were obtained. It was found that these variables were not significantly associated with perceptions of herb/acupuncture safety ($p > 0.05$) (Table II). Personal usage of herbs ($p = 0.051$) and acupuncture ($p = 0.085$) were only slightly not significant and could be possible associations with perceptions of herb/acupuncture safety if a larger sample size was available.

The analysis of paediatricians' attitudes toward referral gave an indication of their acceptance of integrative medicine (combination of TCM methods with conventional medicine), which is a growing trend in the East. They were asked if they would refer children to TCM for either a chronic disease incompletely treated by conventional medicine or a disease without cure using conventional medicine. 32% would refer children with a chronic disease to TCM, while 41% would refer children for diseases which do not have a cure. This finding was similar to a Hong Kong study, which found that 40% of all referrals for TCM by Hong Kong doctors were for chronic illnesses.[8] Postulated predictors of referral for a chronic disease or cure included gender, age, type of hospital (public or private), personal usage of herbs/acupuncture and TCM usage in general, perceptions of herb/acupuncture safety and level of TCM knowledge. These were studied using a univariate analysis and derived odds ratios. Most variables were insignificant ($p > 0.05$), but the perception of herb safety was associated with referral for a chronic illness ($p = 0.044$). Also, the level for TCM knowledge showed an association with referral for a cure ($p = 0.037$) (Table III).

Those who found herbs to be safe were four times more likely to refer patients with a chronic disease than those who did not. However, the 95% confidence interval was wide, ranging from 1.00 to 15.994, which suggested that more data should be collected before a conclusion could be drawn on this parameter. Those with a higher level of TCM knowledge (score > 2) were four times more likely to refer for a cure when conventional medicine had no solution, compared to those with lower TCM knowledge. Similarly, the 95% confidence interval was also wide, ranging from 1.057 to 15.138. In a multivariate analysis using logistic regression, only the level of TCM knowledge was significantly associated with a referral for a cure ($p = 0.012$). Those with TCM knowledge on a reported score > 2 were more likely to refer for a cure.

**Table I. Univariate analysis of factors associated with TCM use in paediatricians.**

| Variable | p-value | OR (95% CI) |
|---|---|---|
| Gender | 0.288 | 2.031 (0.544–7.575) |
| Type of hospital (public or private) | 0.158 | 2.660 (0.669–0.569) |
| Age (≤ 40 vs. > 40 years) | 0.389 | 0.564 (0.152–2.087) |
| Herb usage is safe | 0.288 | 2.031 (0.544–7.575) |
| Acupuncture usage is safe | 0.500 | 1.551 (0.432–5.570) |
| TCM knowledge (score ≤ 2 vs. > 2) | 0.654 | 1.330 (0.383–4.621) |

TCM: traditional Chinese medicine; OR: odds ratio; CI: confidence interval

## DISCUSSION

Acupuncture use in children is surprisingly high (44%). Paediatricians are wary about its use in children; only 42% perceive it as safe in children, despite studies concluding acupuncture as generally safe in the adult population.[9] The high incidence of acupuncture use might be an overrepresentation of the population use considering the intrinsic psychological fear of needles in children. Further research on acupuncture use in children is suggested, as little is known. Herb usage in children was very common (84%), and 80% of parents admitted concurrent usage of TCM and conventional medicine for their children. Hence, drug-herb interactions would be an issue of concern. Paediatricians have to be vigilant of drug-herb interactions as cases of acute liver failure have been reported in the adult population.[10]

According to the Department of Clinical Pharmacology in the Chinese University of Hong Kong, the majority of Chinese herbal preparations are safe.[11] However, nearly all serious poisonings are due to the few preparations containing aconitine, podophyllin or anticholinergics, or proprietary preparations containing dangerous Western drugs or heavy metals. Herb safety control in Singapore is monitored by the Health Sciences Authority (HSA). 88% of parents believed that TCM was safer than conventional medicine, compared to 39%–44% of paediatricians. This conflict in perceptions of TCM safety between paediatricians and parents needs to be addressed as it may represent an overcautious approach from paediatricians or a false delusion of safety among the parents. This discrepancy can be improved with better TCM knowledge for both patients and health professionals. Paediatricians with higher TCM knowledge tend to refer children for conditions without a cure and not for chronic conditions. A possible

