Special Report

AME survey-003 A2: on the attractiveness of an medicine career in current China with a survey of 7,508 medical professionals and 443 non-medical professionals

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Abstract: This is a part of the study of AME survey-003, aiming to understand the motivation and attractiveness of a career in medicine in China. The surveys were conducted on DXY platform with 3,564 medical professionals during October 26 to November 20; on Sojump platform with 1,587 medical professionals during October 28 to December 14, and 443 non-medical professionals during November 15 to December, all in 2015. Similar to our previous result, *the not regretted participants vs. regretted participants* (N/Y) ratio was 1.1 (P<0.01), and there was no significant difference in N/Y ratio between male and female medical professionals. Medical professionals working in class-IIIA hospitals, small township hospitals, or primary care clinics had a relatively higher job satisfaction than those in hospitals of other classes, while lecturer-level attending doctors (zhuzhi yishi) had a relatively lower job satisfaction than doctors of other grades. A large portion of respondents who replied they regretted entered medical profession said they would still like to be in this profession if they could be in their preferred hospital class and specialty. Public health and basic science research staff, anesthesiologists, oncologists had a relatively higher job satisfaction, while accident and emergency physicians, nurses, and pediatricians had a relatively lower job satisfaction. Medical professionals in Yunnan and Gansu ranked consistently high in job satisfaction than other provinces; despite they were not in the economically advanced regions in China. Similar to our previous result, the majority of the participants favored China to open up medical market to qualified foreign medical organizations to take part in fair competition, as well as favor the government to support regulated private hospitals. Pooled data of 7,508 medical professionals with data from AME survey-003 A1 included showed medicine was the top career choice among medical professionals' children (104/508, 20.5%), followed by finance and economics (74/508, 14.4%), and then electronic engineering or computer science (67/508, 13.2%). Among the 443 non-medical professionals, 122 have children who are attending university or have graduated, 12 (9.8%, 12/122) of them are pursuing a career in medicine. For the 100 non-medical professional parents whose children did not study medicine and if a choice could be given to them to start again, 60 parents (54.5%) replied they would support their children to study medicine. Our results consistently show medicine remained an attractive profession in China.

Keywords: China; survey; medicine; job satisfaction; stress; clinical specialty

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"If the misery of the poor be caused not by the laws of nature, but by our institutions, great is our sin."

Charles Darwin
[1809–1882]

"A doctor must work eighteen hours a day and seven days a week. If you cannot console yourself to this, get out of the profession."

Martin Henry Fischer
[1879–1962, German-born American physician and author]

"Experiencing suffering is necessary to be a complete doctor."

Georges Mathé
[1922–2010, French oncologist and immunologist]

Background

This is a follow-up study of AME survey-003 A1 on job satisfaction of doctors in China (1,2). The purpose of this study is to understand whether previous results can further be confirmed. In addition, this study also aims to look at the attractiveness of a career in medicine in the eye of non-medical professionals. Furthermore, a small scale study was conducted to understand the weekly working hours among doctors in hospitals in Beijing.

Materials and methods

Survey on medical doctors' motivations in China

The first part of this survey was conducted during the period of September 10-23, 2015, and the results (dataset-1) have been reported (1,2). The second part of this survey (dataset-2) followed the same method as the first survey, and conducted on DXY platform (www.dxy.cn) during the period of October 26 to November 20, 2015. DXY users who did not attend survey in the first period were invited to answer the same questionnaire (Appendix 1), and a token bonus was awarded to the users who completed survey. The third part of the survey using the same questionnaire was carried out on Sojump platform (wenjuanxin, www.sojump.com) during the period October 28 to December 14, 2005 (dataset-3). This survey was promoted via e-mails and Wechat (https://wx.qq.com/) through personal contacts, friends, and colleagues with the aim to balance out the young age bias seen in dataset-1 and -2.

There were 3,564 and 1,587 participants in dataset-2 and dataset-3 respectively. For dataset-2, the geographical distribution of the voters is shown in *Figure 1*, and followed the same pattern as in dataset-1 (1). For dataset-3, the geographical distribution of the voters is shown in *Figure 2*. Zhejiang province had the highest number of voters (n=421), followed by Guangdong province (n=161) and Hebei province (n=123). The geographical distribution of the three surveys' voters pooled is shown in *Figure 3*. The age distribution of the three surveys' voters pooled is shown in *Figure 4*, with a mean age of 31 (SD: ±7) years for dataset-2 and 37 (SD: ±8) years for dataset-3. The distribution of participants' specialties in dataset-1, -2, and -3 are shown in *Figure 5* (1,2).

Survey on non-medical professionals' attitude toward their children studying medicine.

An online survey was carried out during the period of November 15 to December 2015 to investigate non-medical profession parents' attitude towards their children studying medicine (dataset-4). Survey was conducted on Sojump platform (wenjuanxin, www.sojump.com) and distributed by authors through colleagues, friends, and relatives, and the questionnaire-flow diagram is shown in *Figure 6*. The primary targeted participants were those who are not medical doctors themselves, but have relatives and friends being medical doctors, therefore they knew the life style of being a doctor in China. Zhejiang province had the highest number of participants (n=69), followed by Ningxia province (n=68). The mean age of participants was 40 (SD: ±8) years, and included 155 males and 288 females. The geographical distribution of the voters is shown in *Figure 7*.

Survey on the working hours of doctors in Beijing

A brief survey on doctors' working hours was conducted using Sojump platform (www.sojump.com) during December 19th pm~21st am, 2015. This survey platform was closed at 1:00 pm Dec 21st 2015 to avoid potential abuse. The estimated working hours was suggested to be averaged over one year. It was further reminded that if working 10 hours/day and 6 days a week, the total weekly working hours would be 60 hours/week; and if working 12 hours/day and 7 days a week, the total weekly working hours would be 84 hours/week. Wechat messages (https://wx.qq.com/) were sent via personal contacts to individual doctors in Beijing with their specialties as diversified as possible. The main goal was to get an estimation of the weekly working hours of approximately 50~100 Beijing-based doctors.

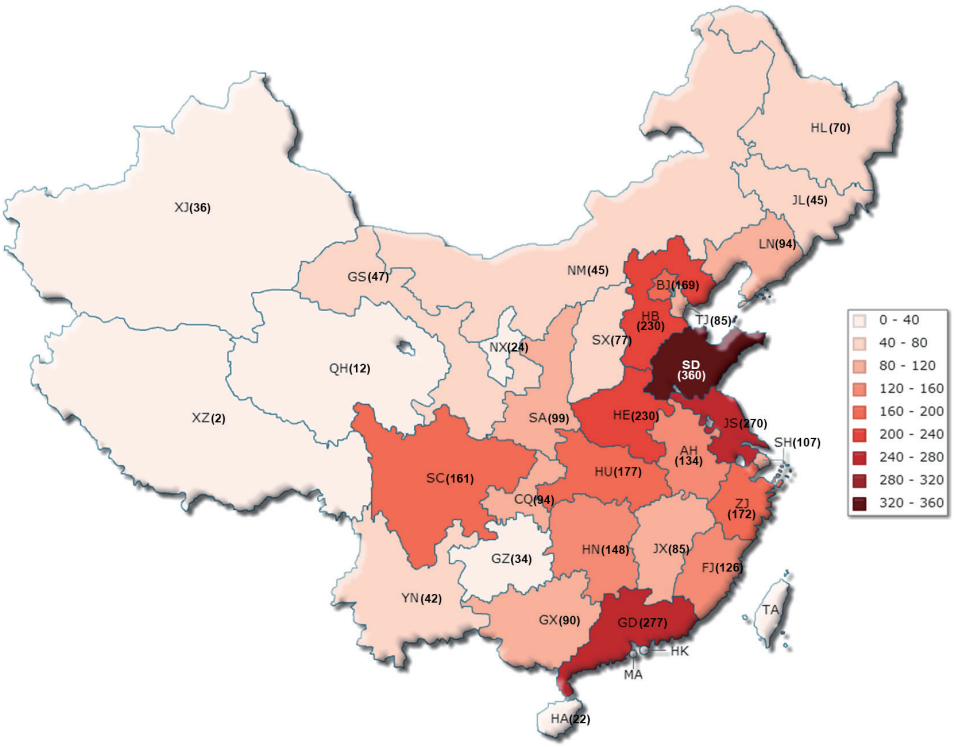

Figure 1 Geographic distribution of participants for dataset-2 (n=3,564). This distribution is similar to dataset-1 (1).

