

อิทธิพลของวาทกรรมการแพทย์แบบวิทยาศาสตร์ต่อกระบวนการเรียนรู้ ของนักศึกษาทันตแพทย์ ผ่านระบบการศึกษาทันตแพทยศาสตร์ กรณีศึกษาในคณะทันตแพทยศาสตร์ มหาวิทยาลัยเชียงใหม่ Biomedical Science Discourse Influences Dental Students' Learning Process Through the Dental Education System: Case in Faculty of Dentistry, Chiang Mai University

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บทคัดย่อ

วัตถุประสงค์เพื่อศึกษาอิทธิพลของวาทกรรมการแพทย์แบบวิทยาศาสตร์ ต่อกระบวนการเรียนรู้ของนักศึกษาทันตแพทย์ และแนวคิดทันตสุขภาพในระบบการศึกษาทันตแพทยศาสตร์ที่นำไปสู่การมุ่งเน้นที่โรคมมากกว่าสุขภาพ วิธีการศึกษาเชิงคุณภาพได้ถูกนำมาใช้โดยมีคณะทันตแพทยศาสตร์ มหาวิทยาลัยเชียงใหม่เป็นพื้นที่เพื่อการศึกษา นักศึกษาทันตแพทย์จำนวน 10 คนในแต่ละชั้นปีเป็นผู้ให้ข้อมูลในการสัมภาษณ์เชิงลึกร่วมกับการสังเกตอย่างมีส่วนร่วมเพื่อทำความเข้าใจกระบวนการปลูกฝังและซึมซับของวาทกรรมการแพทย์แบบวิทยาศาสตร์ภายใต้ระบบการศึกษาทันตแพทยศาสตร์ อีกทั้งกระบวนการที่ทันตสุขภาพได้ถูกแยกออกจากส่วนอื่นของร่างกาย การวิเคราะห์ข้อมูล ทำโดยการแยกแยะข้อมูล การตีความและการให้ความหมายตามประเด็นต่าง ๆ

ผลการศึกษาพบว่า กระบวนการเรียนรู้ภายใต้ระบบการศึกษาทันตแพทยศาสตร์ได้ปรับแต่งให้นักศึกษา

Abstract

The purpose was to study biomedical science discourse in dental education system influence dental students' learning process and dental health concept, leading them to emphasize on disease rather than health. This study was based on the qualitative method and performed in the Faculty of Dentistry, Chiang Mai University. 10 dental students from each education year were the key informants to understand how the cultivating process of biomedical science discourse happened and instilled. Also how dental health was separated from the other parts of body. In-depth interview and participatory observation were the instruments for data collection.

It was found that the learning process in the dental education system shaped the dental students to learn the way of thinking, seeing and speaking in the

ทันตแพทย์เรียนรู้แบบแผนวิธีคิด วิธีมองและวิธีพูดในแบบนักวิชาชีพทันตแพทย์ กระบวนการเหล่านี้ได้ถูกปลูกฝัง และต่อยอดอย่างต่อเนื่องโดยผ่านการศึกษาภาคทฤษฎีและภาคปฏิบัติทั้งในการปฏิบัติในคลินิกและห้องปฏิบัติการฟันและทันตสุขภาพได้ถูกทำให้เป็นเสมือนวัตถุที่นักศึกษาทันตแพทย์ได้ใช้ในการเรียนรู้โดยปราศจากความเป็นมนุษย์ กระบวนการเรียนรู้ในระบบการศึกษาทันตแพทย์-ศาสตร์เป็นการมุ่งเน้นเชิงเทคนิค และนำไปสู่การที่นักศึกษาให้ความสำคัญกับทักษะทางด้านการปฏิบัติมากกว่าทักษะที่สัมพันธ์กับความเป็นมนุษย์และการสื่อสารกับผู้คน นี่คือหลักการพื้นฐานของวาทกรรมการแพทย์แบบวิทยาศาสตร์คือมองสรรพสิ่งที่เกิดขึ้นแบบกลไกแยกส่วนลดทอน และมุ่งเน้นเฉพาะปัจเจกบุคคล

