Int J Clin Exp Med 2016;9(1):448-454
www.ijcem.com /ISSN:1940-5901/IJCEM0008913

Original Article

Is China's eight-year stomatology medical doctor program feasible? Comparison of comprehensive quality between doctoral dental students in China and Japan

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Received April 8, 2015; Accepted September 6, 2015; Epub January 15, 2016; Published January 30, 2016

Abstract: Objective: To compare the comprehensive quality between eight-year Stomatology Medical Doctor (S.M.D) Program students of China and doctoral dental students of Japan, hoping to provide some references for improving dental education in China. Methods and materials: Data were collected from self-answered scoring questionnaires, answered by participants from China and Japan. Results: The study showed Chinese student got higher scores in fields of basic knowledge, basic medical knowledge and basic legal knowledge, although their knowledge still needed improving. Chinese students also got higher scores in dental professional quality items, except for teaching capability. They should improve scientific research ability and teaching capability as well. Japanese students got lower scores in items of oral professional diagnosis, treatment level and professional foreign language proficiency. Conclusion: For general quality, Chinese students got higher scores except for social acceptability. Innovation capability and international communication skills were shortcomings for both Chinese and Japanese students. The comparison provides insight of this new dental education program and the program requires further reform in the future.

Keywords: Dental education, eight-year S.M.D. program, comprehensive quality, China, Japan

Introduction

China's modern dental science education established in 1917 and experienced several education reforms since then. Although China has made great efforts on dental education reforming, its development had lagged far behind western developed countries and Japan. In recent ten years, many countries tried hard on dental education reforming [1-4]. China also realized the importance and commenced elitist education reform since 2001 [5], which had the purposes to improve the quality of Chinese dentists and participate in international dental education. Therefore, eight-year Stomatology Medical Doctor (S.M.D.) program led by Peking University and other top universities of China [6] was established to cultivate high-end talent dentists with doctor degree. Most dental colleges in China only have five-year bachelor degree, three-year master degree and three-year doctor degree program. A few dental schools have seven-year master degree program [7], which means that a student needs to spend at least ten years to get a doctor degree of dentistry. Similarly, Japanese dentists need to take a six-year program for Doctor of Dental Surgery (D.D.S.), followed by one year's mandatory internship in a postgraduate clinical training course, and then a four-year doctor degree program to get a doctor degree [8]. The situation is similar in other countries. Despite training time reduced by 2 to 3 years, Chinese eight-year S.M.D. Program [9] has higher level cultivating objectives than the other normal doctoral program, especially the 4-year plus 4-year D.D.S. program of America. The graduate students can only get the basic den-

tist qualification [10]. Taking Peking University for example, there are already 5 graduates (about 200) doctoral dental students get to work, and they are highly appreciated by their employers. Although this new program has already made some achievements, it is still at the exploratory stage. Few researches have mentioned or evaluated this important dental education reform of China [11]. In this study, we compared comprehensive quality between eight-year S.M.D. program students of China and doctoral dental students of Japan, to get insights of this new dental education program, and hope to provide some references for improving dental education in China.

Methods

This paper has obtained consent from all participants in this study. The written consent has been obtained.

Seventh or eighth-year doctoral dental students of eight-year S.M.D. program and their teachers from School of Stomatology, Peking University, Peking, China and third or fourth-year doctoral dental students and their teachers from Faculty of Dental Science, Kyushu University, Fukuoka, Japan, involved in this study. All the students were voluntary and exposed to clinical practice, research work and education work in their university hospital during the study. Students were asked to leave after their class or meeting and asked if they were willing to complete a survey about their comprehensive quality as higher educated dentist. According to the enrollment students' name list, teachers who had close relationship with the students were selected and they gave scores to the students according to the same marking table. Uniform standards were developed for both the Chinese and Japanese teachers beforehand. The questionnaire was given to Chinese dental students and teachers in June 2013 and to Japanese in July 2013. This study has been conducted in full accordance with the World Medical Association Declaration of Helsinki. The Human Research Ethics Committee involved in this project (China Medical University) approved the study protocol.

