Original Article

Views of young dentists on choosing oral pathology specialist as their lifelong career

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KEYWORDS
Young dentists; Oral pathology; Oral pathology specialist; Oral pathology specialist shortage problem

Abstract  Background/purpose: Currently, very few young dentists in Taiwan are willing to choose oral pathology specialist as their lifelong career. This study reported the views of young dentists on the profession of oral pathology.

Materials and methods: This study exploited the observational method and the questionnaire survey to collect the views of young dentists on the profession of oral pathology in Taiwan.

Results: Thirty-five dental trainees or residents filled out the questionnaires. They agreed that the life quality or workload, interest, incidence of medical disputes, accomplishment, future job opportunities, salary level, and possibility to become a clinic owner were important factors that were considered to choose a dental specialist training program. Most (33, 94.3%) of them were sure that they would not choose oral pathology specialists as their lifelong career. The important reasons for not choosing oral pathology specialists as their lifelong career were learning characteristics, insufficient understanding of the work that an oral pathology specialist has to do, poor life quality or heavy workload, lower accomplishment, fewer job

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Introduction

The American Academy of Oral Pathology was established in the United States in 1946. It was the beginning of oral pathology and oral diagnosis. The American Board of Oral Pathology was established in 1948 and the first oral pathology specialist examination was held in the autumn of 1949. Today, oral pathology has a history of more than 70 years. Oral pathology is a branch of dentistry and also a branch of pathology, and specializes in identifying and dealing with the diseases and lesions in the oral and maxillofacial regions. The scope of work of oral pathology specialists includes the interpretations of clinical, microscopic, biochemical, and other examination data regarding the diseases or lesions in the oral and maxillofacial regions. Meanwhile, oral pathology specialists also use the above interpretations to study and diagnose the diseases or lesions in the oral and maxillofacial regions and to treat the patients. Therefore, it is generally accepted internationally that dentists and dental students must learn oral pathology.  

In the United States, the oral and maxillofacial pathology and oral medicine are two different dental specialties, but in Taiwan, the oral pathology specialists can deal with not only oral histopathological diagnosis but also clinical diagnosis and treatment of patients with the diseases or lesions in the oral and maxillofacial regions. Clinically, our oral pathology specialists specialize in the diagnosis, direct treatment or indirectly guided treatment of allergic symptoms of the oral and maxillofacial regions, recurrent oral ulcers and related systemic diseases, immune-related oral mucosal diseases, oral tumors, precancers, and cancers, drugs reactions, oral infections (including bacteria, fungi, viruses), oral pain and paresthesia, and salivary gland diseases, etc. It can be seen that the scope of work of oral pathology specialists is all-encompassing. Besides, they are also dentists who have received complete general dentistry training and have extensive clinical experience. Under the microscope, they are generally more feasible to do the correlation between the pathology and clinical features of oral lesions than general pathology specialists who have only general surgical pathology training, and thus provide a more accurate diagnosis for diseases or lesions in the oral and maxillofacial regions. Therefore, they can provide a strong back-up for the dentists.

Due to the characteristics of oral pathology, trainees need a lot of reading and recitation. For dental students and dentists, it is relatively boring and difficult to arouse interest. In addition, the diagnosis and treatment of diseases or lesions in the oral and maxillofacial regions often rely on some special tests that can only be performed in the hospitals, so oral pathology must be attached to the hospital system. Thus, the job opportunities of oral pathology specialists are generally limited. Meanwhile, under the hospital system, most of oral pathology specialists are required to undertake three tasks that are clinical and histopathological services, teaching and researches. Thus, the workload is very heavy for the oral pathology specialists, which will inevitably affect the life quality. Besides, the oral pathology specialists in Taiwan also have relatively lower income compared with their dentist peers. Because of the characteristics of oral pathology, the heavy workload, and the lower income of oral pathology specialists, currently very few young dentists in Taiwan are willing to choose oral pathology specialist as their lifelong career. For example, very few trainees of postgraduate year training program for dentists (PGYD) take oral pathology training, and even after 2018, none of young dentist has entered in oral pathology specialist training program.