ข้อเสนอของการศึกษานี้คือ ระบบการเรียนรู้ของนักศึกษาทันตแพทย์ในระบบการศึกษาทันตแพทยศาสตร์จำเป็นต้องมีการปฏิรูป โดยให้ความสำคัญกับสุขภาพมากกว่าความเป็นโรค การดูแลเอาใจใส่ผู้ป่วยทุกคนมากกว่ามุ่งเพียงความสามารถเฉพาะการรักษาฟัน และอวัยวะในช่องปาก และจัดระบบการศึกษาแบบองค์รวมมากกว่าการแยกส่วน โดยเฉพาะอย่างยิ่ง กระบวนทัศน์ทันตสุขภาพควรต้องขยับจากแนวคิดนิวตันฟิสิกส์มาสู่ควอนตัมฟิสิกส์

คำใบ้รหัส: การศึกษาทันตแพทยศาสตร์, วาทกรรมการแพทย์แบบวิทยาศาสตร์, กระบวนการเรียนรู้

dental professional pattern. It was cultivated and reproducible continuous process through the lecture and laboratorial classes, including the clinical setting too. The teeth and dental health were constructed as if they were objects for dental students learning without humanization. The learning process of dental education system was too technique-oriented and leading dental students focused on manual skill rather than human skills and communicative skill. This was the basic concept of biomedical science discourse that was mechanism, reductionism and individualism.

These findings suggest that the learning process of dental students in the dental education system needed to be reformed by emphasize on health-oriented rather than disease-oriented, caring patient as a whole rather than competence focused only teeth and oral health. Also holistic approached rather than segmental in the dental education system. Especially, the paradigm of dental health needed to be shift from Newtonian physics to Quantum physics at the beginning of the reforming period.

Key Words: Dental education, biomedical science discourse, learning process.

Introduction

As for Foucault, discourse is not only a language but it is a group of statements that is a method to present some special knowledge. It is the creation of knowledge which influences the society to practice. Discourse is a system of creation. It creates meanings and significances of things in societies that cover around all of us, such as knowledge, reality, power or even us. Things or knowledge are created by the society and can be transformed into other possible ways, even into some unexpected forms⁽¹⁾. That is our ways of thinking about

things are managed. Discourse has created orders of things for ruling people in societies to follow by hiding them in a form of knowledge.⁽²⁾

Foucault stated that the reality was not out there for human to discover, but reality was recreated by the discourse in various forms of things that depended on each society. Each society has its own culture and constructs the discourse to manage the orders of things. After the discourse had widely been accepted, it would be transformed to be the dominant discourse. This dominant discourse in the form of speaking, writing and acting

are called discursive practice. All various forms of discursive practices such as traditions, customs, taboos, thoughts, values, beliefs, and even the institutes in the society are used for the instruments in the discourses. The functions of the discursive practices are to recreate the meanings significances and orders of things until the people are convinced and accept. So, the created knowledge can become the reality by the discourse⁽²⁾. This knowledge becomes the reality and pushes the society to practice in the pattern that has been constructed. The knowledge is power. On the other hand, the power can create the knowledge and become the discourse, too. The knowledge which is powerful should be created by experts.

In modern society, the power is showed by techniques of discipline, such as surveillance, categorization and gazing. Gazing is another issue that Foucault tried to describe. Medical gaze is a technical power to manage a human body as a docile body. The body is accounted as a machine for physicians to repair and control human lives from birth to death. Gazing is the technical power making the human to be a subject as in the technique of panopticism. Panopticism is the technique for controlling individuals to perform themselves as if they were gazed all the time. It is a tool for modern society to manage and control people in the society.⁽³⁾

The modern medicine applies the scientific knowledge to create the medical discourse and marginalize the traditional Thai medicine. The modern medicine has a right to explain the humans' health and lives by using the scientific knowledge which is powerful in the society. The government also used the medical discourse to construct and manage the health system for the society⁽⁴⁾ and even determine the size of families in the society.⁽⁵⁾

The concept of bio-power that was proposed by Foucault is also a tool for the government to control

people in the society. Individuals' right to die in the 17th century was changed to be the responsibility of the government. Controlling people by sovereigns was changed to promoting health and wealth by constructing a discourse for ordering the individuals' lives. The discourses that the government used to discipline the individuals were constructed from the medicine. People are convinced to practice for their health by the medical discourse as if they were gazed all the time. To take care of our health by medical surveillance, inspection and routine check-up are the discursive practices and these practices are controlled by unseen power or gazing. Power can achieve its goal if it can hide as much mechanism as possible.⁽³⁾

It could be concluded that discourses in the society are created by the knowledge especially medical and scientific knowledge for people to acknowledge and do docile practices. Discourses make the created things or knowledge last forever by ordering, categorizing and ruling people to practice. It is called discursive practice. Nowadays, the government is applying the medical and scientific knowledge that are most powerful to create the discourse to intervene people's lives by stimulating their desires instead of repression.