**Table II. Univariate analysis of factors associated with paediatrians' perceptions of acupuncture and herb safety.**

| Variable | Acupuncture safety | | Herb safety | |
|---|---|---|---|---|
| | p-value | OR (95% CI) | p-value | OR (95% CI) |
| Gender | 0.375 | 1.778 (0.496–6.366) | 0.141 | 0.361 (0.091–1.431) |
| Age | 0.643 | 0.741 (0.208–2.636) | 0.839 | 1.143 (0.314–4.160) |
| Type of hospital | 0.497 | 1.625 (0.398–6.628) | 0.354 | 0.526 (0.134–2.064) |
| Personal TCM usage | 0.085 | 1.551 (0.432–5.570) | 0.051 | 2.031 (0.544–7.575) |
| Herbs usage | – | – | 0.051 | 3.818 (0.961–15.175) |
| Acupuncture usage | 0.085 | 1.133 (0.953–1.348) | – | – |
| TCM knowledge (score ≤ 2 vs. > 2) | 0.654 | 0.752 (0.216–2.614) | 0.901 | 0.923 (0.263–3.239) |

TCM: traditional Chinese medicine; OR: odds ratio; CI: confidence interval

**Table III. Univariate analysis of factors associated with the basis for paediatrians' referral to TCM treatment.**

| Variable | Referral for cure | | Referral for chronic illness | |
|---|---|---|---|---|
| | p-value | OR (95% CI) | p-value | OR (95% CI) |
| Gender | 0.375 | 1.778 (0.496–6.366) | 0.460 | 0.593 (0.147–2.392) |
| Age | 0.605 | 1.403 (0.389–5.058) | 0.557 | 1.508 (0.382–5.955) |
| Type of hospital | 0.497 | 1.625 (0.398–6.628) | 0.886 | 0.900 (0.214–3.780) |
| Personal TCM usage | 0.187 | 2.400 (0.644–8.937) | 0.344 | 1.950 (0.485–7.848) |
| Herbs usage | 0.116 | 2.836 (0.760–10.580) | 0.067 | 3.846 (0.868–17.044) |
| Acupuncture usage | 0.085 | 1.133 (0.953–1.348) | 0.569 | 2.250 (0.130–39.053) |
| Acupuncture usage is safe | 0.540 | 1.481 (0.420–5.228) | 0.075 | 3.378 (0.858–13.296) |
| Herb usage is safe | 0.812 | 1.167 (0.327–4.159) | 0.044* | 4.000 (1.00–15.994) |
| TCM knowledge (score ≤ 2 vs. > 2) | 0.037* | 4.00 (1.057–15.138) | 0.819 | 1.167 (0.312–4.360) |

TCM: traditional Chinese medicine; OR: odds ratio; CI: confidence interval
* p-value is significant

explanation could be that they do not have much faith in its efficacy and would only try it as a last resort, rather than for a long-standing but manageable medical condition.

Western research approaches are making TCM more evidence-based. It is important that unbiased information is disseminated to paediatricians, since the level of their TCM knowledge affects their tendency to refer cases to TCM practitioners. Paediatricians could also address the possible issues of drug-herb interactions with patients more confidently. Extending this knowledge to the general public could also address the discrepancy in perceptions between paediatricians and parents, particularly regarding the safety of TCM. This is the first known study to determine the characteristics of children attending a large TCM clinic in a country dominated by Western healthcare practices. It also provides insight into the perceptions of TCM among paediatricians. Specifically, it gives us an idea of the predictor traits that determine their referral patterns to TCM, and their perceptions of herb and acupuncture safety.

There are a few limitations in this study. Firstly, the subjects surveyed were confined to those attending the TCM clinic. Thus, it might not be representative of the views of the general population towards TCM. As these patients were already attending a TCM clinic, they were likely to be more open-minded to alternative therapies, and the children's usage of acupuncture and herbs were influenced by parental usage and beliefs. Secondly, despite providing self-addressed stamped envelopes for returns, many paediatricians did not respond to the surveys on TCM, thus reducing the potential sample size. The low response rate could have an impact on results, since non-responders could feel very strongly against TCM as an acceptable mode of alternative therapy. Lastly, the data for this study was obtained from self-reported questionnaires and was therefore open to a possible response bias.

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**Appendix 1. Questionnaire on the views of parents towards traditional Chinese medicine (TCM).**

1. Gender of child ☐ Male ☐ Female 2. Age of child _____ years

3. In the past year, how often did your child use TCM?
   ☐ For all of his illnesses ☐ Selectively for some illnesses.
   Please give examples: _____

4. Does your child use Western medicine at the same time?
   ☐ Yes ☐ No

5. Would you tell the TCM practitioner if your child was on conventional Western medicine?
   ☐ Yes ☐ No
   If not, why? _____

6. Would you tell the Western doctor if your child was on TCM?
   ☐ Yes ☐ No
   If not, why? _____

7. How many members in your family would use TCM? (Please include your child as well)
   _____

8. What does your child use? (You may select more than one option)
   ☐ Acupuncture ☐ Herbs ☐ Others

9. Would you choose TCM over conventional Western medicine? (Please select the most appropriate option)
   ☐ All the time ☐ Most of the time ☐ Sometimes ☐ Never

10. What do you think of TCM?
    ☐ I believe that there are fewer side effects than conventional Western medicine (Yes/No).
    ☐ Herbal medicine is milder and less toxic in nature than conventional Western medicine (Yes/No).