Information was derived from a rating scale consisting of sixteen items, included in four parts. The first part is an evaluation for dentists' four kinds of basic knowledge, including dental professional knowledge (Item 1), basic medical knowledge (Item 2), humanities and social knowledge (Item 3) and basic legal knowledge (Item 4). The second part is an evaluation for professional quality, including oral professional diagnosis and treatment level (Item 5), oral comprehensive diagnosis and treatment level (Item 6), scientific research ability (Item 7), teaching capability (Item 8), professional foreign language proficiency (Item 9) and medical ethics (Item 10). The third part is an evaluation for general quality, including innovation capability (Item 11), international communication skills (Item 12), self-knowledge update capability (Item 13), social acceptability (Item 14) and team-work ability (Item 15). The last part contains only one item: comprehensive evaluation (Item 16). Students and teachers needed to score each item (1-10 points, 1 for the worst and 10 for the best). The rating scale was originally in English and then translated into Chinese and Japanese by bilingual faculty members. To guarantee the items same in meaning, Chinese and Japanese translations were checked by colleagues whose mother language were Chinese and had study dentistry for more than ten years in Japan. All versions were analyzed and compared by the authors, and a final version was developed. The Chinese version was send to Chinese eight-year S.M.D. program students and teachers, and the Japanese version was send to Japanese doctoral dental students and teachers.

To evaluate the comprehensive quality of doctoral dental students between two countries, simple frequency tables for group comparison are developed. And Mann-Whitney U test and One-sample T-Test are used to determine if two groups are significantly different from each other. Statistical significance is based on probability values of less than 0.05. Data are analyzed by the GraphPad Prism 5 Project (Kyushu University, Fukuoka, Japan).

Results and discussion

There were a total of 73 doctoral dental students (seventh or eighth-year of eight-year S.M.D. program) and 8 teachers of Peking University (China); 42 doctoral dental students (third or fourth-year for doctoral degree) and 7 teachers of Kyushu University (Japan) participated in this study. As for voluntary and anonymous, information regarding demographic details and social background of participants was not obtained.

Table 1. Score list of students in China and Japan (Mean value ± std)

Item No.	Chinese student	Japanese student
Part 1. Basic knowledge	7.57±0.32	6.20±0.16
1. Dental professional knowledge	7.70±1.12	6.36±1.63
2. Basic medical knowledge	7.01±1.41	6.21±1.52
3. Humanities and social knowledge	7.74±1.57	6.29±1.48
4. Basic legal knowledge	7.81±0.96	5.93±1.53
Part 2. Dental professional quality	7.34±0.59	5.94±0.35
5. Oral professional diagnosis and treatment level	7.49±1.06	6.07±1.94
6. Oral comprehensive diagnosis and treatment level	7.55±1.15	6.43±1.95
7. Scientific research ability	6.48±1.61	5.57±1.59
8. Teaching capability	6.32±1.88	5.64±1.99
9. Professional foreign language proficiency	7.25±1.54	4.21±1.90
10. Medical ethics	8.97±1.17	7.71±1.71
Part 3. General quality	7.60±0.40	5.84±0.96
11. Innovation capability	6.93±1.35	4.86±2.03
12. International communication skills	7.34±1.61	4.57±1.88
13. Self-knowledge update capability	7.81±0.96	6.14±2.07
14. Social acceptability	7.89±0.93	6.64±1.72
15. Team-work ability	8.01±1.54	7.00±1.89
Part 4. Comprehensive evaluation	7.52±0.97	6.29±1.44

Table 2. Teacher-Assessment Scores of Chinese Students in China and Japan (Mean value ± std)

Item No.	Chinese teacher	Japanese teacher
Part 1. Basic knowledge	8.14±0.09	6.54±0.13
1. Dental professional knowledge	8.29±0.71	6.50±1.64
2. Basic medical knowledge	8.12±0.68	6.71±1.22
3. Humanities and social knowledge	8.11±0.59	6.57±1.68
4. Basic legal knowledge	8.04±0.68	6.36±1.44
Part 2. Dental professional quality	8.18±0.10	6.47±0.53
5. Oral professional diagnosis and treatment level	8.29±0.69	5.50±1.40
6. Oral comprehensive diagnosis and treatment level	8.18±0.69	6.71±1.33
7. Scientific research ability	8.14±0.53	6.86±1.55
8. Teaching capability	8.01±0.31	6.29±1.53
9. Professional foreign language proficiency	8.12±0.57	6.07±2.09
10. Medical ethics	8.33±0.83	7.36±1.49
Part 3. General quality	8.28±0.19	7.23±0.43
11. Innovation capability	8.04±0.53	6.79±1.26
12. International communication skills	8.08±0.43	6.71±1.58
13. Self-knowledge update capability	8.48±0.68	7.21±1.08
14. Social acceptability	8.30±0.77	7.79±1.21
15. Team-work ability	8.48±8.48	7.64±1.44
Part 4. Comprehensive evaluation	8.19±0.61	7.14±1.25

The scores given by students and teachers in each country are presented in **Tables 1** and **2** respectively. For the first three parts, Mean and Standard Deviation (std) value of each part was calculated, to compare knowledge/quality differences. For each part, we made horizontal comparison between Chinese student and Japanese students, as well as Chinese teacher and Japanese teacher, and vertical comparison of a certain group by different knowledge/quality. Generally speaking, in both teacher evaluation and student self-evaluation, Chinese eight-year S.M.D. program doctoral dental students got higher scores than Japanese. The Chinese teachers scored higher than their students, while the Japanese teacher scored close to their students.