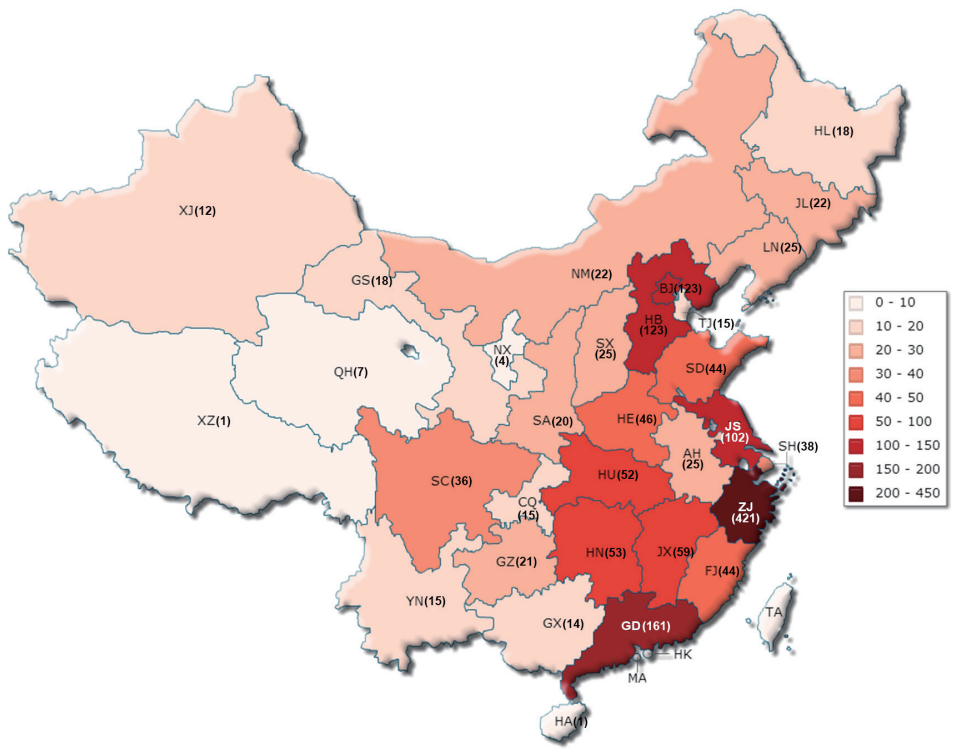

Figure 2 Geographic distributions of participants for dataset-3 (n=1,587). The participant distribution is heavily weighted by participants from Zhejiang Province (n=421), Guangdong Province (n=161), Hebei Province (n=123), Beijing (n=123), and Jiangsu Province (n=102).

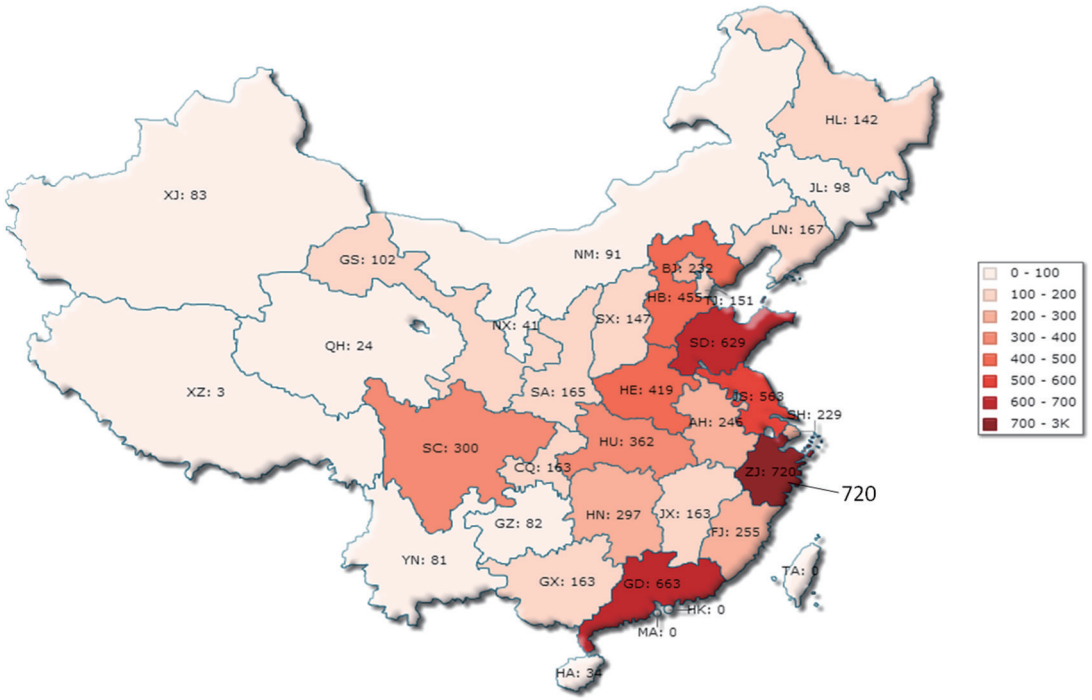

Figure 3 Geographic distributions of participants for dataset-1, -2, & -3 (n=7,508).

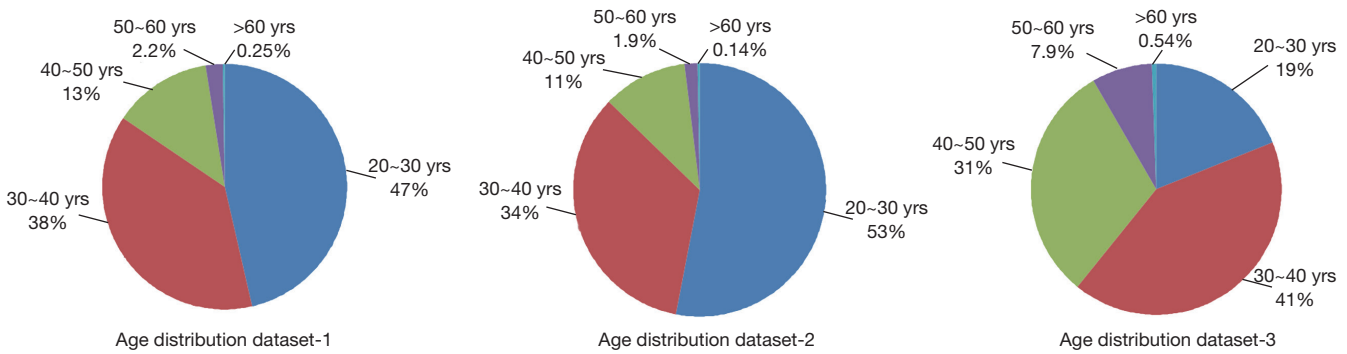

Figure 4 The age distribution of the participants among dataset-1, 2, and -3. Participants of dataset-1, -2 are heavily weighted by years—20~30 groups.

Results

For dataset-2, the N/Y ratio (*not regretted participants* =1,858 *vs. regretted participants* =1,706) was 1.09 (P=0.011). For dataset-3, the N/Y ratio (no regret participants =839 *vs.* regretted participants ratio 748) was 1.12 (P=0.022). Pooling dataset-1, -2,-3 together, the number difference between *not regretted participants* and *regretted participants* was significant (3,908 *vs.* 3,600, P<0.001). For both dataset-2 and dataset-3, there was no significant difference in N/Y ratio between male participants and female participants (*Figure 8*).

For dataset-2, there were 2,232 participants from class-IIIA hospitals (62.6%) with an N/Y ratio =1.20 (P<0.001), followed by class-IIIB &-IIIC hospitals (8.0%) with an N/Y ratio =0.87 (P=0.259), class-IIA, -IIB & -IIC hospitals (22.4%) with an N/Y ratio =0.86 (P=0.469), and lastly class-IA, -IB, & -IC clinics (7.0%) with a N/Y ratio =1.29 (P=0.043, *Figure 9*). A total of 2,186 participants were trainee doctors (61.3%) with N/Y ratio =1.30 (P<0.001), followed by lecturer-level attending specialists (26.6%, N/Y ratio =0.71,

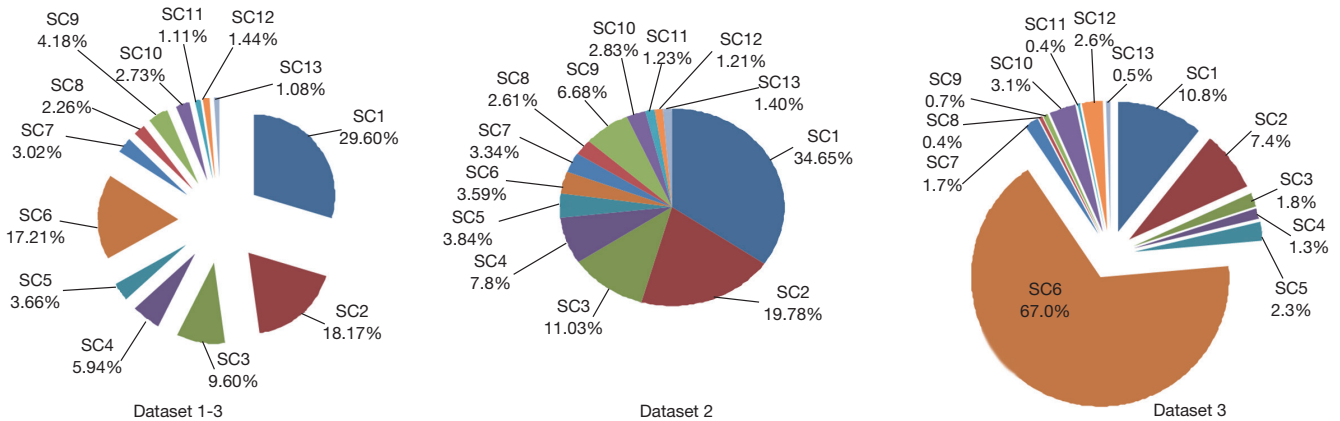

Figure 5 Distribution of various specialist cluster of dataset-2, dataset-3, and dataset 1-3 pooled together. Dataset-3 is over-represented by diagnostics specialty. SC1, internal medicine cluster; SC2, surgical sciences cluster; SC3, unspecified clinical medicine cluster; SC4, traditional Chinese medicine (TCM) cluster; SC5, oncology cluster; SC6, diagnostics cluster; SC7, pediatrics cluster; SC8, anesthesiology cluster; SC9, basic science research and public health cluster; SC10, obstetrics and gynecology cluster; SC11, accident and emergency cluster; SC12, nursing cluster; SC13, ophthalmology cluster.