There are some medical scholars using the discourse to explain and understand medical discursive practices in the medical education. Goods⁽⁶⁾ analyzed the process of the medical education in the medical school of Harvard University by trying to explain how medicine constructed its objects and semiotic study of medical reality. The questions in his research were how medical students learned medicine, how they changed their brain every day and how they interacted with their information. He proposed that medical gaze was the medical discourse and was the origin of constructing medical objects. The medical gaze was the discursive practice and obligated to shape the perception of medical students in the medical ways: ways of speaking,

writing, and seeing.

For medical students, the body and pathology are constituted as distinctive “medical” during their education. Entry into the world of medicine is accomplished not only by learning the language and knowledge base of medicine practitioner engaging and formulating reality in a specific “medicine way”. They include specialization of “seeing” “writing” and “speaking”.

Several elements analyzed were suggested by the observation of Goods and Goods⁽⁷⁾ in the issue of “Learning medicine, the constructing of medical knowledge at Harvard Medical School”

- Medicine is introduced as science. Science is a part of entering into the world of medicine.

- Medical education begins by entering into the body, thus the body is the object of attending and manipulating skills and the site of unending learning.

- Medicine is learned from the perspective of individual’s case. The case is a frame for learning and the individual is an object of the medicine. Social data are presented, but they are presented as identifying feature and significant indicators of potential pathology, dimension lifestyle and risky factors.

- Caring and competence are dual discourses for good physicians. Competence is closely associated with the natural science and caring with the humanities. Competence is a quality of knowledge and skill and caring is a quality of a person. But many feel that the science has to be learned and caring is an innate quality of human. It has to be cultivated but not taught.

- After medical students have graduated from the medical schools and become “doctors” whose competence is a quality of knowledge and skill for cure. The process of cultivation in medical education creates the medical students to be the objects in the process of medical gaze.

Conrad⁽⁸⁾ also reflected the medical education that medical students learned not only anatomy but also a

certain objectification of human body: A separation of soma from persona. Doctors’ clinical perspectives focused almost entirely on the disease rather than on the illness. Virtually all teaching emphasized the technical aspects of doctoring: diagnosis, treatment and intervention. Today doctor and the medical students are enamored with the technological aspect of medicine. The training put a lot of emphasis on instrumental rather than caring of patients. The power of diagnosis and cure is higher than the power of care. Medical schools are a powerful socializing force and medical students absorb many values of the medical profession along with the biomedical knowledge and techniques. Technological medicine with its disease orientation, myriad lab tests, complex intervention and “fix-it” mentality pays scant attention to teaching about doctor-patient relationship.

For the dental profession, Nettleton⁽⁹⁾ criticized that the consequence of the mouth was not dentistry, rather dentistry produce the mouth. Prevention and promotion of dental health were explained under the discourse of the principle of good oral health for people, so the concept of oral health promotion and prevention became to be the principle of dental health education. The discursive practices of dental education, such as oral health surveillance, oral hygiene technique and routine oral health examination were the dental gaze for people to take care of their own oral health. People became objects for dentists in unending treatments. There was also much dental knowledge to recreate in the society: the knowledge of etiology of dental caries and harmful sugary food and brushing their teeth twice a day for their oral hygiene.

Dental scholars are another interesting issue to be searched. How does biomedical science discourse in dental education influence dental students’ learning process and dental health concept, leading them to emphasize on disease rather than health? Thus the

objective of this study was to study the influence of biomedical science discourse on dental students' learning process through the dental education system.