Therefore, because of lack of the studies in the human resources of oral pathology specialists in Taiwan, the main purpose of this study was to survey the views of young dentists on the profession of oral pathology and to find the reasons for the oral pathology specialist shortage problem in Taiwan. Through this survey, we tried to give some helpful suggestions to the government to solve the oral pathology specialist shortage problem in Taiwan in the near future.

Materials and methods

In this study, we adopted the observational method and the questionnaire survey to collect the views of young dentists, such as the PGYD trainees in the Department of Dentistry of National Taiwan University Hospital (NTUH), on the profession of oral pathology. These methods were described as follows.

Participants

A total of 40 dental trainees who took the PGYD training in the Department of Dentistry of NTUH were included from 2019 to 2021 in this study. Among them, there were 20
trainees in the first year (so-called PGYD1) and 20 in the second year (so-called PGYD2) in 2021. Besides, several dental residents (so-called R3 or R4) were also included in this study.

Observation process

In the Division of Oral Pathology and Diagnosis, Department of Dentistry, NTUH, we provided 4 outpatient clinics a week for PGYD1 trainees to come to our clinic for learning oral diagnosis and further treatment of the patients. Our clinical work was to see the first-visit or follow-up dental patients who had mainly oral mucosal diseases, lesions or discomfort. If the patients had oral mucosal diseases only, they were kept in our division for further treatments and follow-up. Moreover, if the patients had tooth-related diseases, they were referred to other divisions in the dental department for further treatments. In addition, we also provided a two-month oral pathology training course for PGYD2 trainees to come to our oral pathology laboratory for learning oral histopathological diagnosis. Besides, the PGYD2 trainees were required to participate in not only oral histopathological diagnosis but also clinical diagnosis and treatment for oral mucosal disease patients (so-called practice in oral medicine). However, in some consultation occasions, we also had the opportunity to exchange our opinions with other dental residents on clinical oral pathological diagnosis. Therefore, the aforementioned dental trainees or residents were our observation subjects from 2019 to 2021. In our dental clinic, they could see how and what an oral pathology specialist could do for his or her patients, and we could also observe their views on the profession of oral pathology from the interaction with them. We summarized the relevant views and then further designed the questionnaire survey.

Survey tool

In March 2021, we invited all PGYD trainees and some dental residents who interacted with our division to fill out the questionnaires. All PGYD trainees or dental residents were invited to join in this study at their free will to fill out the questionnaires without the pressure from the investigators.

Semi-structured questionnaire was used as the survey tool. The questions included the basic demographic data such as their gender, belonging program (PGYD1 or PGYD2), and highest education. The investigated questions included (1) the agreement on the consideration factors when choosing a specialist training program, (2) the views on choosing oral pathology specialist as their lifelong career, (3) the agreement on the reasons why oral pathology specialist is not considered as the lifelong career, and (4) the agreement on the factors that could improve the willingness to choose oral pathology specialist as their lifelong career. In these investigated questions, the answer was designed to let the participant to raise a score ranging from 1 to 4. If the intensity or response for each question was extremely important, the score was 4. In contrast, if the intensity or response for each question was not extremely important, the score was 1. The mean score was 2.5 or more, which meant that on average, answerers agreed that the investigated items were important, and the higher the score also meant that the higher the degree of their agreement. The participants were suggested to give the score in fresh memory. There were open questions in the final questions of parts (1), (3) and (4) of the questionnaire. The participants could fill any suggestion and/or opinion (including advantage or disadvantage).

Statistical analysis

All data collected were stored in excel files and used for statistical analysis. The differences in the mean scores (the degree of agreement) of various investigated items were compared between PGYD1 and PGYD2 trainees, as well as between male and female trainees by Mann–Whitney U test. The result was considered to be significant if the P-value was less than 0.05.

