Chinese pediatrician beliefs about counseling and medications for parents who smoke: a survey in southern China

Kaiyong Huang1, Abu S Abdullah2,3,4*, Jing Liao5, Haiying Huo1, Li Yang1, Zhiyong Zhang1, Jonathan P Winickoff6 and Guangmin Nong5*

Abstract

Background: Pediatricians play an important role in promoting smoking cessation among the parents of young children as more behavioral counseling and cessation treatment are made available in the Chinese healthcare system. However, beliefs about the effectiveness of these interventions can influence pediatricians’ recommendations to their patients. This study examined pediatricians’ beliefs regarding effectiveness of counseling and medications for smoking cessation.

Methods: A cross-sectional survey of pediatricians was conducted in thirteen conveniently selected southern Chinese hospitals, during September to December 2013. A self-administered questionnaire was used for data collection. We used chi square tests and multinomial logistic regression analysis to identify factors associated with beliefs regarding effectiveness of counseling and medications for smoking cessation.

Results: Beliefs of the respondents (504/550; 92% response rate) were divided regarding the effectiveness of counseling and medications for smoking cessation. Sixty percent believed that physician counseling is effective for smoking cessation; 53% believed pharmacological products (or medications) are effective. Factors that were associated with positive beliefs towards the effectiveness of counseling included: believing about the professional responsibility to discuss smoking cessation, being confident in discussing smoking cessation or SHS exposure reduction with patients’ parents, believing that health professionals should routinely ask about their patients smoking habits, believing that health professionals should routinely advise their smoking patients to quit smoking, possessing adequate knowledge in quitting smoking, and being able to assess smokers different stages of readiness to quit. Most of the above factors were also associated with the belief that medication is effective for smoking cessation.

Conclusions: A substantial proportion of Chinese pediatricians believed that cessation counseling and medications are not effective, which is not supported by current evidence in the field. Several factors including individual, practice level and health system level characteristics were associated with their belief. Training efforts are needed to influence pediatricians’ beliefs regarding the effectiveness of cessation counseling and medications.

Keywords: Pediatrician, Beliefs, Effectiveness, Smoking cessation, Counseling, Medication

* Correspondence: asim.abdullah@graduate.hku.hk; ngm8525@hotmail.com
2 Global Health Program, Duke Kunshan University, Duke Avenue, Kunshan, Jiangsu 215316, China
5 Department of Pediatrics, The First Affiliated Hospital of Guangxi Medical University, Nanning, Guangxi 530021, China
Full list of author information is available at the end of the article

© 2015 Huang et al.; licensee BioMed Central. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly credited. The Creative Commons Public Domain Dedication waiver (http://creativecommons.org/publicdomain/zero/1.0/) applies to the data made available in this article, unless otherwise stated.
Background

China is the world's largest producer and consumer of tobacco with 350 million smokers [1]. China has 740 million non-smokers passively exposed to SHS, including 180 million children under the age of 15 [2,3]. At present, an estimated 1 million deaths from smoking occur in China each year, and if the current smoking rates continue, as many as 100 million people currently under the age of 30 in China will die from tobacco use [1,2]. Thus, it is clear that tobacco control efforts in China must be intensified to combat the tobacco-induced morbidity and mortality.

Smoking cessation is a priority for preventing smoking-attributable disease and reducing its burden [4,5]. However, promotion of smoking cessation counseling and cessation medications by physicians is an obstacle for China [6]. Among the physicians group, pediatricians who can address both secondhand smoke (SHS) exposure to children as well as parental smoking cessation are in a critical position. Because, the SHS exposure to children due to parental tobacco use is a serious and prevalent health issue, with over twenty-four percent of children living in a home with a smoking parent [7]. Parental smokers often see their child's doctor more frequently than their own, with an average of over 10 visits in the first two years of a child's life [8,9]. However, very small proportions of pediatrician's visits by a smoker result in cessation counseling or prescription for an effective smoking cessation medication [10]. It was argued that physicians are more likely to recommend treatments that they believe are effective [11]. In studies among physicians in overseas, belief regarding the effectiveness of counseling and cessation medications varied [12-14] with a substantial proportion holding misconceptions about the intervention effectiveness [13,14]. An exploratory study among Chinese pediatricians also reported misconceptions about the effectiveness of counseling and medications for smoking cessation [15]. Therefore, it is critical that the Chinese pediatrician's beliefs are appropriate and evidence-based as they play a key role in clinical decision making. This study describes the beliefs of a sample of Chinese pediatricians regarding the effectiveness of counseling and medication for tobacco dependency treatment.

Methods

Sample

Participants were pediatricians working in the conveniently selected thirteen hospitals (twelve grade III and one grade I) in four major cities of Guangxi province (a Southern Chinese province), the People's Republic of China.

Data collection

A standardized Mandarin Chinese language questionnaire was used for data collection. Questionnaires were distributed through the director of pediatrics department in each of the participating hospitals. The director distributed a copy of the questionnaire to each pediatrician working in his or her department and requested them to put the completed questionnaire in a sealed envelope and drop the questionnaire in the designated box kept in the doctor's office. Our study coordinator then collected the sealed questionnaire from each of the directors. For clarity on any unfinished questions, our study coordinator contacted the individual pediatrician by telephone. To compensate for their time, each participant was given a cash amount of RMB 100 ($15). The study was approved by the institutional review board of Guangxi Medical University.

Questionnaire

The questionnaire was developed with reference to the questionnaires previously used by the investigators team in the United States [9] and in China [6]. The questionnaire obtained demographic information on the subject's demographic background (sex, age, physician type, number of years studied at medical school), smoking behavior (smoker, non-smoker) and other questions on "counseling practices for smoking cessation and secondhand smoke (SHS) exposure to children", "perceiving barriers for smoking cessation service", "whether their workplace is smoke-free", "whether they received any training on smoking cessation counseling", which should be answered "yes" or "no".