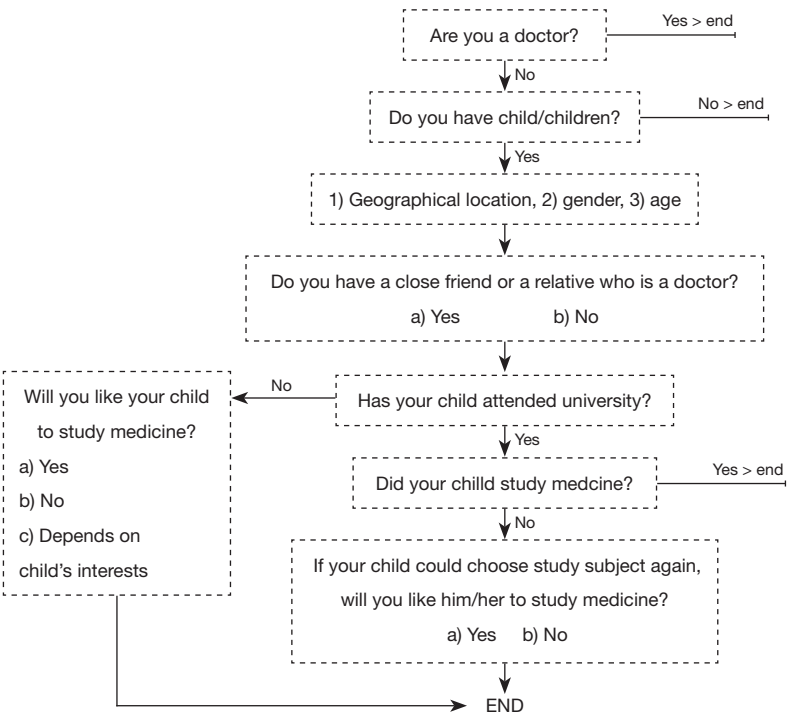

Figure 6 Flowchart of survey on non-medical professionals' attitude toward their children perusing studying medicine.

P<0.001), associate principle doctors (9.8%, N/Y ratio =0.99, P=0.57), and lastly principle doctors (2.2%, N/Y ratio =2.1, P=0.002, *Figure 10*). In dataset 3, 52.4% participants were from class-IIIA hospitals with N/Y ratio =1.16 (P=0.029), followed by class-IIIB & -IIIC hospitals (12.2%) with an N/Y ratio =0.98 (P=0.886), class-IIA, -IIB, & -IIC hospitals (27.0%) with an N/Y ratio =1.07, (P=0.469), and lastly class-IA, -IB & -IC clinics (8.4%) with a N/Y ratio =1.25 (P=0.193,

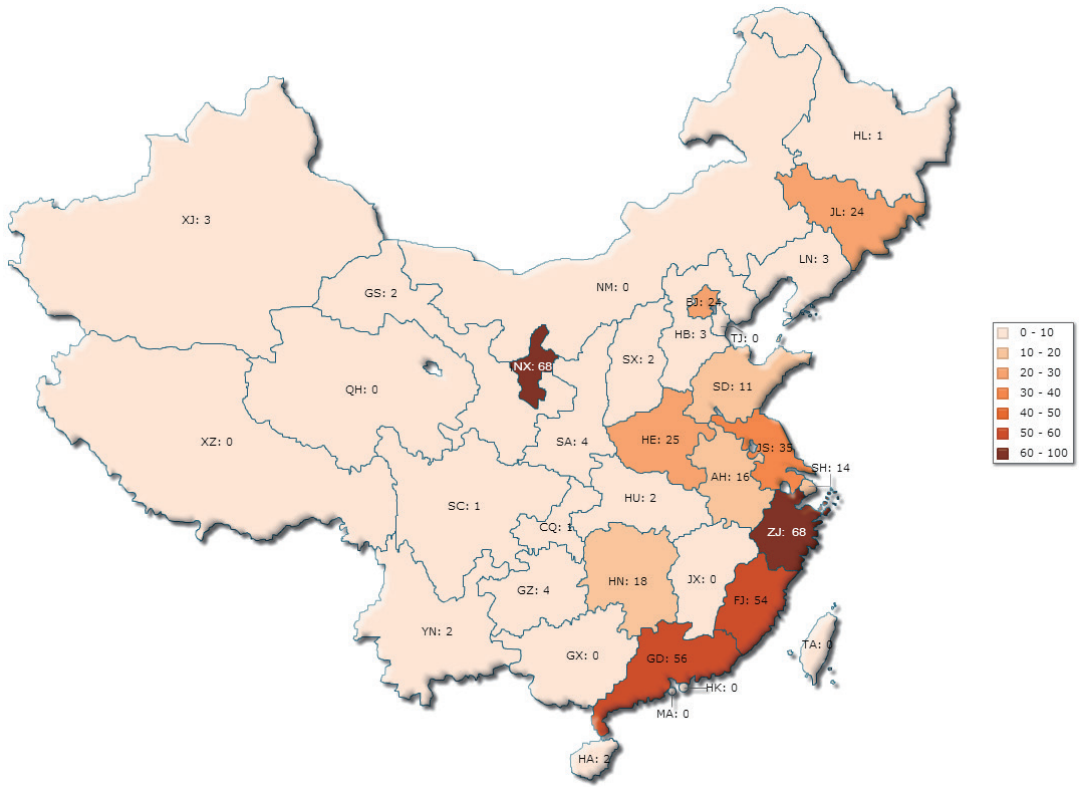

Figure 7 Geographic distributions of participants for dataset-4. The distribution is heavily weighted by participants from Zhejiang Province (n=69) and Ningxia Province (n=68).

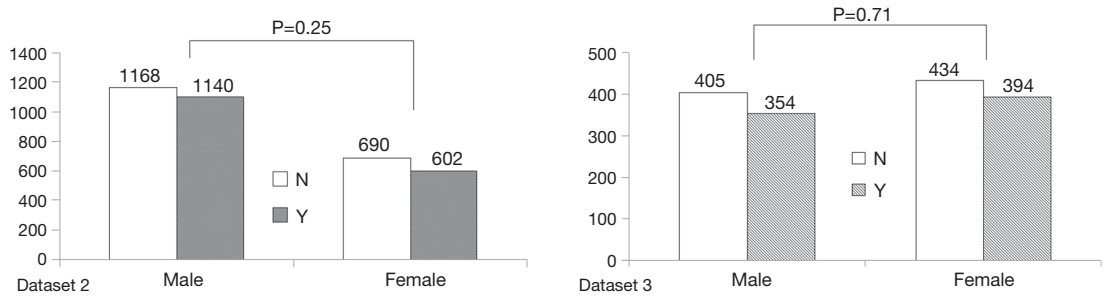

Figure 8 A graphic comparison of job satisfaction of male medical professionals *vs.* female medical professionals in dataset-2, -3.

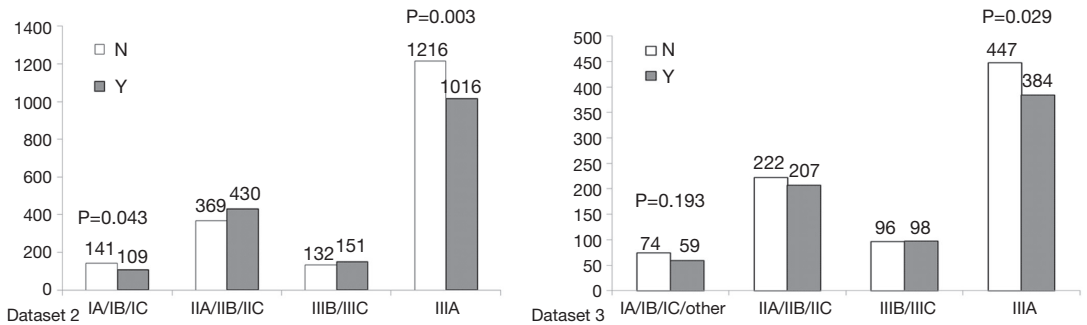

Figure 9 A graphic presentation of job satisfaction of medical professionals working at different classes of hospitals. Class-IIIA hospitals are the highest tertiary hospitals and many of them are university teaching hospitals. Class-IA & IB hospitals refer to small township hospitals or clinics.

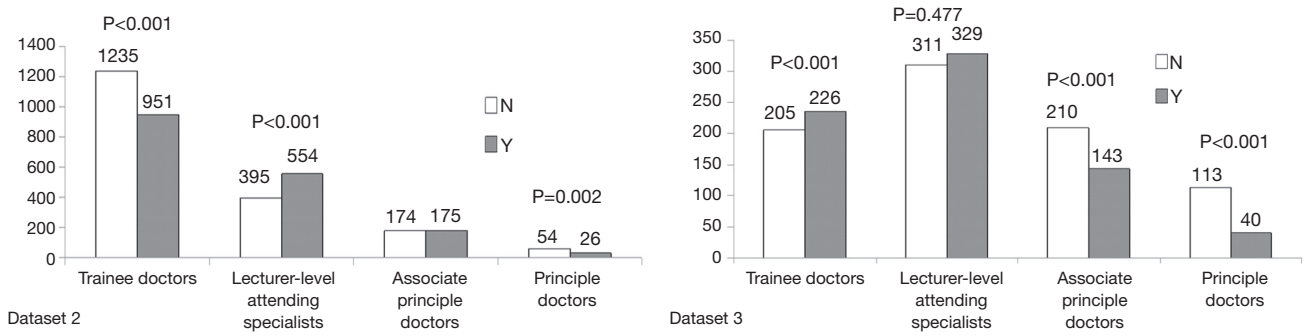

Figure 10 A graphic presentation of job satisfaction of medical professionals of different seniority grades. Trainee doctors include graduate students in clinical specialties.