Results

Demographic data

Thirty-five dental trainees or residents filled out the questionnaires in this study (Table 1). One of them did not provide his or her basic data. They were from different dental training programs including 17 PGYD1 trainees, 16 PGYD2 trainees, and one R4 resident. Of these 34 answerers of this questionnaire survey, 17 were males and 17 were females (Table 1). Their age ranged from 25 to 35 years old with an average age of approximately 27 years of age. All of their highest academic qualifications were doctor of dental surgery (DDS) degrees.

The agreement of factors to be considered in choosing a dental specialty for training

There were seven items and an open question in this part of survey and these items included life quality or workload, interest, incidence of medical disputes, accomplishment, future job opportunities, salary level, and possibility to become a clinic owner. The agreement for the degree of importance of each item was relatively high and all the mean scores and the proportion of those answered as important of each item were over 2.5 and 60%, respectively (Table 2). The agreement for the degree of importance of each item in a descending order were interest (3.51 and 100%), life quality or workload (3.43 and 97%), future job

| Program    | Male | Female | Number |
|------------|------|--------|--------|
| PGYD1      | 7    | 10     | 17     |
| PGYD2      | 10   | 6      | 16     |
| R4         | 0    | 1      | 1      |
| Unfilled   | 1 (unknown) | 1      |
| Total      | 17   | 17     | 35     |
opportunities (3.4 and 97%), salary level (3.29 and 94%), accomplishment (3.26 and 97%), incidence of medical disputes (2.89 and 77%), and possibility to become a clinic owner (2.74 and 63% for the mean score and the proportion of those answered as important of each item, respectively). The differences in the mean scores of investigated items were compared between PGYD1 and PGYD2 trainees, as well as between male and female trainees. The mean scores of the items (interest and salary level) of PGYD1 trainees (3.65 and 3.35, respectively) were much higher than those of PGYD2 trainees (3.31 and 3.25, respectively), indicating that PGYD1 trainees tend to have a viewpoint that the factors of interest and salary level are more important. On the contrary, comparing in the same way as above, PGYD2 trainees tended to have a viewpoint that the factors of accomplishment and possibility to become a clinic owner were more important. Besides, male trainees tended to have a viewpoint that the factors of life quality or workload, salary level, and possibility to become a clinic owner were more important. On the contrary, female trainees tended to have a viewpoint that the factor of incidence of medical disputes was more important (Table 2).

**Table 2** The median/mean score of investigated question “Which of the following factors will be taken into consideration when you choose a dental specialty for training?”

| Factors                        | All answerers (n = 35) | Median/ Mean | Median—Mean Mann—Whitney U test | Significance | Median/ Mean | Median—Mean Mann—Whitney U test | Significance |
|--------------------------------|------------------------|--------------|---------------------------------|-------------|--------------|---------------------------------|-------------|
| Life quality or workload       | Life quality or workload | 3/3.43       | 34 (97%)                        | 3/3.41      | 3/3.44       | 136.00 NS                       | 4/3.59      | 3/3.24       | 190.50 NS                       | 4/3.59      | 3/3.24       | 190.50 NS                       |
| Interest                       | Interest               | 4/3.51       | 35 (100%)                       | 3/3.65      | 3/3.31       | 90.50 NS                       | 4/3.52      | 3/3.47       | 153.00 NS                       | 4/3.52      | 3/3.47       | 153.00 NS                       |
| Incidence of medical disputes  | Incidence of medical disputes | 3/2.89       | 27 (77%)                        | 3/2.88      | 3/2.88       | 140.50 NS                       | 3/2.76      | 3/2.94       | 129.50 NS                       | 3/2.76      | 3/2.94       | 129.50 NS                       |
| Accomplishment                 | Accomplishment         | 3/3.26       | 34 (97%)                        | 3/3.12      | 3/3.31       | 152.00 NS                       | 3/3.24      | 3/3.24       | 134.00 NS                       | 3/3.24      | 3/3.24       | 134.00 NS                       |
| Future job opportunities       | Future job opportunities | 3/3.4        | 34 (97%)                        | 3/3.41      | 3/3.38       | 134.50 NS                       | 3/3.41      | 3/3.35       | 156.00 NS                       | 3/3.41      | 3/3.35       | 156.00 NS                       |
| Salary level                   | Salary level           | 3/3.29       | 33 (94%)                        | 3/3.35      | 3/3.25       | 125.00 NS                       | 3/3.35      | 3/3.18       | 164.00 NS                       | 3/3.35      | 3/3.18       | 164.00 NS                       |
| Possibility to become a clinic owner | Possibility to become a clinic owner | 3/2.74       | 22 (63%)                        | 3/2.59      | 3/2.88       | 169.50 NS                       | 3/3         | 3/2.41       | 205.00 NS                       | 3/3         | 3/2.41       | 205.00 NS                       |