Belief of effectiveness for smoking cessation counseling was assessed by asking "physician counseling about smoking cessation is a cost-effective intervention compared to other preventive interventions?", with response categories of "strongly agree, agree, disagree and strongly disagree". Belief of effectiveness for pharmacological products was assessed by asking "pharmacological products or medications (i.e., nicotine patch, nicotine gum, nicotine lozenges, bupropion, varenicline) are effective in helping smokers quit smoking", with response categories of "strongly agree, agree, disagree and strongly disagree". And responses were categorized as 1 for "strongly agree and agree", 2 for "disagree and strongly disagree".

Analyses

Two members of the research team coded each questionnaire and entered all data with Epidata 3.1, and then made a data consistency check. We used \( \chi^2 \) procedures to compare differences between the belief of effectiveness and demographic characteristics or other relevant variables, and then used multinomial logistic regression analysis to analyze the factors with p-value <0.2 in \( \chi^2 \) procedures. A p-value of <0.05 (two-tailed) was considered statistically significant.

Results

Demographic and other characteristics

A total of 550 questionnaires were handed out and 504 pediatricians completed the questionnaires, with a
response rate of 92% (504/550). Response rates were almost identical in all the hospitals. Of the respondents, 64% were female, 77% received 5 years of education at medical school and 17% were current smokers (Table 1). More than one-third of the respondents didn’t hear about e-cigarettes. As a non-smoker, 46% of all pediatricians inhaled secondhand smoke for more than 15 minutes daily for more than 1 day during the past week; 81% of the samples didn’t receive formal training in smoking cessation and 64% of all pediatricians didn’t read China smoking cessation guidelines. Of the respondents, 60% and 53% believed that physician counseling and pharmacological products are effective for smoking cessation, respectively.

The belief that physician counseling is effective for smoking cessation

Table 2 describes the pediatrician’s beliefs regarding effectiveness of smoking cessation counseling. A significantly higher proportion of female (64%) than male (54%) pediatricians believed that cessation counseling is effective (p < .05). A higher proportion of pediatricians who reported that their hospital have a policy to advise smokers to quit smoking (64%) than those which have no policy (55%) believed that cessation counseling was effective (p < .05). Pediatricians who received formal training in smoking cessation (71%) than those who did not receive training (58%) believed that cessation counseling were effective (p < .02). A significantly higher proportion of those who had read China smoking cessation guidelines (66%) than those who did not hear about the guidelines (49%) believed that cessation counseling is effective (p < .05). Other significant characteristics related to the belief that cessation counseling is effective included being confident (65%) than not at all confident (32%) in discussing smoking or SHS exposure reduction with parents, believing that pediatricians can help parents stop smoking (77%) than not believing so (40%), in the usual practice advising (64%) than not advising (17%) parents not to smoke around children, agreeing (65%) than not agreeing (37%) with the statements that health professionals should routinely ask about parents smoking habits (p < .001), believing (61%) than not believing (24%) that health professionals should advise smoking parents to quit smoking (p < .001), believing that they possess adequate knowledge (74%) to help parents in quitting smoking than not believing so (48%) (p < .001), and those who could assess smokers different stages of readiness to quit (67%) than those who do not believe so (50%) (p < .01).

Multinomial logistic regression analysis showed that “being confident in discussing smoking cessation or SHS exposure reduction with patients’ parents”, “believing that pediatricians can help parents stop smoking”, “believing that health professionals should routinely ask about their patients smoking habits”, “believing that health professionals should routinely advise their smoking patients to quit smoking”, “possessing adequate knowledge in quitting smoking”, and “being able to assess smokers different stages of readiness to quit” were the factors associated with the belief that physician counseling is effective for smoking cessation (see Table 3).

The belief that pharmacological products are effective for smoking cessation

Table 4 describes that nine factors were associated with pediatrician’s beliefs regarding the effectiveness of pharmacological products for smoking cessation. These factors are: receiving (65%) than not receiving (50%) formal training in smoking cessation (p < .02), reading (66%) than not reading (53%) China smoking cessation guidelines (p < .01), being confident (55%) than not at all confident (38%) in discussing smoking or SHS exposure reduction with parents (p < .01), believing that pediatricians can help parents stop smoking (67%) than not believing so (35%) (p < .001), in the usual practice advising (55%) than not advising (23%) parents not to smoke around children (p < .001), agreeing (59%) than not agreeing (29%) with the statements that health professionals should routinely ask about parents smoking habits (p < .001), believing (61%) than not believing (24%) that health professionals should advise smoking parents to quit smoking (p < .001), believing that they possess adequate knowledge (74%) to help parents in quitting smoking than not believing so (48%) (p < .001), and those who could assess smokers different stages of readiness to quit (67%) than those who do not believe so (50%) (p < .01).

Multinomial logistic regression analysis showed that “being confident in discussing smoking cessation or SHS exposure reduction with patients’ parents”, “believing that pediatricians can help parents stop smoking”, “believing that health professionals should routinely ask about their patients smoking habits”, “believing that health professionals should routinely advise their smoking patients to quit smoking”, “possessing adequate knowledge in quitting smoking”, and “being able to assess smokers different stages of readiness to quit” were the factors associated with the belief that pharmacological products are effective for smoking cessation (See Table 5).