Part 1. Evaluation for basic knowledge

In the basic knowledge part, both the self-assessment and teacher-assessment scores of Chinese students were statistical significantly higher than those from Japan. (Chinese students vs Japanese students, *P*-value: Item 1: P=0.0046; Item 2: P=0.0003; Item 3: P= 0.0015; Item 4: P=0.0044. Chinese teachers vs Japanese teachers, *P*-value: Item 1, Item 2, Item 3, Item 4: P<0.0001). Chinese teacher scored higher than students themselves in dental professional knowledge and basic medical knowledge items, while they believed that the students were lack of basic legal knowledge. From the scores of Chinese students,

they had a lower recognition in their basic medical knowledge than teachers'. But Japanese students got a lower level in self-assessment, especially in the part of basic legal knowledge (Mean value ± std: 5.93±1.53).

The result was not beyond the authors' expected that the Chinese students were better than the Japanese students in the mastery of basic knowledge. First, the comprehensive quality of freshmen in Chinese eight-year S.M.D. program was better than those in Japan. For the last several years, the sufficiency rate of dentist is about 150% [12] in Japan. The difficulty of dentist licenses examination is rising year by year and the payment of dentist is much lower than the clinicians [13]. All these unfavorable conditions had leaded to serious challenges for total enrollment of dentistry in Japan. Therefore, many schools have to decrease the threshold, resulting in lower enrollment requirements [13]. In contrast, the education reform in China improves the quality of potential students. As most Chinese universities, the admission of Peking University is through the National Matriculation Test and a two-way selection system, which is decided by scores and individual will [14]. Peking University, as one of the best universities of China, has special advantages in the competition of enrollment. In recent years, a large number of excellent Chinese medical colleges were integrated into comprehensive universities, which also greatly improved the quality of new students. The improvement of enrollment quality is important, especially for eight-year S.M.D. program. Because it has higher education objectives and much compact teaching schedule. To ensure the implementation of elite education, Peking University for example, limit the number of annual admissions upon 30 to 40 students, which means only 1 to 2 students were recruited in each province (31 provinces in China) every year [15]. In the dilution of the large number of high school graduates in China, this admission rules select the best. So the quality of new students in eight-year S.M.D. program in China has a higher level than that in Japan.

Regarding to the knowledge structure, take Kyushu University (Japan) as example, the dental doctoral training objective has an emphasis on cultivating senior professionals and leaders of dentistry and relevant aspects [16]. However, the training objectives of Chinese eight-year S.M.D. program emphasize on mastering the theory of Dentistry and Medicine, based on broad theoretical knowledge of social humanities [9]. This emphasis on humanities and social knowledge is similar with '4+4' D.D.S. program of America [7]. The D.D.S. program of America recruits graduates directly from general colleges to guarantee students with well social humanities education [17]. For the same reason, the eight-year S.M.D. program students study in the comprehensive university to learn public elementary courses at the first 1 or 2 years, and they can be benefit from the study experience [9]. It explains why the social humanities knowledge and basic legal knowledge of Chinese eight-year S.M.D. program students were better than those of Japanese.

It should be mentioned that, Chinese teachers believe that their students were still lack of legal awareness. This phenomenon may be related to the present medical environment in China. The high frequency of 'Doctor-patient dispute' and patients' violent incidents [18, 19] causing experienced Chinese dental teachers particularly valued students' legal awareness, because it could be a powerful self-protection way for Chinese doctors. Therefore, as the medical environment is hard to be improved, education should strengthen students' legal awareness.

Part 2. Evaluation for dental professional quality

The scores of dental professional quality of Chinese students were higher than Japanese, except for teaching capability. Chinese teacher-assessment scores were also higher than their students' self-assessment scores. Medical ethics has been fully recognized by all participants from China and Japan. Chinese students considered that they were lack of research and teaching ability. The professional foreign language proficiency score of Japanese students' self-assessment was much lower, while oral professional diagnosis and treatment level score of Japanese teachers' assessment was lower than the other dental professional quality scores.