Table 1 The not-regretted voter vs. regretted voter (N/Y) ratios in different specialty clusters of dataset 2

Variable	SC9	SC8	SC5	SC10	SC6	SC13	SC4	SC1	SC2	SC3	SC7	SC11	SC12
Volters	238	93	137	101	128	50	278	1235	705	393	119	44	43
N	169	57	78	56	69	27	142	621	352	193	58	20	16
Y	69	36	59	45	59	23	136	614	353	200	61	24	27
N/Y ratio	2.45	1.58	1.32	1.24	1.17	1.17	1.04	1.01	1	0.97	0.95	0.83	0.59
P value	<0.001	0.02	0.1	0.27	0.37	0.57	0.71	0.84	0.97	0.72	0.78	0.54	0.09

Table 2 The not-regretted voter *vs.* regretted voter (N/Y) ratios in different specialty clusters (three datasets pooled together)

Variable	SC9	SC8	SC5	SC6	SC4	SC3	SC2	SC10	SC1	SC13	SC7	SC12	SC11
Volters	314	170	275	1292	446	721	1364	205	2222	81	227	108	83
N	215	101	148	694	236	370	699	104	1123	37	102	48	31
Y	99	69	127	598	210	351	665	101	1099	44	125	60	52
N/Y ratio	2.17	1.46	1.17	1.16	1.12	1.05	1.05	1.03	1.02	0.84	0.82	0.80	0.60
P value	<0.001	0.01	0.21	0.01	0.22	0.48	0.36	0.83	0.61	0.44	0.13	0.25	0.02

SC1, internal medicine cluster; SC2, surgical sciences cluster; SC3, unspecified clinical medicine cluster; SC4, traditional Chinese medicine (TCM) cluster; SC5, oncology cluster; SC6, diagnostics cluster; SC7, pediatrics cluster; SC8, anesthesiology cluster; SC9, public health and basic science research cluster; SC10, obstetrics and gynecology cluster; SC11, accident and emergency cluster; SC12, nursing cluster; SC13, ophthalmology cluster.

Figure 9). Among participants of dataset-3, 27.8% were trainee doctors with N/Y ratio =0.87 (P=0.14), followed by lecturer-level attending specialists (40.3%, N/Y ratio =0.94, P=0.477), associate principle doctors (22.2%, N/Y ratio =1.5, P<0.001), and lastly principle doctors (9.6%, N/Y ratio =2.8, P<0.001, *Figure 10*).

The same as the previous study we grouped all specialties into 13 clusters (SC1-SC13, Appendix 2). A few specialties were grouped together as single cluster due to the nature of their duties and operations are similar, such as radiology and pathology, and additionally the subspecialties N/Y ratios were also similar according to initial separate assessment. The job satisfaction for each cluster of dataset-2; and the results of polling three dataset together are shown in *Tables 1* and *2*.

The N/Y ratio's geographical distribution is shown in *Tables 3* and *4*, and *Figure 11*. Medical professionals in Yunnan and Gansu ranked consistently high in job satisfaction; despite they were not in the economically advanced regions in China. While Jiangsu and Zhejiang, two economically advanced provinces, had relatively higher negative response (lower N/Y ratio).

In both dataset-2&3, with the respondents who gave answers to question-3 and said they *regretted* entered medical profession, a large portion replied they would

Table 3 The N/Y ratio (not-regretted voters *vs*. regretted voters ratio) in various provinces and regions from dataset-2 (n=3,564).

Region	N/Y ratio	n
Inner Mongol	1.81	45
Yunnan	1.6	42
Gansu	1.61	47
Hebei	1.47	230
Shanxi	1.26	77
Jilin	1.25	45
Chongqing	1.24	94
Guangdong	1.23	277
Anhui	1.23	134
Liaoning	1.17	94
Hubei	1.19	177
Tianjin	1.18	85
Beijing	1.17	169
Xinjiang	1.12	36
Shanghai	1.10	107
Hunan	1.08	148
Henan	1.07	230
Zhejiang	1.05	172
Fujian	1.03	126
Jiangsu	1.03	270
Heilongjiang	1	70
Tibet*	1	2
Qinghai	1	12
Shandong	0.96	360
Guangxi	0.88	90
Ningxia	0.85	24
Hainan	0.83	22
Sichuan	0.83	161
Guizhou	0.79	34
Shaanxi	0.74	99
Jiangxi	0.7	85

*, the ratio for Tibet is less reliable due to the small number of voters.

Table 4 The N/Y ratio of all voters (no regret participants *vs*. regretted participants ratio) in various provinces and regions from dataset 1+2+3 (n=7,508)

Region	N/Y ratio	n
Tibet*	2	3
Yunnan	1.79	81
Gansu	1.55	102
Hebei	1.36	455
Shanxi	1.33	147
Inner Mongol	1.28	91
Tianjin	1.25	151
Shanghai	1.25	229
Beijing	1.23	421
Qinghai	1.18	24
Jilin	1.18	98
Liaoning	1.17	167
Guangdong	1.14	663
Hubei	1.13	362
Chongqing	1.13	168
Anhui	1.12	246
Guizhou	1.10	82
Xinjiang	1.08	83
Henan	1.06	419
Zhejiang	1.06	720
Shandong	1.05	629
Fujian	1.02	255
Guangxi	1.01	163
Heilongjiang	1	142
Ningxia	0.95	41
Jiangsu	0.95	563
Sichuan	0.94	300
Hainan	0.89	34
Jiangxi	0.87	202
Shaanxi	0.85	165
Hunan	0.77	297

*, the ratio for Tibet is less reliable due to the small number of voters.

like to be in medical profession if they could enter their preferred hospital classes and specialties (*Figures 12* and *13*). In dataset-2, 1,632 participants (45.8%) *still* replied being a doctor is a good choice comparing with some other professions (*Figure 12*). For the participants in different seniority levels, 655 (57.5%) of graduate students, 471 (45.0%) of trainee doctors, 308 (32.5%) lecturer-level specialist doctors, 152 (43.6%) of associate principle doctors, 46 (57.5%) of principle doctors replied being doctor is a good choice compared with some other professions. In dataset-3, 667 participants (42.0%) still replied being a doctor is a good choice comparing with other professions (*Figure 13*). For the

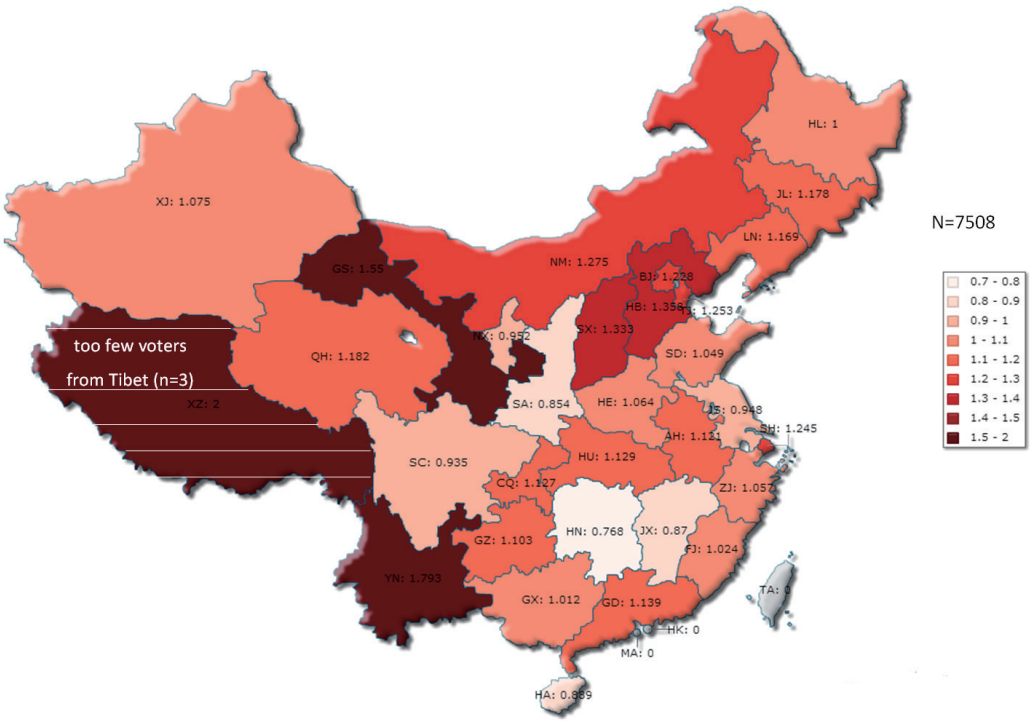

Figure 11 A graphic presentation of job satisfaction of medical professionals at individual provinces with three datasets pooled together. Color map represents the N/Y ratio with lighter color representing less extent of satisfaction. Note Tibet (XZ) has only three participants for this study.

participants in different seniority levels, 52 (53.1%) graduate students, 122 (35.6%) trainee doctors, 250 (39.1%) lecturer-level specialist doctors, 154 (43.6%) associate principle doctors, 89 (58.2%) principle doctors replied being doctor is a good choice compared with some other professions. These conflicting answers reflect that these respondents were not satisfied with their current personal circumstances, but still had a positive view on medical doctor as a profession in China. In addition, the trends with doctors of different grades concur with the trends shown *Figure 10* and also the results in dataset-1 (1); reflecting lecturer-level specialist doctors are under more stress in some ways.

A total of 152 and 243 respondents had their child/children attending university or graduated from university in dataset-2 and dataset-3 respectively. Their studying subjects or professions are shown in *Figure 14A-D*. Pooling together datasets 1-3, a total of 508 respondents have their child/children attending university or graduated from university, 104 (20.5%) are pursuing a career in medicine. These data show medicine remained an attractive choice among doctors' children, followed by economics & finance, and then computer sciences & electronic engineering.