Discussion

To the best of our knowledge, this is the first study of pediatrician beliefs regarding the effectiveness of counseling and pharmacological products for smoking cessation in a developing country and in China. In the current study, 79% pediatricians did not receive any formal training on tobacco control or smoking cessation, although 84% of the pediatricians were very or somewhat confident
about discussing smoking cessation or SHS exposure reduction with children’s parents. Studies elsewhere reported low rates of implementation of effective SHS exposure reduction interventions on parents who smoke among the pediatricians [16-18]. In an earlier study among Chinese parents [10], few parents (8/33, 24%) had positive experiences about the way they have been asked about SHS exposure to the children or about parental smoking status,

Table 1 Demographic and other characteristics of survey sample, Guangxi, China 2013 (n = 504)

| Variables                                      | N   | %   |
|-----------------------------------------------|-----|-----|
| **Demographic and work environment characteristics** |     |     |
| Gender                                        |     |     |
| Male                                          | 182 | 36  |
| Female                                        | 322 | 64  |
| Age                                           |     |     |
| 20-30                                         | 215 | 43  |
| 31-40                                         | 159 | 31  |
| 41-50                                         | 89  | 18  |
| Above 50                                      | 41  | 8   |
| Physician type                                |     |     |
| Resident Physician                            | 223 | 45  |
| Attending Physician                           | 151 | 30  |
| Associate Chief Physician                     | 88  | 17  |
| Chief Physician                               | 42  | 8   |
| Number of years studied at medical school     |     |     |
| 5 Years                                       | 388 | 77  |
| More than 5 years                             | 116 | 23  |
| Tobacco use related characteristics           |     |     |
| Smoking status                                |     |     |
| Current smoker                                | 82  | 17  |
| Nonsmoker                                     | 400 | 83  |
| Use other forms of tobacco                    |     |     |
| No                                            | 480 | 95  |
| Yes                                           | 24  | 5   |
| Heard about e-cigarettes                      |     |     |
| No                                            | 178 | 35  |
| Yes                                           | 326 | 65  |
| Exposed to SHS regularly*                     |     |     |
| No                                            | 247 | 54  |
| Yes                                           | 211 | 46  |
| Received cigarettes as gift or gave cigarettes as gifts to others |     |     |
| No                                            | 423 | 84  |
| Yes                                           | 81  | 16  |
| Hospital policy characteristics               |     |     |
| Have smoke-free policy in the hospital        |     |     |
| No policy                                     | 8   | 2   |
| Have policy                                   | 496 | 98  |
| Hospital have any policy to advise smokers to quit |     |     |
| No                                            | 219 | 43  |
| Yes                                           | 285 | 57  |
| Training and work attitudes                   |     |     |
| Received formal training in smoking cessation |     |     |
| No                                            | 399 | 81  |

Table 1 Demographic and other characteristics of survey sample, Guangxi, China 2013 (n = 504) (Continued)

| Variables                                      | N   | %   |
|-----------------------------------------------|-----|-----|
| Have read China smoking cessation guidelines   |     |     |
| No                                            | 322 | 64  |
| Yes                                           | 77  | 15  |
| Never heard about it                          | 105 | 21  |
| Have read international (i.e. US, UK) smoking cessation guidelines |     |     |
| No                                            | 359 | 71  |
| Yes                                           | 36  | 7   |
| Never heard about it                          | 109 | 22  |
| Other international guidelines are useful      |     |     |
| No                                            | 4   | 10  |
| Yes                                           | 31  | 78  |
| Not Sure                                      | 5   | 12  |
| Believe about the professional responsibility to discuss smoking cessation |     |     |
| Pediatricians                                  | 229 | 25  |
| Nurses                                        | 160 | 18  |
| The parent’s primary care doctor              | 379 | 41  |
| Others                                        | 150 | 16  |
| Level of confidence discussing smoking cessation or SHS exposure reduction with patients’ parents |     |     |
| Not at all confident                          | 66  | 13  |
| Somewhat confident                            | 316 | 63  |
| Very confident                                | 122 | 24  |
| Beliefs regarding effectiveness of physician counseling for smoking cessation |     |     |
| Agree/strongly agree                          | 304 | 60  |
| Disagree/strongly disagree                    | 200 | 40  |
| Beliefs regarding effectiveness of pharmacological treatment for smoking cessation |     |     |
| Agree/strongly agree                          | 266 | 53  |
| Disagree/strongly disagree                    | 238 | 47  |
| Lack of professional training in the area of tobacco cessation counseling is a major barrier |     |     |
| Yes                                           | 455 | 94  |
| No                                            | 27  | 6   |

Note: Due to the missing values in some variables, the total number may not equal to the same. *exposed to SHS for more than 15 minutes daily for more than 1 day in the past week.
Table 2 Factors associated with the belief that physician counseling is effective for smoking cessation, Guangxi, China 2013