Methodology

This study was based on the qualitative method, and was performed in the Faculty of Dentistry, Chiang Mai University. Dental students were the study samples to study how the cultivating process happened, how medical science discourse was instilled and how dental health was separated from the other parts of body. Purposive selection was a method used for selecting dental students. 10 dental students from each education year who had rich information were selected to be the key informants in order to gain the needed information that covered basic science, preclinical science, dental science and dental clinical sciences.

The instruments for data collection were literature search, in-depth interview and participatory observation. Initial data was collected from the dental curriculum and course contents of each subject. According to this data, the cultivating process was analyzed under the obvious discursive practice. While the indepth interview, open-ended questions were used to analyze medical science discourse constructed in dental education. Not only the in-depth interview but also participatory observation in dental student classes was applied

Discourse analysis was applied to analyze this study, to reflect how medical science discourses influence the dental students' learning process in the dental education system.

Results

Since the establishment of Faculty of Dentistry in 1965, there had been much development of the dental education curriculum in 1991 because of the compulsory dentist-policy. The dental education curriculum had changed from the model of 2:2:2 (The first two

years for basic sciences, the later two years for pre-clinical sciences which were medical sciences and dental sciences and the last two years were clinical practice.) to the 1:2:3 model, that is (the first year is basic science and general education, the another two years are medical sciences and dental sciences. The last 3 years are skill training in the clinical setting and community setting.

The dental education curriculum

At present, dental education curriculum is:

The 1st year, the dental students have to study on the various subjects which are called general education. It consists of physic, chemistry, mathematics, social science (sociology) and humanity (anthropology).

Puangkaew⁽¹⁰⁾ interestingly commented the dental education in the conference, "The Development of Dental Education Curriculum" in 1992 that:

"The philosophy of learning the general education is to understand human life and social life and to enjoy their lives in real situations. The objective of the communication is to communicate with others, talk and understand with the same languages. However, in the dental educational curriculum, the communicative purpose is transferred to 6 credits of English subject. Studying the mathematic and scientific purpose is to make the students understand the philosophy of science in routine in order to enjoy their lives and understand the science related to nature and human life. However, studying 27 credits of science and mathematics in the dental education is to support basic medical and dental science in order to strengthen the dental profession."

The 2nd and the 3rd years of curriculum are called pre-clinical stage. The dental students are expected to have strong pre-professional training including excellent dental technical skills according to basic biomedical science and dental science. Human anatomy (10 credits), physiology (5 credits), biochemistry (6 cre-

dits), microbiology (6 credits), pathology (4 credits), pharmacology (3credits) and behavioral science (which is focused on the psychiatry instead of health psychology) are the subjects that are under the control of the Faculty of Medicine. Dental students are cultivated and encircle with the logic of sciences and medical sciences, way of explanation of diseases. Dental students are understood and reproduced the logic of pathogenesis in human body that bacteria and virus are the main pathogens for human diseases through the way of education.

As for subjects concerning dental science, the dental students have to study both lecture and laboratorial practices of dental anatomy, oral histology, oral pathology, oral microbiology and oral biology. According to basic dental laboratorial techniques: prosthodontics and operative dentistry, much time has been allocated for practical training of waxing and operating teeth in phantom head laboratories. The dental students have to train their manual skills as if they were handicraft workers.

It is not surprising that the dental students would be fully trained in manual skills which are based on medical and dental scientific knowledge before they start providing treatment to patients, real human.

Baum⁽¹¹⁾ commented on dental curriculum of the US that the dental students received poor training in science. Education of basic science for dental students has been achieved in name only. Generally, new graduates did not understand human biology because basic science was not made practically relevant to them. Too often the biomedical science and its advances were taught and described separately from clinical dental practices. In addition, the topics were often taught and assessed separately from dental contexts.

The curriculum of dental education in Chiang Mai University is not far different from in the U.S.A. as Baum commented.

"Studying in the pre-clinical stage, I concentrated

only on the dental science and dental laboratorial subjects. I truly confess that I did not understand how to apply or integrate almost all of the medical science subjects that I had studied from the Faculty of Medicine with dental science..."

(3rd year dental student)

In the last three years (4th-6th) of training in the clinical stage with 87 credits of lectures and laboratory classes, and 62 credits of clinical operation, dental students have been trained in both curative and preventive clinical skills for patients. Since dental curriculum is handicraft-based emphasizing manual skills, the dental students have to start clinical training with simple cases in the 4th year of education and more complicated cases in following years, such as class I and class III cavity filling in the 4th year, class II, class IV and class V cavity filling which is more complicated in the 5th year.