NS: not significant.

Views on choosing oral pathology specialist as young dentists' lifelong career

There were four items in this part of survey and these items were ranked from low to high according to whether there was a willingness to choose oral pathology specialist as the lifelong career. Basically, 33 (94.3%) of all answers showed that they would not choose oral pathology specialist as the lifelong career, while the other two (5.7%) just undecided (Table 3).

**Table 3** The answers of investigated question “Do you want or have ever wanted to choose oral pathology specialist as the lifelong career?”

| Answers                                                                 | Number | Percentage |
|-------------------------------------------------------------------------|--------|------------|
| I have no idea on choosing oral pathology specialist as the lifelong career. | 26     | 74.3%      |
| I had this idea, but I will choose other dental specialties at the end.  | 7      | 20%        |
| Yes, but I am not sure which dental specialty I will choose.             | 2      | 5.7%       |
| Yes, I am likely to choose oral pathology specialist as the lifelong career. | 0      | 0%         |
| Total                                                                   | 35     | 100%       |

The agreement of the reasons why young dentists do not consider to choose oral pathology specialist as their lifelong career

There were seven items and an open question in this part of survey and these items included learning characteristics (such as too difficult or too much recitation), insufficient understanding of the work that an oral pathology specialist has to do, poor life quality or heavy workload, incidence of medical disputes, lower accomplishment, fewer job opportunities, and lower salary. The agreement for the degree of importance of each item was relatively high and all the
mean scores and the proportion of those answered as important of each item were over 2.5 and 50%, respectively, except for the incidence of medical disputes (Table 4). The agreement for the degree of importance of each item in a descending order were learning characteristics (3.14 and 80%), lower salary (3.11 and 86%), fewer job opportunities (3.09 and 83%), lower accomplishment (2.77 and 71%), poor life quality or heavy workload (2.77 and 57%), insufficient understanding of the work that an oral pathology specialist has to do (2.57 and 51%), and incidence of medical disputes (2.43 and 37% for the mean score and the proportion of those answered as important of each item, respectively). Comparing in the same way as above, we found that PGYD1 trainees tended to have a viewpoint that the factor of learning characteristics was more important. On the contrary, PGYD2 trainees tended to have a viewpoint that the factors of poor life quality or heavy workload, and incidence of medical disputes were more important. Besides, male trainees tended to have a viewpoint that the factor of poor life quality or heavy workload \((P < 0.05)\) was more important. On the contrary, female trainees tended to have a viewpoint that the factors of learning characteristics, and fewer job opportunities were more important (Table 4).