| Variables                                      | Agree/strongly agree n (%) | Disagree/strongly disagree n (%) | \( \chi^2 \) | P value |
|------------------------------------------------|-----------------------------|---------------------------------|-------------|---------|
| Total                                          | 304 (60)                    | 200 (40)                        |             |         |
| **Gender**                                     |                             |                                 |             |         |
| Male                                           | 98 (54)                     | 84 (46)                         | 4.984       | 0.026   |
| Female                                         | 206 (64)                    | 116 (36)                        |             |         |
| **Ages**                                       |                             |                                 |             |         |
| 20-30                                          | 126 (59)                    | 89 (41)                         | 1.977       | 0.577   |
| 31-40                                          | 93 (58)                     | 66 (42)                         |             |         |
| 41-50                                          | 59 (66)                     | 30 (34)                         |             |         |
| Above 50                                       | 26 (63)                     | 15 (37)                         |             |         |
| **Physician type**                             |                             |                                 |             |         |
| Resident Physician                             | 121 (54)                    | 102 (46)                        | 6.825       | 0.078   |
| Attending Physician                            | 95 (63)                     | 56 (37)                         |             |         |
| Associate Chief Physician                      | 60 (68)                     | 28 (32)                         |             |         |
| Chief Physician                                | 28 (67)                     | 14 (33)                         |             |         |
| **Number of years studied at medical school**  |                             |                                 |             |         |
| 1-5 Years                                      | 232 (60)                    | 156 (40)                        | 0.193       | 0.660   |
| More than 5 years                              | 72 (62)                     | 44 (38)                         |             |         |
| **Smoking status**                             |                             |                                 |             |         |
| Current smoker                                 | 51 (62)                     | 31 (38)                         | 0.108       | 0.743   |
| Nonsmoker                                      | 241 (60)                    | 159 (40)                        |             |         |
| **Use other forms of tobacco**                 |                             |                                 |             |         |
| No                                             | 289 (60)                    | 191 (40)                        | 0.031       | 0.861   |
| Yes                                            | 15 (63)                     | 9 (37)                          |             |         |
| **Heard about e-cigarettes**                   |                             |                                 |             |         |
| No                                             | 105 (59)                    | 73 (41)                         | 0.203       | 0.625   |
| Yes                                            | 199 (61)                    | 127 (39)                        |             |         |
| **Exposed to SHS regularly**                   |                             |                                 |             |         |
| No                                             | 158 (64)                    | 89 (36)                         | 1.076       | 0.299   |
| Yes                                            | 125 (59)                    | 86 (41)                         |             |         |
| **Received cigarettes as gift or gave cigarettes as gifts to others** | | | | |
| No                                             | 251 (59)                    | 172 (41)                        | 1.055       | 0.304   |
| Yes                                            | 53 (65)                     | 28 (35)                         |             |         |
| **Hospital have any policy to advise smokers to quit** | | | | |
| No                                             | 121 (55)                    | 98 (45)                         | 4.153       | 0.042   |
| Yes                                            | 183 (64)                    | 102 (36)                        |             |         |
| **Received formal training in smoking cessation** | | | | |
| No                                             | 231 (58)                    | 168 (42)                        | 5.416       | 0.020   |
| Yes                                            | 68 (71)                     | 28 (29)                         |             |         |
| **Have read China smoking cessation guidelines** | | | | |
| No                                             | 201 (62)                    | 121 (38)                        | 6.833       | 0.033   |
| Yes                                            | 51 (66)                     | 26 (34)                         |             |         |
| Never heard about it                           | 52 (49)                     | 53 (51)                         |             |         |
Table 2 Factors associated with the belief that physician counseling is effective for smoking cessation, Guangxi, China 2013 (Continued)

| Have read international (i.e. US, UK) smoking cessation guidelines | No | 218 (61) | 141 (39) | 1.169 0.557 |
|---|---|---|---|---|
| Yes | 24 (67) | 12 (33) |
| Never heard about it | 62 (57) | 47 (43) |

| Other international Guidelines are useful | No | 3 (75) | 1 (25) | 0.361 0.835 |
|---|---|---|---|---|
| Yes | 21 (68) | 10 (32) |
| Not sure | 4 (80) | 1 (20) |

| Believe about the professional responsibility to discuss smoking cessation | Pediatricians | 159 (69) | 70 (31) | 34.927 0.000 |
|---|---|---|---|---|
| Nurses | 107 (67) | 53 (33) |
| The parent’s primary care doctor | 250 (66) | 129 (34) |
| Others: | 63 (42) | 87 (58) |

| Level of confidence discussing smoking cessation or SHS exposure reduction with patients’ parents | Not at all confident | 21 (32) | 45 (68) | 25.771 0.000 |
|---|---|---|---|---|
| Very/Somewhat confident | 283 (65) | 155 (35) |

| Believe pediatricians can help patients’ parents to stop smoking | Agree/strongly agree | 216 (77) | 65 (23) | 72.683 0.000 |
|---|---|---|---|---|
| Disagree/strongly disagree | 88 (40) | 135 (60) |

| I am not familiar with the guidelines for stop smoking | Agree/strongly agree | 181 (59) | 128 (41) | 1.012 0.314 |
|---|---|---|---|---|
| Disagree/strongly disagree | 123 (63) | 72 (37) |

| Smoking cessation counseling for my patients’ parents is not an efficient use of my time | Agree/strongly agree | 146 (57) | 110 (43) | 2.347 0.126 |
|---|---|---|---|---|
| Disagree/strongly disagree | 158 (64) | 90 (36) |

| I am unaware of the best strategies for helping my patients’ parents to stop smoking | Agree/strongly agree | 194 (62) | 119 (38) | 0.955 0.329 |
|---|---|---|---|---|
| Disagree/strongly disagree | 110 (58) | 81 (42) |

| Advise patients who smoke to avoid smoking around children | Agree/strongly agree | 298 (64) | 171 (36) | 29.291 0.000 |
|---|---|---|---|---|
| Disagree/strongly disagree | 6 (17) | 29 (83) |

| Health professionals should routinely ask about their patients smoking habits | Agree/strongly agree | 275 (65) | 150 (35) | 21.816 0.000 |
|---|---|---|---|---|
| Disagree/strongly disagree | 29 (37) | 50 (63) |

| Heath professionals should routinely advise their smoking patients to quit smoking | Agree/strongly agree | 275 (69) | 123 (31) | 60.920 0.000 |
|---|---|---|---|---|
| Disagree/strongly disagree | 29 (27) | 77 (73) |

| My current knowledge is sufficient for helping patients to stop smoking | Agree/strongly agree | 70 (81) | 17 (19) | 17.823 0.000 |
|---|---|---|---|---|
| Disagree/strongly disagree | 234 (56) | 183 (44) |
and rarely were told by their child’s pediatricians to quit smoking.