The crucial challenge in dental education is still considered to be the development of appropriate dental skills especially clinical skills of all students. The dental students need to be trained in various dental clinical practices which are oral diagnosis, dental roentgenology, oral and maxillofacial surgery, dental restoration (dental filling, and root canal treatment), pedodontic, periodontic, prosthodontic (artificial teeth replacement or denture), community dentistry (preventive clinic and community training) and comprehensive dentistry. The clinical requirement of dental graduates is to be able to operate competently on their patients. Accordingly, the system of requirement is considered to be very important for the dental education. Every training dental clinic has set up minimum requirements for each training dental skill.

Goldberg⁽¹²⁾ stated that

"Because of the centrality of the need to develop dental skills in dental student, basic science and basic

medical science education had often been relegated to a marginal role in dental education... there was no science in the performance of dental surgery even if the dentist was surrounded by understands and uses high-tech equipment that was designed by, and function on, sophisticated physical and biological principle. In the final analysis, the dental procedure might be accomplished by the skill action of the practitioner. Dentistry is performance art...'

Nowaday, the dental education curriculum is still concentrated in the manual skill on clinical setting and most of the dental students are frustrated from the requirement system.

How dental constructs its objects

Good & Good⁽⁷⁾ showed how medicine constructed its objects in the medical education. Medical education began to enter into the body which was the object manipulating skills and aspects of unending learning. Also, body was newly constituted as medical body which was distinct from the body which we interacted with in routine life. Besides, medicine was learned from the perspectives of individual cases, therefore individuals were the objects of medicine. In the learning process of medical education, medical students learned not only anatomy but also a certain objectification of the human body, a separation of soma from persona.⁽⁸⁾

The dental education is also not different from the medical education. Dental students start perceiving dental knowledge that was constructed by the course of dental anatomy, oral histology and oral microbiology. All of the dental science knowledge is basic to enter into teeth and tissues in oral cavity in order to know the structure of teeth which is different from others and the nomenclature or name of each tooth in the oral cavity. 32 teeth in the oral cavity have varied structures and names. That is a language of dental profession. The

language is one of the symbols that dental students are quickly oriented to and is the pathway of dental students that dental teeth are distinct from teeth according to the viewpoints of lay people in routine life. A student in the 2nd year described the feeling of studying dental anatomy and histology:

"Before I studied dentistry, I had known only the classification of human teeth from my secondary school that there were anterior teeth, canine and posterior teeth. Starting on the lecture of the dental anatomy, I was very surprised that 32 teeth in the mouth had different structures and nomenclatures. Even right and left anterior teeth had different details of structure and size. I tried to remember the width and length of each tooth in the laboratorial works. I had to craft a bar of wax to be a tooth in the laboratorial period. I had to remember the nomenclatures or the names of every tooth as the symbolic names, such as # 11 was upper right anterior. I spent much time carrying out waxing 28 teeth in the laboratory and I have focused only on the teeth without patients for the whole year."

(2nd year dental student)

This is the way that shaped students to learn to see teeth in the dental world. It is different from the world of lay people. Good & Good⁽⁷⁾ described that entry into the world of medicine was accomplished not only by learning the language and knowledge based on medicine, but also by learning fundamental practices which medical practitioners engaged and formulated reality in a specifically "medical" way. Specific ways of "seeing", "writing" and "speaking" were also included.

Dental students have cultivated the way of "seeing" especially in millimeter scale in the prosthodontics laboratorial training. The students are trained to do artificial teeth (denture) by starting on arranging the artificial teeth on the wax base which has the same size and shape as gum.

"When I first attended in class of complete denture, I had to arrange one tooth on the wax base and let the instructor check the correct position and direction. Once, one of the instructors told me that you should move this tooth 0.2 millimeter upright and 6 degree rotated to the right. I was shocked. Oh! Just 0.2 mm. and 6 degree. But now I can not estimate the distance in meters or even centimeters. I feel that it was too wide".