Medical treatment, teaching ability and researching ability were most important and

basic qualities. Chinese eight-year S.M.D. program focused on medical training. Eight-year S.M.D. program students of China need to complete 2 years clinical rotations of all the dental clinical departments and 1 year professional practice. Therefore, they will already have nearly 3 years clinical experience when graduate [9]. Chinese dental students can do clinical treatment under the guidance and control of their teachers, and they have right to do the treatment as long as therapeutic effect can be ensured. This learn-practice-summarize study mode can significantly improve students' clinical competence. The Japanese undergraduates need to obtain dentist license at the last year of college education, and then attend 1 or 2 years' mandatory training course. After passing the entrance examination, they can become doctoral dental students of a particular specialty, but professional clinical competence training was inadequate. Teaching and research abilities are time-consuming, the compression training time of Chinese eight-year S.M.D. program students lead to shortage of these two abilities. The research ability shortage may result in poor competitiveness for the graduates, especially in the circumstances that China continues emphasis on scientific research. Only a few colleges recognized this problem and arrange the eight-year students to do research early [20]. Teaching ability training is almost ignored by both the Chinese and Japanese, which is in accordance with our previous study. There is no special attention for teaching ability training in Chinese eight-year S.M.D. program. In Kyushu University, Japan, the doctoral dental students work as teaching assistants in pre-clinical practice teaching team, in their first and third grade. The training pattern is worth learning by Chinese medical universities. Foreign language learning in Japan seems not as important as in China [21]. Japanese students consider their professional foreign language proficiency poor. However, English is a mandatory evaluation indicator not only in the National Matriculation Test, but also in almost all learning stages in China [22]. English is a measurement for different learning stage completion of eight-year S.M.D. program as well, which occupies a large amount of learning time. However, there are an increasing number of Chinese universities deemphasizing foreign language, and allowing students to make more effort on professional learning [22]. But as dentistry is a highly internationalized subject, whether or not to reduce foreign language training has not reached a consensus among the non-English speaking countries [23].

Part 3. Evaluation for general quality

Chinese eight-year S.M.D. program students got higher scores than Japanese in the area of general quality except for social acceptability. Both the students and teachers in China and Japan believed that students' innovation capability and international communication skills were in a low level. Both the students of China and Japan had confidence in social acceptability and team-work ability. Chinese teachers gave their students credit for self-knowledge update capability.

Poor innovation capability is a general problem of the Asian students, which may due to the meritocracy of Confucian tradition and long term of classroom teaching model [24, 25]. Although China, Japan and other Asian countries are exploring to cultivate students with good innovative ability by adopting PBL, TBL teaching modes [26, 27], there is still a long way to changing the present teaching model caused by deep-rooted cultural.

China is a non-English speaking developing country. Because of language barriers, students' financial constraints and few international exchange chances; doctoral dental students rarely participate in worldwide academic conferences and international exchange programs, which could limit their horizons. It may be an unfavorable factor for Chinese dentistry to link up with the world. Japanese doctoral dental students also have such problems as poor international communication skills, but the problems have no adverse effects on Japanese dentistry as it has already reached a high level.

Social skills and teamwork ability are symbols of modern society working abilities, and have always brought special attentions. Such abilities are also very important to dentist who communicate with the patients and manage the medical team every day, especially for private practitioner. These general abilities should be pay most attentions besides the treatment ability [28]. Consequently, the training of social skills and teamwork ability cannot be ignored by the college.

Part 4. Comprehensive evaluation

The scores of teacher-assessment were much higher than the students' self-assessment both in China and Japan. The evaluation of Chinese students and their teachers were significantly higher than that of Japanese students and their teachers. (Item 16: Chinese students vs Japanese students, *P*-value: 0.0029; Chinese teachers vs Japanese teachers, *P*-value: <0.0001.) As for the comprehensive quality evaluation, both the students' and the teachers' opinions should be considered. Experienced teachers can find problems ignored by students, while students themselves could know their capabilities and shortcomings best. Therefore, combined with both the students' and the teachers' evaluation, a more meaningful guideline could be developed for future reference.

Conclusions

Compared the doctoral dental students' comprehensive quality of China with that of Japan, Chinese eight-year graduate doctoral dental students showed more excellent ability, although the development of China's dentistry is relatively laggard. This dental education innovation will inevitably have great impact on the development of China's dentistry. However, this program still needs improving, and requires more educators' efforts.

Acknowledgements

This research was supported by Foundation of Liaoning Educational Committee (UPRP2014-0498) and Foundation of Medical Education of China Medical University (YDJK2014014). The authors would like to express our appreciation to Dr. Dong Shi, Dr. Yang Li, Dr. Jing Li, Dr. Xuguang Lu, Peking University School of Stomatology, China, for their valuable support. The authors also would like to acknowledge the cooperation of students and their participating dental schools in the conduct of this study.

Disclosure of conflict of interest

None.

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