Our findings show that about half of the pediatricians did not believe the fact that smoking cessation counseling and medication are effective in promoting smoking cessation. Evidence suggests that counseling [19,20] and cessation medications [21-25] are effective for smoking cessation. Factors that were associated with pediatricians’ beliefs included individual characteristics (i.e. female gender, perceived knowledge), clinical practice (i.e. receiving cessation training, advising to quit) and health system (i.e. hospital policy to ask about smoking) related factors. However, many other factors could influence these beliefs among the pediatricians. An earlier survey in China showed that, through creating smoke-free hospital activities, the rate of often asking patients’ smoking status increased from 55.0% to 68.9%, the rate of often advising patients to quit smoking from 67.8% to 77.3% [26]. The same study also reported higher confidence to provide smoking cessation service among physicians who received training on tobacco use prevention and cessation [26].

The low perceived effectiveness of counseling and medications for smoking cessation among Chinese pediatricians are not supported by the current evidence which suggests that these are effective intervention strategies [27-29]. The scarcity of smoking cessation services within

### Table 2 Factors associated with the belief that physician counseling is effective for smoking cessation, Guangxi, China 2013 (Continued)

| I can assess a smoker’s different stages of readiness to quit | Agree/strongly agree | Disagree/strongly disagree | Odds ratio | P value |
|-------------------------------------------------------------|----------------------|---------------------------|------------|--------|
| Agree/strongly agree                                        | 61 (75)              | 21 (25)                   | 8.103      | 0.004  |
| Disagree/strongly disagree                                  | 243 (58)             | 179 (42)                  |            |        |

### Table 3 Multinomial logistic regression analysis on factors associated with the belief that physician counseling is effective for smoking cessation

| Variables                                                                 | Agree/strongly agree | Disagree/strongly disagree | Odds ratio | 95% confidence interval | P value |
|---------------------------------------------------------------------------|----------------------|---------------------------|------------|-------------------------|--------|
| Believe about the professional responsibility to discuss smoking cessation |                      |                           |            |                         |        |
| Pediatricians                                                             | 159 (69)             | 70 (31)                   | 1.855      | 0.042                   |        |
| Nurses                                                                    | 107 (67)             | 53 (33)                   | (1.024–3.362) |                        |        |
| The parent’s primary care doctor                                          | 250 (66)             | 129 (34)                  |            |                         |        |
| Others                                                                    | 63 (42)              | 87 (58)                   |            |                         |        |
| Level of confidence discussing smoking cessation or SHS exposure reduction with patients’ parents |                      |                           |            |                         |        |
| Not at all confident                                                      | 21 (32)              | 45 (68)                   | 3.800      | 0.005                   |        |
| Very/Somewhat confident                                                   | 283 (65)             | 155 (35)                  | (1.510–9.566) |                        |        |
| Health professionals should routinely ask about their patients smoking habits |                      |                           |            |                         |        |
| Agree/strongly agree                                                      | 275 (65)             | 150 (35)                  | 3.395      | 0.002                   |        |
| Disagree/strongly disagree                                                | 29 (37)              | 50 (63)                   | (1.591–7.244) |                        |        |
| Heath professionals should routinely advise their smoking patients to quit smoking |                      |                           |            |                         |        |
| Agree/strongly agree                                                      | 275 (69)             | 123 (31)                  | 4.129      | 0.000                   |        |
| Disagree/strongly disagree                                                | 29 (27)              | 77 (73)                   | (2.100–8.120) |                        |        |
| My current knowledge is sufficient for helping patients to stop smoking   |                      |                           |            |                         |        |
| Agree/strongly agree                                                      | 70 (81)              | 17 (19)                   | 6.015      | 0.000                   |        |
| Disagree/strongly disagree                                                | 234 (56)             | 183 (44)                  | (2.366–15.293) |                        |        |
| I can assess a smoker’s different stages of readiness to quit             |                      |                           |            |                         |        |
| Agree/strongly agree                                                      | 61 (75)              | 21 (25)                   | 3.613      | 0.003                   |        |
| Disagree/strongly disagree                                                | 243 (58)             | 179 (42)                  | (1.540–8.475) |                        |        |
Table 4 Factors associated with the belief that pharmacological products are effective for smoking cessation, Guangxi, China 2013