The agreement of the factors that can increase young dentists’ willingness to consider oral pathology specialist as their lifelong career

There were four items and an open question in this part of survey and these items included to increase salary for oral pathology residents, to improve job opportunities after finishing specialist training, to increase income of oral pathology specialists, and to improve life quality or reduce workload. The agreement for the degree of importance of each item was very high and all the mean scores and the proportion of those answered as important of each item were over 3 and 90%, respectively (Table 5). The agreement for the degree of importance of each item in a descending order were to increase income of oral pathology specialists (3.34 and 100%), to improve job opportunities after finishing specialist training (3.29 and 97%), to improve life quality or reduce workload (3.26 and 100%), and to increase salary for oral pathology residents (3.17 and 91% for the mean score and the proportion of those answered as important of each item, respectively). Comparing in the same way as above, we found that PGYD1 trainees tended to have a viewpoint that the factors to increase salary for oral pathology residents, to improve job opportunities after finishing specialist training, and to increase income of oral pathology specialists were more important. On the contrary, PGYD2 trainees tended to have a viewpoint that the factor to improve life quality or reduce workload was more important. Besides, male trainees tended to have a viewpoint that the factors to increase income of oral pathology specialists and to improve life quality or reduce workload were more important. However, male and female trainees had the same viewpoints on the factors to increase salary for oral pathology residents and to improve job opportunities after finishing specialist training, because both factors showed the same mean scores for male and female trainees (Table 5).

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**Table 4** The median/mean score of investigated question "What are the reasons why you do not consider to choose oral pathology specialist as the lifelong career?"

| Reasons                                                                 | All answerers (n = 35) | PGYD1 (n = 17) | PGYD2 (n = 16) | Mann–Whitney U test | Significance | Male (n = 17) | Female (n = 17) | Mann–Whitney U test | Significance |
|-------------------------------------------------------------------------|------------------------|----------------|----------------|---------------------|--------------|--------------|----------------|---------------------|--------------|
| Learning characteristics (such as too difficult or too much recitation)  | 3/3.14 28 (80%)        | 3/3.29         | 3/3            | 109.00 NS           |              | 3/3          | 3/3.35         | 116.00 NS           |              |
| Insufficient understanding of an oral pathology specialist’s work       | 3/2.57 18 (51%)        | 2/2.53         | 2/2.69         | 151.50 NS           |              | 2/2.47       | 3/2.71         | 123.00 NS           |              |
| Poor life quality or heavy workload                                     | 3/2.77 20 (57%)        | 2/2.59         | 3/3            | 178.00 NS           |              | 3/3.06       | 2/2.47         | 202.00 P < 0.05     |              |
| Incidence of medical disputes                                          | 3/2.43 13 (37%)        | 2/2.35         | 2.5/2.56       | 162.50 NS           |              | 2/2.41       | 2/2.47         | 136.50 NS           |              |
| Lower accomplishment                                                    | 3/2.77 25 (71%)        | 3/2.65         | 3/2.81         | 151.50 NS           |              | 3/2.82       | 3/2.71         | 153.00 NS           |              |
| Fewer job opportunities                                                | 3/3.09 29 (83%)        | 3/3.12         | 3/3.06         | 125.00 NS           |              | 3/2.88       | 3/3.29         | 108.50 NS           |              |
| Lower salary                                                           | 3/3.11 30 (86%)        | 3/3.12         | 3/3.19         | 142.00 NS           |              | 3/2.88       | 3/3.12         | 152.00 NS           |              |

NS: not significant.
There were 14 trainees (4 PGYD1, 9 PGYD2, and one R4) who gave their suggestions or opinions for the questionnaire survey. One PGYD1 trainee indicated that oral pathology teachers are knowledgeable, philosophical, and enthusiastic people, and oral pathology career is a difficult and lonely road to go. One PGYD1 trainee expressed that an oral pathology specialist can only be employed in the hospitals, so the salary of the attending dentist in the oral pathology department is very important. One PGYD1 trainee suggested that the training environment, colleagues, and working hours are also important for an oral pathology specialist training. Moreover, one PGYD2 trainee indicated that the dentist emphasizes manual work, while the oral pathology specialist focuses on the recitation, which is not in line with personal interests. One PGYD2 trainee suggested that the peer learning environment, and out-of-school and overseas cooperation are important for an oral pathology specialist training, and also expressed that the diagnosis and treatment of oral mucosal diseases and the management of oral pathological specimens are not understood by general dentists. In addition, 9 trainees indicated that the salary subsidy for oral pathology residents and oral pathology specialists are absolutely needed. In summary, a reasonable range of subsidies should be 100,000 to 200,000 dollars per month for oral pathology residents, and 150,000 to 200,000 dollars per month for oral pathology specialists by their suggestions.