(3rd year dental student)

Throughout the 2nd and 3rd year of education, students studied dental disease of enamel, dentine and pulp including disease of tissue around the teeth, i.e. gingivitis or gum disease and bone disease. The students are trained to find out the disease of the oral cavity and the abnormality of teeth, gingiva and even the structure of faces. According to this cultivating process in the dental education, the dental students have narrow viewpoints as stated in an article of the community dentistry newsletter in 2002 written by a dental student in the 6th year:

"...When I became a dental student, I was interested only in teeth and mouths. I could remember my patients' teeth rather than their names or their statures. I knew the nature of oral disease rather than names of the ministries. Even my friends and classmates were happier to focus on the diastema of an actor in the movie "Pearl Harbor" rather than the romantic story. I did not know why I focused on only small points. I always found myself paying attention to anatomical features of teeth of people whom I met rather than perceiving them as people with social characteristics".

(6th year dental student)

In the process of pre-clinical stage in dental education, students learn only oral cavity and teeth as if it were something without a possessor. This study process neglected human aspect of dehumanization.

Even in the operative dentistry class, (a study of the etiology of caries, the methodology for repairing and restoring the carious teeth), students have a practical training in phantom head laboratories. The phantom head laboratory is the simulation for the students to practice their competency and care of the curative process. However, a student in the 3rd year has described that

"According to the training of the phantom head laboratory, I did not feel that I was treating a patient. It was probably due to the requirement of the training course. Most of the students did not care the phantom head, therefore they turned the phantom head left and right carelessly. The phantom head was different from a corpse in the human anatomy study. I felt that the corpses were like our instructors; even they were dead bodies.

(3th year dental student)

Dental students' ways of seeing and speaking are a reproducible continuous process in the dental education. The dental students are quickly oriented to proper use of the language of dental profession which is the symbol of the profession. Even the title, "Doctor" that instructors called the dental students in the pre-clinical stage is a tool of cultivating the normative structure of dentistry and strengthening the sense of individuals' special: one-to-one role obligations of the dentists. The dental students are socialized to be dentists only in the pre-clinical stage and accustomed to using the language of the dental profession without embarrassing.

"When I started studying the nomenclature of teeth in dental anatomy class, I was slightly surprised at a lot of dental words which the instructors always repeat for the students' inspiration. For only a short period of time, I could speak and remember other uses of the language without embarrassing i.e. - It was an impacted tooth, or this was a carious tooth and had already an exposed pulp. I always accidentally call names of

teeth with digital system which no one could understand, such as ?36 meant the left lower first molar."

(2th year dental student)

I would like to conclude that the dental educational process in the pre-clinical stage shapes the dental students to learn the way of thinking, seeing and speaking in the dental professional pattern. Through the cultivating process in the lecture and laboratorial classes, the dental students could construct the teeth as if they were the objects for them to study without humanization or the teeth without owners. This is the basic concept of biomedical science that separates teeth from people. The process of dental education is too technique-oriented, and the dental students also focus on manual skills more than humane skills which should get through communicative skills. This dental identity can be obviously seen through the clinical stage of dental education.

In the 4th-6th year of dental education that is called the clinical stage, the dental students are proud of wearing a white coat or a white gown and providing dental services for patients as if they were real dentists. However, the Faculty has set up 5 days of clinical orientation for the students as ritual time, time for rite de passage and time for transforming from the dental students to dentists.

According to the observation on the 5-day clinical orientation, almost all instructors have focused on the techniques of writing charts and minimum requirements that the dental students had to perform in each clinic. Every instructor described the clinical process and competence required for treatment rather than concern about patients' care.

"You have to talk to patients that they could come to see you by appointment. You would not get the requirement if the treatment was not complete. You have to consider the socioeconomic status of the patients if they

could pay for the service..."

(Instructor , in clinical orientation meeting)

Good and Good⁽⁷⁾ commented that competence and care were two themes that reflected the meaning of being a good physician. The competence is associated with the knowledge, skills, techniques and actions, whereas the care is related to attitudes, compassions and empathies. The competence is a quality of knowledge and skills, whereas the care is a quality of people. However, many felt that the competence had to be learned and taught, but the care was an innate human quality that should to be cultivated but not taught. One of the dental students in the 6th year who has ever read Good and Good's article said that:

"After I had read the Good's article that you (researcher) have assigned, I strongly agreed with Good. Most of the instructors in the Faculty focused on the competence of the students especially the technical skills for treatment. Some instructors laid particular stress on curative competence related to the future income after the students had graduated. As for caring, the instructors concerned patients' cares in the meaning of considering the economic status and cooperating behaviors of the patients..."