For dataset-2 and -3, a total of 1,396 and 962 respondents have child/children and did not reach university age yet, among them 22.3% and 18.7% replied respectively that they would like their child/children to study medicine. For dataset-2, among the respondents who would like their child/children to study medicine, 195 (62.5%) preferred their child/children to enter *first-line* specialties such as cardiology and orthopedics, while 97 (31.1%) preferred their child/children to enter *second-line* specialties such as radiology, electrocardiography (ECG), or pathology etc.; while 10 (3.3%) specifically liked their child/children to study Chinese Traditional Medicine (CTM), 6 (1.9%) liked their child/children to study Dentistry. Four respondents replied it would be up to the interests of the child. For dataset 3, among the respondents who would like their child/ children to study medicine, 97 (53.9%) preferred their child/children to enter *first-line* specialties, while 56 (31.1%) preferred to enter *second-line* specialties, while 27 (15.0%) preferred other medicine subjects.

For dataset-4, 443 participants meet the survey requirement, i.e., they were not medical profession (NMP) and had children, and including 288 (64.3%) females and 155 (35.7%) males, with mean age of 40.1±7.7 yrs. A total of 348 NMP respondents (78.6%) had at least one

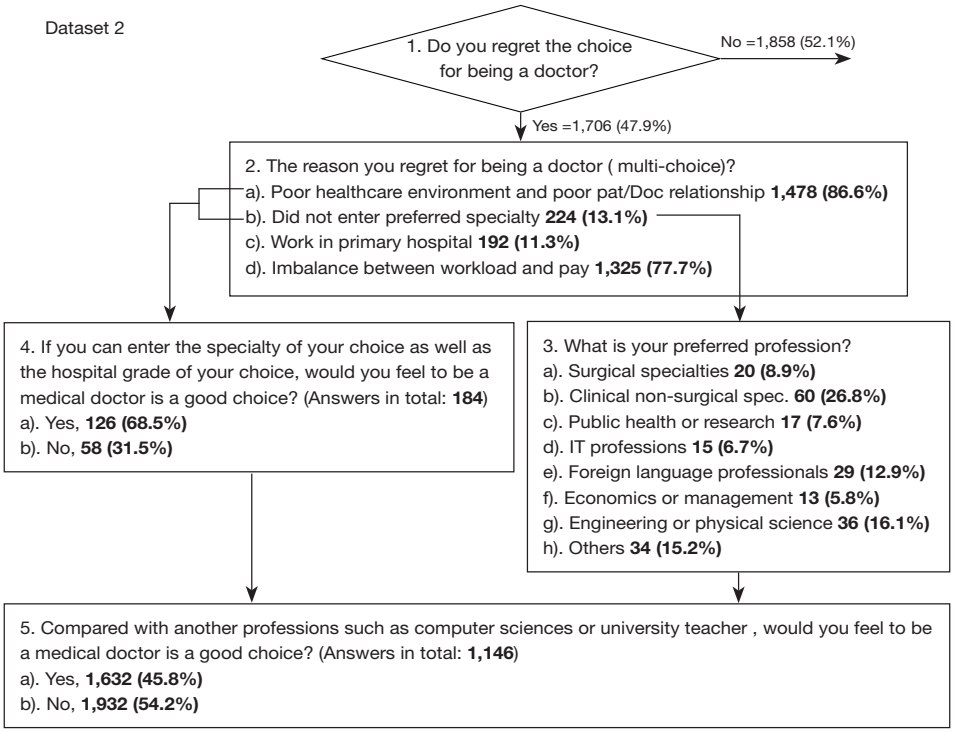

Figure 12 In dataset-2, with the respondents who gave answers to question-3 and said they regretted entered medical profession, a large portion replied they would like to be in medical profession if they could enter their preferred hospital class and specialty.

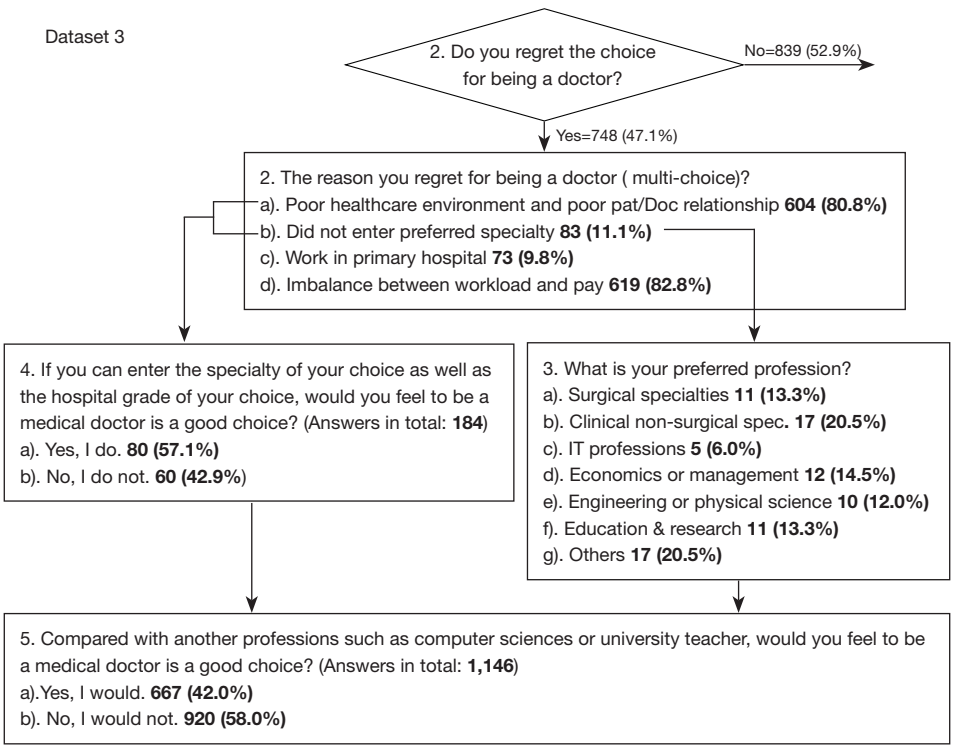

Figure 13 In dataset-3, with the respondents who gave answers to question-3 and said they regretted entered medical profession, a large portion replied they would like to be in medical profession if they could enter their preferred hospital class and specialty.

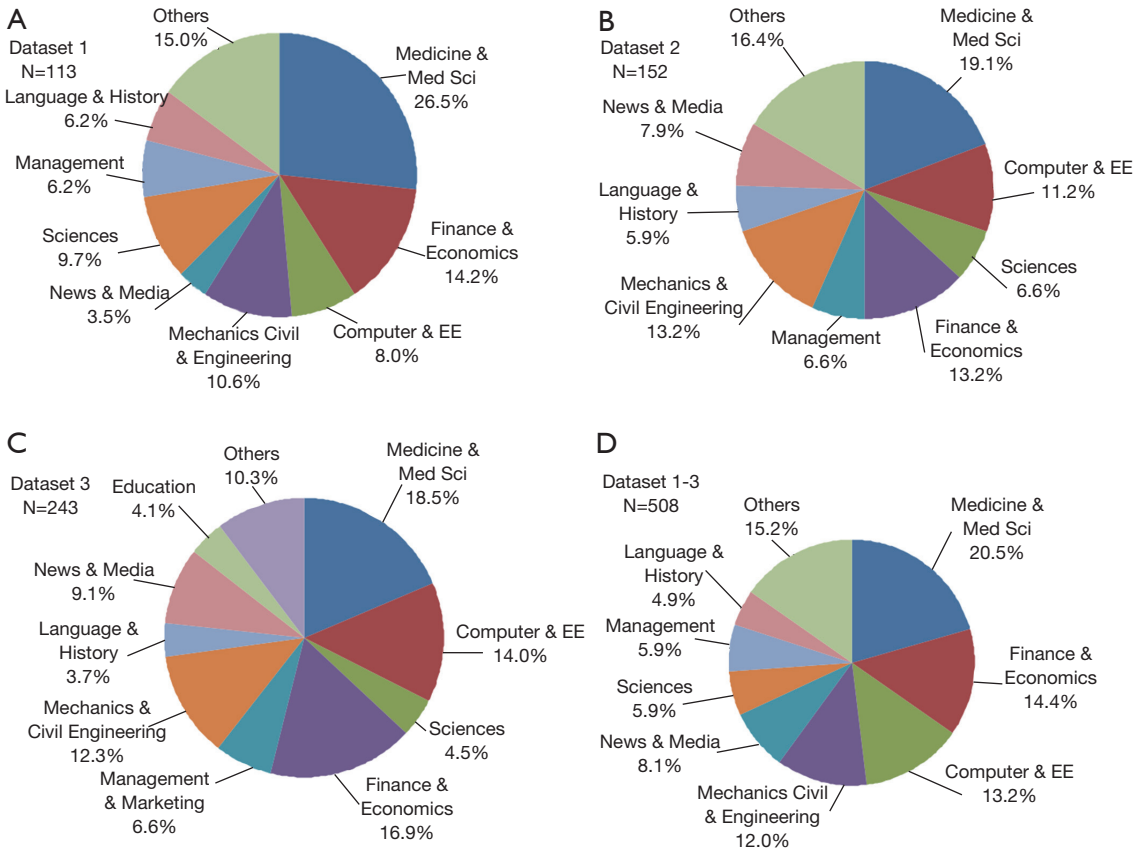

Figure 14 (A-D) The studying subject or profession distribution of respondents' children who had attended university or graduated.

friend or one relative is a doctor. Among them 107 had child attended or graduated from university, 12 (11.2%) of them studied medicine. The children of 321 NMP respondents did not reach university age, and these parents' attitude is show in *Figure 15A-C*. The data showed overall students are well supported by their parents to study medicine, among NMPs' children who are attending university or have graduated, 9.8% (12/122) are pursuing a career in medicine. Our data also showed the NMP respondents who have at least one friend or one relative being a doctor were more likely to have their children pursuing a career in medicine.