Discussion

Since Taiwan Academy of Oral Pathology (TAOP) founded in 1989, the development of oral pathology in Taiwan has been more than 30 years. The implementation of the dental specialist system in Taiwan started in oral and maxillofacial surgery in 1999, oral pathology in 2001, and orthodontics in 2009. Although oral pathology is one of the earliest officially recognized classifications of dental specialist and the specialist examination was firstly performed in 2001, the accumulative number of board-certified oral pathology specialists was merely 80 in 2017, of which only 23 were qualified by passing the oral pathology specialist examination after completing the oral pathology specialist training. Moreover, since 2017, there has been no newly certified oral pathology specialist for 3 consecutive years. In the past, the number of the dentists who accepted the oral pathology specialist training and passed the oral pathology specialist examination ranged from 1 to 2 per year, in contrast to the current training capacity of 10 dentists but none participates in oral pathology specialist training in 2020. Obviously, young dentists in Taiwan are reluctant to work in the specialty of oral pathology. In addition, the oral pathology specialist system has lasted for nearly 20 years, most of the oral pathology specialists who got their specialist certificates in the first year of the specialist system in 2002 also approached their retirement age (65 years old). Moreover, some of them did not persist to perform the oral pathology work. At this moment, Taiwan is facing the dilemma of the manpower shortage of oral pathology specialists.

There was a questionnaire survey of dentists (283 samples) who have participated in PGYD training during the period from 2010 to 2018. Among all the specialties selected by the PGYD trainees, oral pathology training is the least proportionately in terms of the numbers of training person-months and dentists, with only 39 training person-months (2.3%, 39/1698), and 13 dentists (4.6%, 13/
283). In addition, there are only 6 dentists (2.1%, 6/283) who ever have the idea of choosing oral pathology specialists as their lifelong career. However, they do not act at the end. Furthermore, during our study period, there was only one PGYD2 trainee who took the oral pathology training. In fact, there was just one trainee who took the oral pathology training since our hospital handled PGYD training in 2010. As a result, there were at least nearly 200 dentists who have completed PGYD training in our hospital. Only one trainee who took the oral pathology training was indeed too small in number, which was only 0.5% of all dentists who had completed PGYD training in our hospital.

Therefore, we really needed to know the views of young dentists on choosing a specialty for training in order to further understand the reasons why young dentists did not intend to be engaged in oral pathology specialty in Taiwan, and in turn proposed solutions for this problem. According to the results of a questionnaire survey of PGYD trainees (39 samples) by the Department of Dentistry of NTUH in 2018, the main factors that hinder young dentists from choosing oral pathology specialists as their lifelong career are academic characteristics (26.08%), fewer future job opportunities (21.74%), poor life quality or heavy workload (18.47%), and lower salary (16.3%).

In this study, since 2019, during the interaction with PGYD trainees and dental residents in the Department of Dentistry of NTUH, we have observed and discovered the factors that influence them to choose a dental specialist as their lifelong career. Based on our observations, we designed the content of the questionnaire, and finally conducted a questionnaire survey on current PGYD trainees and dental residents in March 2021. Due to the small number of answerers, qualitative judgment on each investigated item was used instead of quantitative approach to assess the relationship between different variables. Each investigated item was judged by answerers, and then they gave a score for each item to express their judgment on the agreement for the degree of importance of each item.