(6th year dental student)

The condition of dental education in the clinical stage still focuses on competency (manual skills) rather than care. On account of the nature of dentistry which requires manual skills, training course for manual skills has to set the sequence of priority. Consequently, clinical training for the 4th-year dental students is only simple cases and it is more complicated in the 5th year. In the last year (the 6th year) of training dental education, the dental students have to be responsible for comprehensive cases. For instance, students in the 4th year are only trained in scaling the patients' calculus, and

performing a plaque controlling program which is the pattern of dental health education. After finishing the process of scaling, the students in the 5th and 6th year would provide more complicated treatment for patients, such as: root planning or gingivectomy. Based on natural condition of one's oral cavity, it is hard to find patients who meet a set of requirements for the 4th year students in simple cases of dental treatment, such as mild calculus, small cavity on teeth, etc. In real situations, almost every patient has to see several dental students for variety of treatment until he gets a completed treatment. Thus, some patients came to see a student in the 4th year to have their calculus scaled and see a student in the 5th year on another day to have their impacted teeth removed and might see another student in the same year to have their complicated cavity filled. Through this process of clinical training, patients become objects for dental students, and this process is reproducible continuously until it becomes a normal situation for the instructors and dental students.

"On the first day when I started my clinical training, I received one patient from the prosthetic instructor for tooth replacement as a temporary plate denture. I have completed the oral check-up and written the prosthetic dental chart. I could not insert the temporary plate denture for the patient until he received a complete root planning treatment. The root planning treatment was a complicated work and was not included in a set of requirements for me (the 4th year student), so I had to ask a senior dental student (the 5th year student) to operate this procedure. If I did not perform in this way, I would not get the requirement and the patients who had a requirement of temporary plate denture were rare."

(4th year student)

"After I completed my patient's oral check-up and patient's charting for periodontal treatment (complicated gingival disease). This patient had deep periodontal

pocket that I had to treat for my requirement. Although I made an appointment with him for the next visit of treatment, I could not do as I had planned because the patient had removed the impacted tooth from the oral surgical clinic on the day before my appointment. I did not know that he had an appointment of removing impacted tooth before."

(5th year student)

"When I got 3 patients for root canal treatment, I have operated in the step of opening the root canal access (OCD) for the first two visits and this patient disappeared. I called for the second patient who had incomplete root canal treatment last year. Then, I finished this case and I got 4 steps of root canal treatment process in this case. I still lacked 2 steps of root canal treatment process that I should complete my requirement of root canal treatment. So I called for the third patient and operated only 2 steps which led me to complete my requirement, and I kept this case for referring to the dental students in the next year. I knew that I should complete the root canal treatment of the third patient but I have not done. I had to save my remained time for other treatments and other requirements. If I continued to treat the third patient, I might not pass this clinical training"

(5th year student)

"When I was training in the 6th year of dental comprehensive clinic, I felt that I was truly a dentist taking care for patients as total patient care or holistic care. I did not like the 4th and 5th year of training procedures. In this comprehensive clinical training, I could perform almost all of the oral care needed, both simple and complicated cases. However, it was still hard for me to communicate with my patients. I was cultivated to concern only my interesting point, teeth and mouth. In addition, I endured talking with my patients about other topics be-

yond dental field. Thus, I appreciated to talk with my patients especially about dental health education and advise them to take care of their oral health. I frequently stopped talking when my patients induced other topics, i.e.-social or political events. Normally, we (I and my patient) did not have much time for talking. We did it only before and after the dental treatment.

(6th year student)

According to present dental education, dental students are learning to consider dental field under the fundamental construction of the objects for dentistry during the pre-clinical stage. Learning to think, write and speak in dental professional pattern is critical during the year of clinical training stage. The dental students are cultivated to focus only on disease rather than patients as a whole and concern the techniques more than patients' feeling. The dental students have their attitudes towards their patients as if they were the objects for the students to repair and restore the defect of teeth and oral tissue as carpenters repair houses.