When asked the estimated working hours per week, 60 doctors gave answers including 14 trainee doctors, 25 lecturer-level specialists, 15 associate principle doctors, and 6 principle doctors. 54 (90%) were from class-IIIA hospitals, 3 from class-IIIB hospitals, and class-IIIC, IIA, and IB had one participant each. Trainees, lecturer-level specialists, associate principle doctors, principle doctors gave an estimation of 49.9±9.4, 56.8±8.5, 58.5±11.4 and 54.2±6.6 hrs/week, respectively (*Figure 16*).

In dataset-2 and dataset-3, those favor or against China to open up medical market to let qualified foreign medical organizations to participate in fair competition in China's market; and those favor or against government to support regulated private hospitals are shown in *Figure 17*. Despite the demographic differences between participants of dataset-2 and dataset-3, the percentages of favor or against the changes were remarkably similar, with the participants in dataset-2, being younger, slightly more in favor of changes than the participants in dataset-3.

The questionnaire item-18 was to let participants to comment on the current healthcare system in China. Participants enthusiastically expressed their views. After removing the duplicative comments, 1,105 comments are presented on line at http://blog.sciencenet.cn/blog-3000837-952956.html (in Chinese). In addition, 50 selected comments have been translated into English and presented in Appendix 3.

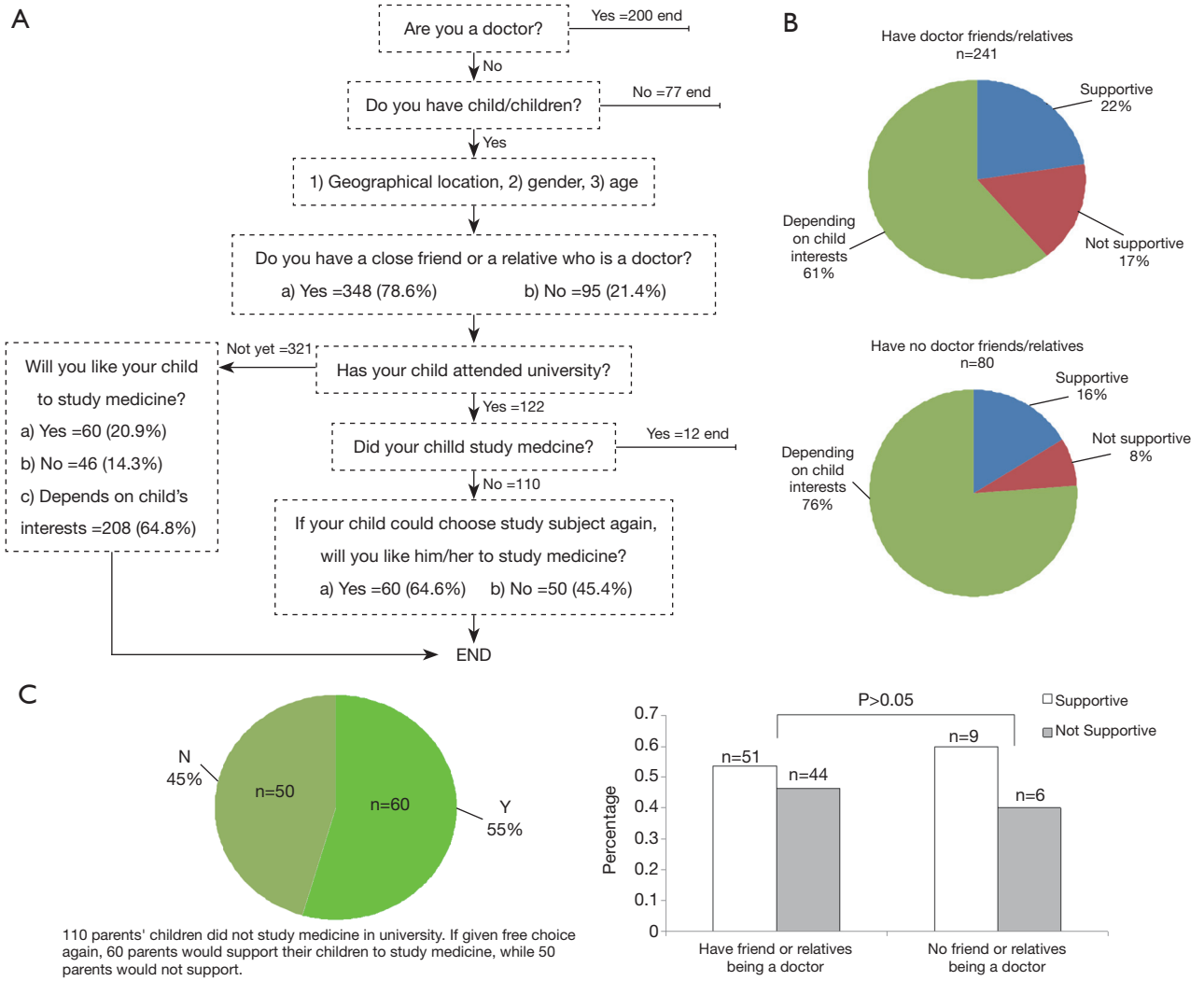

Figure 15 Attitude of 321 non-medical professionals toward their children to study medicine. (A) Flow diagram of the questionnaire; (B) upper pie, the replies of non-medical professionals who have at least one doctor friend/relative on whether they would support their children to study medicine. lower pie: the replies of non-medical professionals who have no doctor friend/relative on whether they would support their children to study medicine; (C) left pie, 110 parents' children did not study medicine in university. If given free choice again, 60 parents would support their children to study medicine, while 50 parents would not support. Right: the data in left pie is further broken down into those have friend or relative being a doctor, and those have no friend or relative being a doctor.

Discussion

Reliability of the survey results

This survey is the largest on the motivation of medical professionals in China, and a number of consistent patterns were observed from three datasets (1,2). However, a few limitations remain. The first is the great under-representation of doctors working in rural clinics, primary care and class-I hospitals, and the under-representation of senior doctors. Both primary care doctors and senior doctors tended to demonstrate higher job satisfaction (1,3). Another limitation is the over-representation of the age group between 20~30 yrs in dataset-1 and dataset-2. These were due to the web-based nature of the surveys. Dataset-3 had more matured participants, on the other hand its limitations include the profession clusters are dominated by diagnostics [67%], and voters from Zhejiang province counted for 26.5%. The survey on NMPs' attitude toward their children studying

medicine and the working hours of Chinese doctors remain preliminary. Both studies had limited number of participants, and not well balanced in geographical distribution. However, Ningxia province and Zhejiang province are geographically and economically rather different.

We tend to suspect that the participants might have slightly over-estimated their working hours, and quite likely have under-estimated their income in relative term compared with other professions in China. One example is the great under-estimation of working hours of Korean doctors compared with the working hours of Chinese doctors (see more discussion below). These subjectivity and psychological factors have been previously discussed (1,2,4,5). This study further demonstrates that the results of such kinds of survey should be interpreted with great caution (4). The job satisfaction rate might have been under-estimated in this study due to reasons stated above. That some participants replied that they regretted joining medical profession was more likely to express dissatisfaction with their current personal situation, instead of really regretted they joined the medical profession overall.

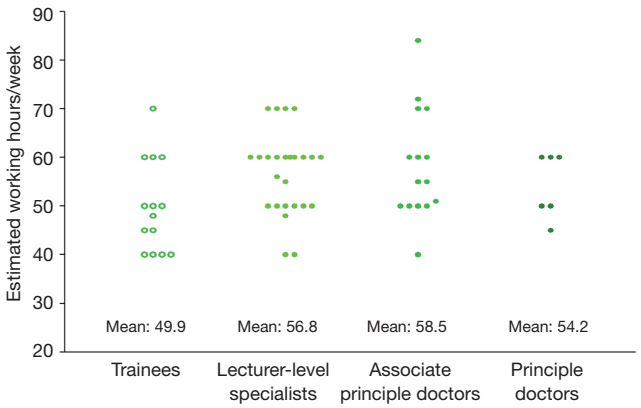

Figure 16 Estimated weekly working hours among 60 Beijing based doctors, including 14 trainees, 25 lecturer-level specialists, 15 associate principle doctors, and 6 principle doctors.