In this study, all answerers gave high scores for the investigated items of factors that were considered when choosing a dental specialist training. These items were life quality or workload, interest, incidence of medical disputes, accomplishment, future job opportunities, salary level, and possibility to become a clinic owner. Among all answerers, interest was the most important factor. However, among PGYD2 or male trainees, life quality or workload was the most important factor. These findings indicate that the differences in working experience and gender are also influential in the perception of degree of importance. Regarding the question of whether you consider to choose oral pathology specialist as the lifelong career, they almost all expressed that it was impossible to choose oral pathology as their dental specialty. This is exactly the plight of oral pathology in Taiwan now.

All answerers also gave high scores for the investigated items of the reasons for not considering to choose oral pathology specialist as their lifelong career, except for the incidence of medical disputes. These findings indicate that learning characteristics (such as too difficult or too much recitation), insufficient understanding of the work that an oral pathology specialist has to do, poor life quality or heavy workload, lower salary, fewer job opportunities, and lower salary are all very important reasons why young dentists do not consider to choose oral pathology specialist as their lifelong career. Among all answerers, learning characteristics was the most important reason. However, among PGYD2 or male trainees, the lower salary was the most important reason. These findings also indicate that the differences in working experience and gender are also influential in the perception of important reasons.

Furthermore, all answerers also gave very high scores for the investigated items of factors that can increase their willingness to consider oral pathology specialists as their lifelong career. These items included to increase salary for oral pathology residents, to improve job opportunities after finishing specialist training, to increase income of oral pathology specialists, and to improve life quality or reduce workload. Among all answerers, to increase income of oral pathology specialists was the most important factor. However, among PGYD1 trainees, to improve job opportunities after finishing specialist training was also the most important factor. Among PGYD2 trainees, to improve life quality or reduce workload was also the most important factor. Moreover, among female trainees, to improve job opportunities after finishing specialist training was the most important factor. Therefore, the above factors all were very important from the views of young dentists.

Through the open information webpages of the Ministry of Health and Welfare, we also found that there was a total of 154 dentists registered in NTUH and National Taiwan University Children’s Hospital (NTUCH) in 2020. Of these 154 dentists, there were 14, 20, and 10 dentists registered in the divisions of oral and maxillofacial surgery, orthodontics, and pediatric dentistry, respectively. However, there were only 2 dentists registered in the division of oral pathology, which accounted for only 1.3% of the total dentists in NTUH and NTUCH. However, there were 9 dental specialties in the entire dental department of NTUH and NTUCH. On average, a dental specialty should have about 17 dentists. However, these 2 dentists (oral pathology specialists) were also assistant professors in the dental school, and thus they were required to undertake the work of service, teaching and research for oral pathology, indicating that these two oral pathology specialists are really overloaded. Therefore, the manpower of oral pathology in NTUH was indeed too small. Although a reasonable range of subsidies should be 100,000 to 200,000 dollars per month for oral pathology residents, and 150,000 to 200,000 dollars per month for oral pathology specialists by the suggestions of answerers in this study, this is indeed a reasonable subsidy range compared to our government’s policy of a guaranteeing income of 220,000 to 300,000 dollars per month for dental clinics in areas with insufficient dental resources.

Finally, according to the findings of this study, we suggest that the government should propose a policy that create some new positions for board-certified oral pathology specialists. Meanwhile, for those dentists who enter the oral pathology specialist training program and are willing to practice oral pathology as a career, the government, especially the Ministry of Health and Welfare, should build a regular and long-term budget to subsidize these devoted
oral pathology residents and specialists to increase their monthly income and to secure their life quality. We also think that a perfect policy can secure the manpower of oral pathology specialists who can not only help the oral pathology education work in the dental schools but also provide a more precise and specific oral histopathological diagnoses for the diseases or lesions in the oral and maxillofacial regions, which further guide the treatment toward the correct direction and lead to a better clinical outcome for the treated patients.

Declaration of competing interest
The authors have no conflicts of interest relevant to this article.

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