| Variables                                           | Agree/strongly agree n (%) | Disagree/strongly disagree n (%) | \( \chi^2 \) | P value |
|-----------------------------------------------------|----------------------------|----------------------------------|-------------|---------|
| Total                                               | 266 (53)                   | 238 (47)                         |             |         |
| **Gender**                                          |                            |                                  |             |         |
| Male                                                | 86 (47)                    | 96 (53)                          | 3.489       | 0.062   |
| Female                                              | 180 (56)                   | 142 (44)                         |             |         |
| **Ages**                                            |                            |                                  |             |         |
| 20-30                                               | 107 (50)                   | 108 (50)                         | 3.756       | 0.289   |
| 31-40                                               | 93 (59)                    | 66 (41)                          |             |         |
| 41-50                                               | 43 (48)                    | 46 (52)                          |             |         |
| Above 50                                            | 23 (56)                    | 18 (44)                          |             |         |
| **Physician type**                                  |                            |                                  |             |         |
| Resident Physician                                  | 116 (52)                   | 107 (48)                         | 3.392       | 0.335   |
| Attending Physician                                 | 84 (56)                    | 67 (44)                          |             |         |
| Associate Chief Physician                           | 49 (56)                    | 39 (44)                          |             |         |
| Chief Physician                                     | 17 (41)                    | 25 (59)                          |             |         |
| **Number of years studied at medical school**       |                            |                                  |             |         |
| 1-5 Years                                           | 207 (53)                   | 181 (47)                         | 0.222       | 0.638   |
| More than 5 years                                   | 59 (51)                    | 57 (49)                          |             |         |
| **Smoking status**                                  |                            |                                  |             |         |
| Current smoker                                      | 42 (51)                    | 40 (49)                          | 0.251       | 0.616   |
| Nonsmoker                                           | 217 (54)                   | 183 (46)                         |             |         |
| **Use other forms of tobacco**                      |                            |                                  |             |         |
| No                                                   | 251 (52)                   | 229 (48)                         | 0.956       | 0.328   |
| Yes                                                  | 15 (63)                    | 9 (37)                           |             |         |
| **Heard about e-cigarettes**                        |                            |                                  |             |         |
| No                                                   | 88 (49)                    | 90 (51)                          | 1.231       | 0.267   |
| Yes                                                  | 178 (55)                   | 148 (45)                         |             |         |
| **Exposed to SHS regularly**                         |                            |                                  |             |         |
| No                                                   | 124 (50)                   | 123 (50)                         | 0.843       | 0.358   |
| Yes                                                  | 115 (55)                   | 96 (45)                          |             |         |
| **Received cigarettes as gift or gave cigarettes as gifts to others** | | | | |
| No                                                   | 225 (53)                   | 198 (47)                         | 0.181       | 0.671   |
| Yes                                                  | 41 (51)                    | 40 (49)                          |             |         |
| **Hospital have any policy to advise smokers to quit** |                            |                                  |             |         |
| No                                                   | 106 (48)                   | 113 (52)                         | 2.976       | 0.085   |
| Yes                                                  | 160 (56)                   | 125 (44)                         |             |         |
| **Received formal training in smoking cessation**    |                            |                                  |             |         |
| No                                                   | 199 (50)                   | 200 (50)                         | 6.716       | 0.010   |
| Yes                                                  | 62 (65)                    | 34 (35)                          |             |         |
| **Have read China smoking cessation guidelines**     |                            |                                  |             |         |
| No                                                   | 172 (53)                   | 150 (47)                         | 11.538      | 0.003   |
| Yes                                                  | 51 (66)                    | 26 (34)                          |             |         |
| Never heard about it                                 | 43 (41)                    | 62 (59)                          |             |         |
Table 4 Factors associated with the belief that pharmacological products are effective for smoking cessation, Guangxi, China 2013 (Continued)

| Have read international (i.e. US, UK) smoking cessation guidelines | 193 (54) | 166 (46) | 2.711 | 0.258 |
|--------------------|----------|----------|--------|--------|
| No                 | 22 (61)  | 14 (39)  |        |        |
| Yes                | 51 (47)  | 58 (53)  |        |        |
| Never heard about it |         |          |        |        |
| Other international Guidelines are useful | 3 (75) | 1 (25) | 3.972 | 0.137 |
| No | 20 (65) | 11 (35) | | |
| Yes | 1 (20) | 4 (80) | | |
| Not sure | | | | |
| Believe about the professional responsibility to discuss smoking cessation | | | | |
| Pediatricians | 115 (50) | 114 (50) | 6.821 | 0.078 |
| Nurses | 82 (51) | 78 (49) | | |
| The parent’s primary care doctor | 209 (55) | 170 (45) | | |
| Others: | 64 (43) | 86 (57) | | |
| Level of confidence discussing smoking cessation or SHS exposure reduction with patients’ parents | | | | |
| Not at all confident | 25 (38) | 41 (62) | 6.764 | 0.009 |
| Very/Somewhat confident | 241 (55) | 197 (45) | | |
| Believe pediatricians can help patients’ parents to stop smoking | | | | |
| Agree/strongly agree | 188 (67) | 93 (33) | 50.849 | 0.000 |
| Disagree/strongly disagree | 78 (35) | 145 (65) | | |
| I am not familiar with the guidelines for stop smoking | | | | |
| Agree/strongly agree | 166 (54) | 143 (46) | 0.286 | 0.593 |
| Disagree/strongly disagree | 100 (51) | 95 (49) | | |
| Smoking cessation counseling for my patients’ parents is not an efficient use of my time | | | | |
| Agree/strongly agree | 130 (51) | 126 (49) | 0.832 | 0.362 |
| Disagree/strongly disagree | 136 (55) | 112 (45) | | |
| I am unaware of the best strategies for helping my patients’ parents to stop smoking | | | | |
| Agree/strongly agree | 169 (54) | 144 (46) | 0.490 | 0.484 |
| Disagree/strongly disagree | 97 (50) | 94 (49) | | |
| Advise patients who smoke to avoid smoking around children | | | | |
| Agree/strongly agree | 258 (55) | 211 (45) | 13.510 | 0.000 |
| Disagree/strongly disagree | 8 (23) | 27 (77) | | |
| Health professionals should routinely ask about their patients smoking habits | | | | |
| Agree/strongly agree | 237 (59) | 166 (41) | 29.351 | 0.000 |
| Disagree/strongly disagree | 29 (29) | 72 (71) | | |
| Heath professionals should routinely advise their smoking patients to quit smoking | | | | |
| Agree/strongly agree | 241 (61) | 157 (39) | 45.900 | 0.000 |
| Disagree/strongly disagree | 25 (24) | 81 (76) | | |
| My current knowledge is sufficient for helping patients to stop smoking | | | | |
| Agree/strongly agree | 64 (74) | 23 (26) | 18.228 | 0.000 |
| Disagree/strongly disagree | 202 (48) | 215 (52) | | |
| I can assess a smoker’s different stages of readiness to quit | | | | |
| Agree/strongly agree | 55 (67) | 27 (33) | 8.137 | 0.004 |
| Disagree/strongly disagree | 210 (50) | 211 (50) | | |
the Chinese hospitals and the unavailability of cessation medications contributed significantly to possessing such beliefs among the pediatricians. It may be the fact that pediatricians were reluctant to know more about the effectiveness of these intervention modalities (i.e. counseling and medication) as they will not utilize these in their clinical practice. If these modalities for smoking cessation are to be fully implemented within the healthcare system, physicians need to be trained and aware of their effectiveness. At the same time, the Chinese healthcare system needs to realize the need for smoking cessation services with provision for medications. In this study, receiving formal training in smoking cessation or reading China smoking cessation guidelines were associated with the belief that cessation counseling and pharmacological products were effective.