11. Would you use TCM to: (Please tick one, if applicable)
    ☐ Supplement conventional Western medical treatment (i.e. you would use both TCM and conventional treatments concurrently).
    ☐ Replace conventional Western medical treatment (i.e. if you think TCM alone is effective enough).

12. What does your child use TCM for? (You may select more than one response)
    ☐ Asthma
    ☐ Joint problems (e.g. arthritis, backaches)
    ☐ Neurological disorders (e.g. cerebral palsy)
    ☐ Nausea and vomiting
    ☐ Cancer
    ☐ Digestive tract problems
    ☐ Diabetes mellitus
    ☐ Respiratory tract infection
    ☐ Strengthen the immune system
    ☐ Skin disorders (including eczema)
    ☐ General pain management
    ☐ Behavioural problems (e.g. attention-deficit hyperactive disorder, nightmares, bedwetting, eating disorders)
    ☐ Headaches
    ☐ Others; please specify: _____

13. Have you noticed any improvement in your child's condition since receiving TCM treatment? (Please select one option)
    ☐ Improved a lot ☐ Improved slightly ☐ No change

14. Which of the following best describes why you use TCM? Please select your top five responses. (1: most important; 5: least important)
    ☐ TCM is effective for my child's condition.
    ☐ Western medicine does not help.
    ☐ Prescribed conventional medicine produces side effects.
    ☐ I want a more natural therapy.
    ☐ Consultation fee and medicine are cheaper.
    ☐ Taking too many medications.
    ☐ Recommended by the doctor.
    ☐ Advised by family/friends.
    ☐ Easier to communicate with the doctor.

15. Any additional comments?
    _____

**THANK YOU FOR YOUR ASSISTANCE IN THE SURVEY.**

**Appendix 2. Survey on the views of paediatricians toward the use of traditional Chinese medicine (TCM) in treating children aged 0–18 years.**

1. Gender ☐ Male ☐ Female
2. Age (years) _____ 3. Race _____
4. Qualification _____ 5. Specialisation _____
6. Would you or your family use TCM personally? ☐ Yes ☐ No
7. If yes, what do you or your family use? (You may select more than one option)
   ☐ Acupuncture ☐ Herbs ☐ Others _____
8. How often would you ask patients whether they use TCM? (Please select the most appropriate option)
   ☐ Always ☐ Mostly ☐ Sometimes ☐ Never
9. Who usually initiates discussion of TCM? (e.g. asking about side effects, effectiveness, etc.) (Please tick the most appropriate option)
   ☐ Self ☐ Parents/guardian/child ☐ Not applicable
10. Therapies which you consider to be safe in the paediatric population: (You may select more than one option)
    ☐ Acupuncture ☐ Herbs ☐ Others _____
11. Would you recommend TCM for the following purposes? (Tick if applicable)
    ☐ Supplement conventional Western medical treatment.
    ☐ Replace conventional Western medical treatment.
12. Would you refer patients to TCM, if the patient has:
    (a) end-stage cancer or other medical conditions without a cure? ☐ Yes ☐ No
    (b) a chronic illness which cannot be completely treated by conventional Western medicine? ☐ Yes ☐ No
13. In which of the following conditions would you see a role of TCM in alleviating the child's medical condition? (You may select more than one option)
    ☐ Asthma
    ☐ Joint problems (e.g. arthritis, backaches)
    ☐ Neurological disorders (e.g. cerebral palsy)
    ☐ Nausea and vomiting
    ☐ Cancer
    ☐ Digestive tract problems
    ☐ Diabetes mellitus
    ☐ Respiratory tract infection
    ☐ Strengthen the immune system
    ☐ Skin disorders (including eczema)
    ☐ General pain management
    ☐ Behavioural problems (e.g. attention-deficit hyperactive disorder, nightmares, bedwetting, eating disorders)
    ☐ Headaches
    ☐ Others; please specify: _____
14. How would you rate your knowledge of TCM on a scale of 1 to 10?

    0 1 2 3 4 5 6 7 8 9 10

    No knowledge — Excellent knowledge
15. Where did you acquire your knowledge of TCM (if applicable)? (e.g. TCM degree, training course, newspapers, other media?)

    _____
16. Any additional comments:

    _____

**THANK YOU FOR YOUR ASSISTANCE IN THE SURVEY.**