The relationship among doctors' professional grade, specialty, hospital class, geographical regions, and job satisfaction

Understandably this survey consistently showed principle doctors had higher job satisfaction, with N/Y ratio of 2.83 with dataset-3. Doctors at class-I clinics & hospitals, and doctors at class-IIIA hospitals tended to have better job

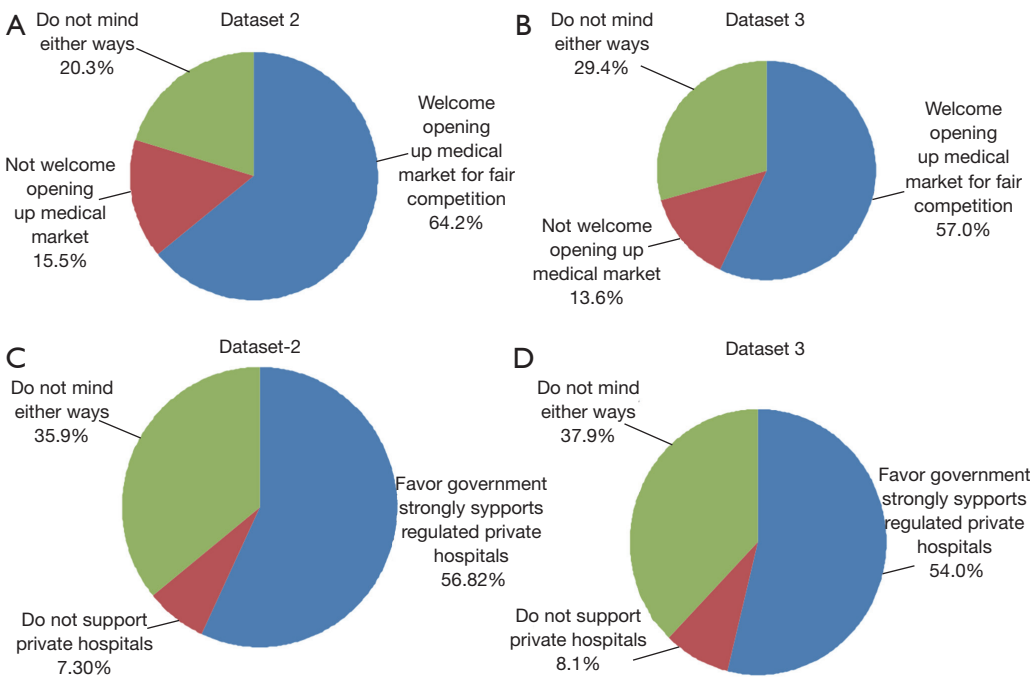

Figure 17 The attitude of participants favor or against China to open up medical market to let qualified foreign medical organizations to participate in fair competition in China's market (A&B); and participants favor or against government to support regulated private hospitals (C&D) (dataset-2 & -3).

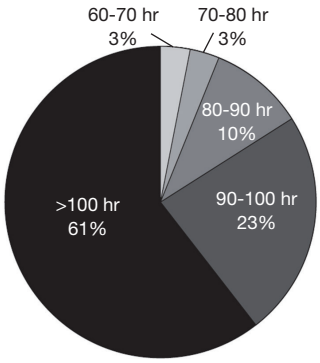

Figure 18 Distribution of working hours of surgical residents in Korea [a year-2012 survey, reproduced from (5)].

satisfaction than doctors in hospitals in other classes. The reasons have been explained our previous papers (1,2). The results suggest measures should be taken to motivate doctors in class-II and class-IIIB/C hospitals. This survey consistently showed the doctors at economically more developed eastern coast regions, such as Zhejiang province and Jiangsu province, did not necessarily have higher job satisfaction than economically less developed provinces. In fact, Yunnan and Gansu provinces consistently ranked high in doctors' job satisfaction. This might be related to the relative purchasing power of the salary and also probably the more relaxed life style in these provinces. Consistent with our report in dataset-1 (1), this paper shows specialties with less stressful workload had the higher job satisfaction. Public health and basic science research specialty cluster (SC9) staff do not directly face the patients. It is generally accepted that disputes between patients and doctors are more likely to occur with surgeons than anesthesiologists, while anesthesiologists (SC8) can enjoy the job security and relative good income by working in hospitals. Oncologists (SC5) are less likely to face disputes and violence from patients because the patients and relatives tend not to have an unreasonably high expectation for the treatment outcome. Doctors in diagnostics cluster (SC6) tend to have less face-to-face contact with patients. Traditional Chinese Medicine physicians mostly deal with chronic but not severe diseases. As having been well documented, this study further confirms accident and emergency physicians (SC11), nurses (SC12), and pediatricians (SC7) have less job satisfaction.

International comparison of doctor's weekly working hours

For doctors' working hours, hereby we choose the reported data of doctors in South Korea, Japan, Hong Kong, India, and USA for comparison. In a 2012 survey carried out by the S. Korean Surgical Society (5) (*Figure 18*), it was reported that more than 90% of the surgical residents surveyed worked more than 80 hours per week [=(11.3 hours/day)*(7 days a week)]. Furthermore, 60.6% percent of the residents worked more than 100 hours per week [=(14.3 hours/day)*(7 days a week)]. Almost half of the surgical residents surveyed (48.5%) reported working night shifts more than 4 days a week. 17.2% of residents had 6 or 7 night shifts per week. In addition, based on one survey reported in 2008, over 40% of surgery residents worked more than 18 hours per day (6,7). In a 2012 survey (8), 53% of Korean specialist surgeons worked more than 60 hr a week [=(10 hours/day)*(=6 days a week)], 26% of surgeons worked more than 80 hours a week, and strikingly, 14% of surgeons worked more than 100 hours a week. A personal contact of one author, a radiologist at a university hospital in Seoul, informed that he usually works 71 hours a week as standard (Monday to Friday: 7:00 am to 21:30 pm, Sat: 8:00 am to 14:00 pm).

According to 2006 statistics of Ministry of health, labor and welfare of Japan, the mean working time of hospital doctors was 63.3 hours at the main hospital and additional 7.3 hours at other hospitals per week [total: 70.6 hours/week (9)]. Young doctors may work up to 80 hours a week (*Figure 19*). Some Japanese doctors work more than 100 hours a week and see as many as 100 patients a day (10). In Hong Kong, in a 2011 poll of 711 public sector doctors, they work an average of 65.6 hours per week, with 3% work more than 100 hours per week, and 12% work more than 80 hours a week (11). While in India, taking the example of a typical work week of an anesthesia resident includes three duties and three regular days of work. A regular day of work includes operation theatre duty, intensive care unit/cardiac care unit/neonatal intensive care unit/pediatric intensive care unit duty, teaching seminars, thesis work, and running outpatient department services. While a duty day means 24 straight hours of emergency/casualty posting and operation theatre service and responding to cardio pulmonary resuscitation calls. This "duty" day then blends into the next "regular" work day without a break. This duty roster continues to operate for three years' duration of residency (12).

On July 1, 2003, the Accreditation Council on Graduate Medical Education (ACGME) of USA implemented the guidelines for all residency training programs limiting the time of in-house duty to 80 hours per week. In a pre-implementation survey of orthopaedic residents in July 2003, 49% of responding house staff reported working 80

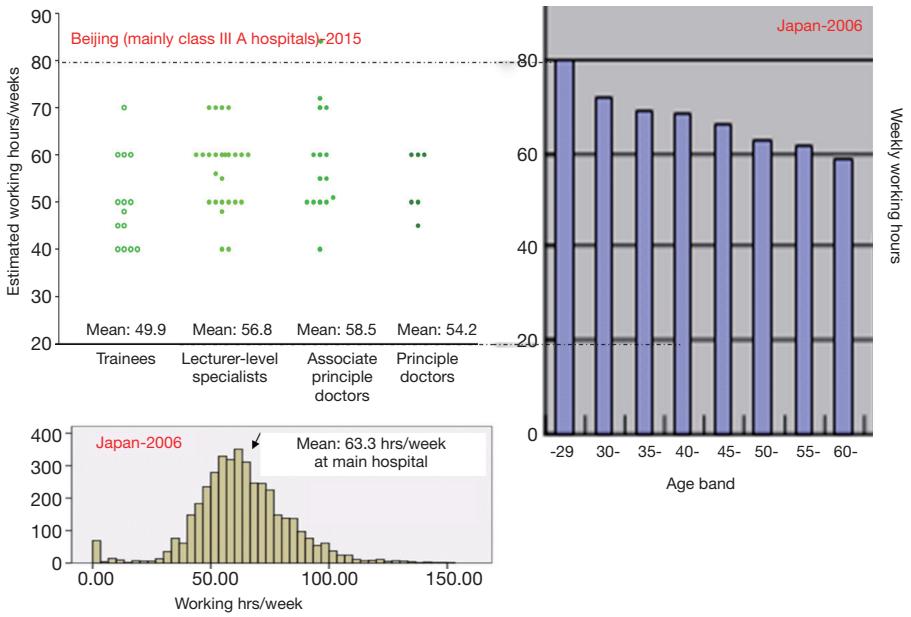

Figure 19 A graphic comparison of working hours between doctors in Beijing (yr-2015 data) and doctors in Japan [year-2006 data, modified from (9)].

to 100 hours per week, and 40% worked 60 to 80 hours on a weekly basis before the new rules (13). One year after implementation of the ACGME guidelines 13% orthopaedic residents were on duty more than 80 hours on average per week. However, 33% reported they worked, at times, more than 80 hours per week, but intentionally under-reported their hours (13). Across all specialties and in recent years it was reported that non-resident physicians in USA works on average 51.0 hours/week in 2006-2008 (14). The doctors USA who work the longest hours are cardiologists, who reported working 60 hours per week [year-2013 data (15)].

The working hours of non-resident physicians in Beijing, also primarily in class-IIIA hospital (90%), were self-reported to be 56.98 hours/week; and this is likely to represent a high end of working hours for Chinese doctors. These data seem to suggest Chinese doctors work no more hours than doctors in USA, but trainee doctors in China work fewer hours than their counterparts in Korea, Japan, and India. Residential training of clinical skills is *THE* most important period of medical education. Clinical skill training is also the most difficult one to tackle in China [Appendix 3 (16)]. Another significant obstacle is Chinese students' less familiarity with English literature, which creates another hurdle for trainee doctors to learn the most recent evidences (17).