Limitations

Several factors may limit the generalizability of the findings. First, the sample may not be representative of the whole pediatric population in China. Second, although it is expected that the characteristics of pediatricians working in all the similar grade level hospitals would be similar, there may be regional variations. However, responses to key items did not differ as a function of hospital type or physician type so this is unlikely to have affected the results. Third, one might expect that attitudes would change over time as more information about the smoking cessation intervention was available in China since this study was conducted. A follow-up survey may examine the changes of beliefs over time.

Conclusion

The findings suggest that a substantial proportion of Chinese pediatricians believed that cessation counseling and medications are not effective, which is not supported by current evidence in the field. Several factors including individual, practice level and health system level characteristics were associated with their belief regarding the effectiveness of cessation counseling and medications. Perceived effectiveness of cessation counseling and medication may affect pediatricians’ clinical practice and recommendations for tobacco use reduction and cessation. Therefore, training efforts are needed to influence pediatricians’ beliefs about the available evidence-based interventions (i.e., counseling and medications). At the same

Table 5 Multinomial logistic regression analysis on factors associated with the belief that pharmacological products are effective for smoking cessation

| Variables                                                                 | Agree/strongly agree n (%) | Disagree/strongly disagree n (%) | Odds ratio (95% confidence interval) | P value |
|--------------------------------------------------------------------------|----------------------------|---------------------------------|-------------------------------------|---------|
| Level of confidence discussing smoking cessation or SHS exposure reduction with patients’ parents |                            |                                 |                                     |         |
| Not at all confident                                                     25 (38)                   | 41 (62)                      | 2.018 (1.492–4.655)             | 0.006                              |         |
| Very/Somewhat confident                                                 241 (55)                   | 197 (45)                     | 3.520 (1.731–7.924)             | 0.001                              |         |
| Believe pediatricians can help patients’ parents to stop smoking         |                            |                                 |                                     |         |
| Agree/strongly agree                                                    188 (67)                   | 93 (33)                      | 3.520 (1.492–4.655)             | 0.001                              |         |
| Disagree/strongly disagree                                              78 (35)                    | 145 (65)                     |                                     |         |
| Health professionals should routinely ask about their patients smoking habits |                            |                                 |                                     |         |
| Agree/strongly agree                                                    237 (59)                   | 166 (41)                     | 3.685 (1.731–7.924)             | 0.000                              |         |
| Disagree/strongly disagree                                              29 (29)                    | 72 (71)                      | 5.833 (2.072–11.448)            | 0.000                              |         |
| Heath professionals should routinely advise their smoking patients to quit smoking |                            |                                 |                                     |         |
| Agree/strongly agree                                                    241 (61)                   | 157 (39)                     | 5.833 (2.072–11.448)            | 0.000                              |         |
| Disagree/strongly disagree                                              25 (24)                    | 81 (76)                      |                                     |         |
| My current knowledge is sufficient for helping patients to stop smoking  |                            |                                 |                                     |         |
| Agree/strongly agree                                                    64 (74)                    | 23 (26)                      | 4.156 (2.072–9.588)             | 0.000                              |         |
| Disagree/strongly disagree                                              202 (48)                   | 215 (52)                     |                                     |         |
| I can assess a smoker’s different stages of readiness to quit            |                            |                                 |                                     |         |
| Agree/strongly agree                                                    55 (67)                    | 27 (33)                      | 3.577 (1.605–8.184)             | 0.001                              |         |
| Disagree/strongly disagree                                              210 (50)                   | 211 (50)                     |                                     |         |
time, health system-level change to incorporate cessation service within the healthcare delivery system will increase pediatricians’ participation in the training, enhance their understanding about the evidence-based intervention available for smoking cessation and generate positive beliefs towards cessation counseling and medication.

Competing interests
The authors declare that they have no competing interests.

Authors’ contributions
KH took part in designing the study, drafted the manuscript, carried out the acquisition, analysis and interpretation of the data. ASA conceptualized and designed the whole study, supervised and instructed data collection and analysis, reviewed and revised the manuscript. JL and HH coordinated and supervised data collection, carried out the initial analyses. LY and ZZ contributed to the overall design of the study, commented on the data collection instrument, critically reviewed the manuscript. JPW contributed to the overall design of the study, critically reviewed the manuscript. GN contributed to the overall design of the study and data interpretation. All authors read and approved the final manuscript.

Acknowledgements
This study was supported by a grant (principal investigator: Abu S. Abdullah) from the Flight Attendant Medical Research Institute, USA, to the American Academy of Pediatrics (AAP), Julius B. Richmond Center. We thank the pediatricians who gave their time to contribute to this study.

Author details
1 School of Public Health, Guangxi Medical University, Nanning, Guangxi 530021, China. 2 Global Health Program, Duke Kunshan University, Duke Avenue, Kunshan, Jiangsu 215316, China. 3 Duke Global Health Institute, Duke University, Durham, North Carolina, USA. 4 Boston University School of Medicine, Boston Medical Center, Boston, Massachusetts, USA. 5 Department of Pediatrics, The First Affiliated Hospital of Guangxi Medical University, Nanning, Guangxi 530021, China. 6 MGH Center for Child and Adolescent Health Research and Policy, Harvard Medical School, Boston, USA.