International comparison of remunerations

The income of doctors in China is difficult to accurately quantify, as the remunerations include basic salary, bonus, and other benefits. Internationally, approximately medical doctors earn 50% more than peers with similar qualifications and experiences over the life time, but medical doctors need to work longer time (15,18-20). Note PhD students and post-doctoral fellows, which are equivalent to trainee doctors, are also poorly paid. Japanese doctors are known for their long working hours and relative low salary [around 125,000 USD dollars a year at mid-career (10)]. The case in USA is a special case where the students have to pay expensive tuition fee for medical school. A typical doctor doesn't earn a full-time salary until 9–10 years after the typical college graduate starts making money. In addition, if a physician is working individually in private practice, he/she needs to have his/her own malpractice insurance paid by him/herself, and this malpractice insurance premiums generally range 40,000–80,000 USD yearly depending on the location and the type of practice. Also if that individual physician was previously sued, the premium goes up significantly.

It is highly feasible that the rough rule that medical doctors earn 50% more than peers with similar qualifications and experiences over the life time can be

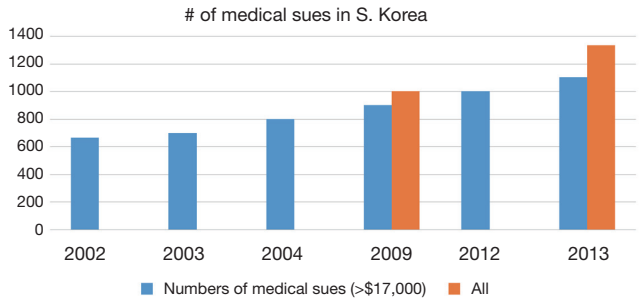

Figure 20 The medical sues against doctors or hospitals have been increasingly in recent decade in S. Korea (30).

satisfied, or has been satisfied in some cases, in China. Cuba's experience is that the State trains lots of doctors. The doctor-to-patient ratio in Cuba is three times of that in USA (21,22). The authors expect the doctors in Cuba could work much less hours than colleagues in USA, Japan, and Korea, and in return they earn similar salary as state employees of other professions. This would be a more humane and workable alternative approach.

International comparison of patient vs. doctor relationship

The international comparison of patient *vs*. doctor relationship is beyond the scope of this study. However, since this issue is highly concerned among Chinese doctors (23). We try to put forward some discussions. Patient and visitor violence is a complex occupational hazard for health care staff working in general hospitals, as we described previously (2). Globally, healthcare workers are one of the most likely groups to experience workplace aggression (24). In a systematic review of the literature (25), Hahn *et al.* noted that about half of health care staff reported having experienced patient violence while almost all nurses reported having been exposed to patient and visitor violence. A 2005 study on Australian general practitioners found that 63.7% of those sampled had experienced violence at work (26). A 2011 cross-sectional survey by Hahn *et al.* showed that 50% of all staff (n=2,495) in a Swiss University Hospital had experienced patient and visitor violence over the previous 12 months, with 11% having experienced it in the previous week (27). In a small sample Lepping *et al.* reported in North Wales 83% of staff (n=131/157) reported being verbally abused over the previous 4 weeks. In total, 55% (n=79/144) reported being threatened and 68% (n=99/146) reported actual physical assault. Of those assaulted, 56% sustained an injury and three needed medical assessment and/or treatment (28). Moreover, One 2009 report showed that the prevalence of violence toward physicians in emergency departments in Morocco was 70% in the previous 15 days (29). Additionally, a Korean study shows the medical sues against doctors or hospitals have been increasingly in the recent decade (*Figure 20*) (30).

In China, the severity of medical disputes has been increasing significantly over the past two decades, due to a lack of trust between physicians and patients and an imperfect legal system that provides weak safeguards of the rights and interests of both healthcare professionals and patients (23). However, because reported studies from different countries employed different methodologies and definitions, international comparison is difficult. While medical disputes happen in any countries, we expect it is more like to occur when patients feel the arbitration force (or law enforcement) would not settle the disputes fairly. We expect it will be very useful if an independent organization will be set-up to deal with these issues transparently, being fair to parents and healthcare staff. Various data can be stored in database, risk factors scientifically analyzed so to prevent future occurrence as much as possible. Since medical errors in a sense is inevitable, the matter of professional liability insurance can be purchased by the hospital for doctors, the same as in many other countries.

In a 1984 recent report from the Institute of Medicine, it was estimated approximately 98,000 patients die each year as a result of a medical error in USA (31). A more recent analysis suggests a much higher number (32). Similar data is not available for China. However, patients, doctors, and hospitals have to accept medical error is part of life in healthcare system. Regretful events such as misdiagnosis and surgical complication do happen occasionally (and also inevitably). However, these events have to be within the limit of certain accepted percentage. When the frequency of errors occurs above some recognised thresholds, the involved doctor may need to be re-trained in some areas.

Patient satisfaction towards doctors was not investigated in this study. Patient satisfaction had a major impact on shaping the public healthcare policy in Western countries. Since 1998, France has been using patient satisfaction as a mandatory index to evaluate hospitals (33). In the UK, the National Health Service also included patient satisfaction into medical contracts, and introduced policies to allow the public to monitor and improve the quality of health-care services (34). As the increase of expenditure on healthcare in China is faster than GDP increase (*Figure 21*), more attention and research should be spent on improving patient satisfaction in China (35).

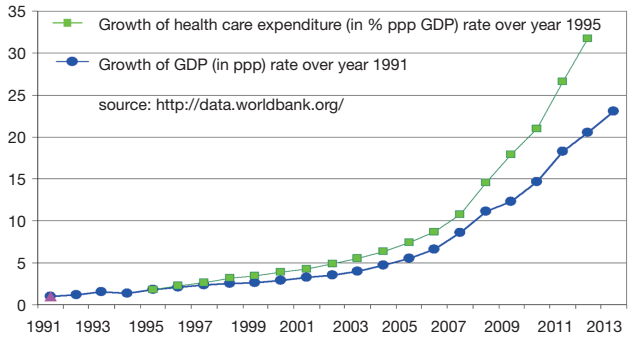

Figure 21 Year annual growth rate of GDP (in PPP) and healthcare expenditure (in % PPP GDP) of China Mainland. Available online: http://data.worldbank.org/. GDP, Gross Domestic Product; PPP, purchasing power parity.

International of comparison of job satisfactions and the attractiveness of medical profession

This further study confirmed the conclusion of our last report (1,2). The morale and motivation of medical doctors in China are likely to be similar to other continuously evolving societies (2). Medicine remains one of the top choices for doctors' children's career. It is also recommended by non-medical professionals. Additionally, in a small 2016 survey a similar question was posted to DXY users, asking 'will you choose a career in medicine if you were able to do it all over again' (36). Thirteen DXY users replied, among them 6 said they would still like to a doctor; 5 said they would not like to a doctor; one said he/she would not but he/she will try best be to a good doctor since already chosen this profession; while one said he/she wanted to do something more important and fundamental than simply being a doctor (36). This small newest survey further confirms our results. In the meantime, that doctor parents' children choose to study medicine could be affected by the fact that these doctor parents might feel they knew this walk of life, and had right connections to secure better jobs for their children.

In China the university specialty selection for secondary school graduates is heavily influence by parents, relatives, and teachers; the decision is rarely solely made by the secondary school graduates themselves. It is thus not surprising that a portion of medical doctors would indeed prefer to pursue another career and they regretted joined medical profession. This should be solved by more consultations when secondary school graduates select university study subject; and more flexibility for junior year university students to switch subjects.

International of comparison of job satisfactions has been partially addressed in our last papers (1,2). Additional examples include according to a 2013 survey by NerdWallet, in USA most doctors were reported to be dissatisfied with the job, and less than half said they would choose a career in medicine if they were able to do it all over again (13). In Kang *et al.*'s recent 2012 study on surgical residents in S. Korea, 49.5% of the surveyed replied that they would not become a physician if they were to make the choice again (5). With the same group's 2012 survey on specialist surgeons, 50.7% said that they would not become a surgeon again, and 84.4% felt that they were not able to balance their personal life and work, and 82.5% said that they would not recommend their career to their children (8). The subjectivity of these answers remains unknown to the current authors.

Implication of this study

Medicine remains an attractive profession in China. The overall morale of the medical profession in China remains healthy. It looks the working hours of Chinese doctors is no more than colleagues in the neighboring countries such as Korea and Japan. As some noted by some participants, because medicine is attractive, to train better doctors, a higher threshold for medical school enrollment can be implemented.

The majority of participants in this survey support additional expansion of well regulated private hospitals and foreign hospitals to enter Chinese market. This can be further considered by Chinese government. The slight difference between dataset-2 and dataset-3 may suggest that younger generation doctors are more open to changes. Patient satisfaction would be improved by developing nonpublic hospitals that increase the health-care supply in specific markets. Nevertheless, care should be taken as the competition among public and nonpublic hospitals in the medical market is a "double-edged sword" [(35,37) Appendix 3].

In addition to recruit highly motivated medical students, much more attentions should be paid to the most difficult part, i.e., clinical skill training.

China should be prepared to learn from different sources, including Japan and Cuba, instead of over-borrowing the costly American system.

A healthcare system should be designed so that while hard-working qualified doctors are well paid, but doctors should not be allowed to become VERY rich due to their

clinical skills. If doctors can profit hugely to their clinical skills, then by nature they will be reluctant to disseminate their clinical skills, and younger generation of doctors will have less chance to learn and mature, particularly in the field of surgical sciences. This will lead to undesirable consequence for patients.

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Footnote

(I) The primary aim of this study was to survey clinical doctors working in hospital. A small number of nurses and public health and medical research staff also participated in this survey, thereby also included in this analysis.

(II) During the design the questionnaire, it was generously assumed that each parent has one child due to the 'one child policy' existed in China.

(III) For the data interpretation, subjective components were introduced as the authors saw appropriate. In case of errors, author Wang YX takes sole responsibility.

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