Received: 2 November 2014 Accepted: 28 March 2015

Published online: 07 April 2015

References
1. Yang GH, Ma JM, Liu N, Zhou LN. Smoking and passive smoking in Chinese, 2002. Zonghua Liu Xing Bing Xue Za Zhi. 2005;26:77–83.
2. Center for Disease Prevention and Control. Chinese Ministry of Health: GATS china report. Beijing: China CDC; 2010.
3. Liu Y, Chen L. New medical data and leadership on tobacco control in China. Lancet. 2011;377:1218–20.
4. Coffield AB, MacIsaac MW, McGinnis JM, Harris JR, Caldwell MB, Teutsch SM, et al. Priorities among recommended clinical preventive services. Am J Prev Med. 2001;21(1):1–9.
5. Centers for Disease Control and Prevention, USA. The surgeon General’s 1990 report on the health benefits of smoking cessation executive summary - preface. MMWR Recomm Rep. 1990;39(RR-12):viii–xx.
6. Zhou J, Abdullah AS, Pun VC, Huang D, Lu S, Luo S. Smoking status and cessation counseling practices among physicians, Guangxi, China, 2007. Prev Chronic Dis. 2010;7(1):A15.
7. U.S. Department of Health and Human Services. The health consequences of involuntary exposure to tobacco smoke: a report of the surgeon general. Washington, DC: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion; 2006.
8. Rowland D, Lyons B, Salganicoff A, Long P. A profile of the uninsured in America. Health Aff. 1994;13(2):283–7.
9. Winickoff JP, Buckley VJ, Palfrey JS, Perrin JM, Rigotti NA. Intervention with parental smokers in an outpatient pediatric clinic using counseling and nicotine replacement. Pediatrics. 2003;112(3):1127–33.
10. Abdullah AS, Ma ZY, Liao J, Huang KY, Yang L, Zhang ZY, et al. Addressing parental smoking in pediatric settings of Chinese hospitals: a qualitative study of parents. Biomed Res Int. 2014;2014:382345.
11. Vogt F, Hall S, Marteau TM. General practitioners’ beliefs about effectiveness and intentions to prescribe smoking cessation medications: qualitative and quantitative studies. BMC Public Health. 2006;6:277.
12. Steinenberg MB, Delnove CD. Physician beliefs regarding effectiveness of tobacco dependence treatments: results from the NJ Health Care Provider Tobacco Survey. J Gen Intern Med. 2007;22(10):1459–62.
13. Vogt F, Hall S, Marteau TM. General practitioners’ and family physicians’ negative beliefs and attitudes towards discussing smoking cessation with patients: a systematic review. Addiction. 2005;100(1):423–31.
14. Williams JM, Zimmerman MH, Steinberg ML, Gandhi KK, Delnove C, Steinenberg MB, et al. A comprehensive model for mental health tobacco recovery in New Jersey. Adm Policy Ment Health Ment Health Serv Res. 2011;38(5):368–83.
15. Liao J, Abdullah AS, Nong GM, Huang KY, Lin LD, Ma ZY, et al. Engaging Chinese pediatricians on secondhand smoke exposure assessment and counseling: a qualitative study. BMC Pediatrics. 2014;14:226.
16. Zapka JG, Pbert L, Stoddard AM, Ockene JK, Geis KS, Bonollo D. Smoking cessation counseling with pregnant and postpartum women: a survey of community health center providers. Am J Public Health. 2000;90(1):78–84.
17. Zapka JG, Fletcher K, Pbert L, Drucker SK, Ockene JK, Chen L. The perceptions and practices of pediatricians: tobacco intervention. Pediatrics. 1999;103(5):665.
18. Winickoff JP, Tanski SE, McMillen RC, Klein JD, Rigotti NA, Weitzman M. Child health care Clinicians’ Use of medications to help parents quit smoking: a national parent survey. Pediatrics. 2005;115(4):1013–7.
19. Lancaster T, Stead LF. Individual behavioural counselling for smoking cessation, Cochrane Database Syst Rev. 2005;CD001292.
20. Stead LF, Lancaster T. Group behaviour therapy programmes for smoking cessation, Cochrane Database Syst Rev. 2005;4:CD001007.
21. Stead LF, Perera R, Bullen C, Mant D, Lancaster T. Nicotine replacement therapy for smoking cessation, Cochrane Database Syst Rev. 2008;1:CD000146.
22. Crogan HT, Hunt RD, Dahlhri SR, Crogan GA, Sloan JA, Novotny PJ, et al. Randomized comparison of a nicotine inhaler and bupropion for smoking cessation and relapse prevention. Mayo Clin Proc. 2007;82(2):186–95.
23. Hays JT, Hunt RD, Rigotti NA, Naura R, Gonzales D, Duncan MJ, et al. Sustained release bupropion for pharmacologic relapse prevention after smoking cessation: a random- ized, controlled trial. Ann Int Med. 2001;135(6):423–33.
24. Jorenby DE, Leischow SJ, Nides MA, Rennard SJ, Johnston JA, Hughes AR, et al. A controlled trial of sustained-release bupropion, a nicotine patch, or both for smoking cessation. New Engl J Med. 1999;340(9):685–91.
25. Steinberg MB, Foulds J, Richardson DL, Burke MV, Shah P. Pharmacotherapy and smoking cessation at a tobacco dependence clinic. Prev Med. 2006;42(2):114–49.
26. Cao RG, Xu GH, Zhao N, Zen FY, Wang JB, Feng ML. Effect on doctor’s knowledge, attitude, and practice of tobacco control of creating smoke-free hospital in 60 hospitals. Chin Hosp. 2011;15(7):24–8.
27. Zhu SH, Anderson CM, Tedeschi GJ, Rosbrook B, Johnson CE, Byrd M, et al. Evidence of real-world effectiveness of a telephone quitline for smokers. New Engl J Med. 2002;347(14):1087–93.
28. Swartz LH, Noell JW, Schroeder SW, Agy DV. A randomised control study of a fully automated internet based smoking cessation programme. Tob Control. 2006;15(1):7–12.
29. Walters ST, Wright JA, Sloggs R. A review of computer and internet – based interventions for smoking behavior. Addict Behav. 2006;31(2):264–77.