Today dentists who come from the Faculty of Dentistry are enamored with the technological aspect of dentistry. The training has an emphasis on instruments rather than patients' cares. Besides, the power of treatment has sapped the power of promotion and prevention including the power of care.

Under the dental educational curriculum, not only dental students are trained in treatment, but promotion and prevention of oral care are also trained. Disease prevention clinics and periodontal clinics are the two main clinics for training. The dental students learn the techniques to screen for risky factors of dental caries and experience (DMFT score), bacterial test (streptococcus mutant count test, RD test), dental plaque score (PI score), gingival score (GI score and periodontal pocket score) and diet counseling (Four food group score). The main risky factor of oral disease is dental

plaque and the advice for routine prevention is oral hygiene instruction or OHI of tooth brushing techniques, tooth picking techniques and dietary controls.

In clinical training course, dental students have to start with using the detecting technique for periodontal disease and perform oral hygiene instruction for the patient before each treatment visit. One of the 5th year students stated that

"On the clinical training, only the instructors of periodontal disease concerned on oral hygiene instruction and plaque control program and it is counted to be the requirement. But other instructors, such as root canal treatment instructors, check only the root canal process and considered only this tooth while prosthodontic instructors have his concerned only on denture and occlusion."

(4th year dental student)

Faculty of Dentistry consists of ten departments. It means that each department has its own specialty as division of labor. The promotion and prevention of oral health belong to Department of Community Dentistry. Although this department is responsible for the promotion and prevention in the clinical and community settings, it is mainly oriented to communities rather than clinics which is individual.

"As for the Ottawa Charter, the health promotion concept that I have learned from Department of Community Dentistry, I could understand it, but I could not know how to apply it to my patients in the clinical settings. I only studied dental knowledge."

(4th year student)

Glanz⁽¹⁴⁾ purposed that the central concern of health promotion and health education is health behaviors how to bring about changes and how to develop the techniques that change behaviors. Department of Community Dentistry has also taught the theories of health

behaviors and various techniques to change behaviors, such as health belief model, transtheoretical model, communication theory of health, social learning theory and self efficacy. However, in real situations of clinical training, it is problematic in clinical contexts.

"It is very difficult to apply theories of health behaviors to change patients' behaviors in the clinical training on account of the limitation of time. I have to concentrate on my performance and I am afraid of incomplete performance in each visit. Even listening to patients, I really feel endurable. The items of oral hygiene instruction and plaque control program are done only in the period of periodontal care."

(5th year student)

Communicative skill is another problem for dental students. The causes could be: Firstly, the cultivation for dental students in the dental education is based on the medical science or biomedical concept which separate teeth as objects from people. Secondly, learning language and knowledge of dentistry is a fundamental practice that dental students engage and formulate reality in a specific "dentistry" way. Specialized ways of "seeing", "writing" and "speaking" are also included.

Besides, most of the dental students have to focus on treatment rather than prevention since the curative process is in their hands, and they are able to manage it. However, the preventive and promotional process needs good communicative skill. Dental health education is based on the communication and the relationship between dentists and patients.

"Probably, the dental educational curriculum which focused on teeth, oral tissues, oral disease and abnormality, and dental laboratories was time-consuming. I frequently slept after midnight due to dental laboratorial works and read the dental articles in order to prepare for examinations. It reduced my curiosity. I was willing to be

interested only in the field of dentistry. That is why it is hard for me to talk with my patients for a long time. I really told you that I was endurable. I felt happier to describe the etiology of dental caries and preventive techniques. Since the clinical time is limited, I nearly stopped talking because I worried over my operation that could not be completed in that visit"

(6th year dental student)

This is the feeling of a student in the 6th year about her communicative skill and another student in the same year:

"I know that patients prefer the dentists who had good communication, competent operation, and good relationship between dentists and patients. However, most of the skills that I trained were technical skills, manual skills, and curative skills. I have never learnt how to do it. Maybe it is a skill that needs common senses that engage interpersonal language. Some instructors suggested the way of talking with the patients like you were talking with your friends, but I think it is not the same at all..."

(6th year dental student)

In the Faculty of Dentistry, all courses emphasize the technical aspects of dentists: screening, diagnosis, treatment and intervention. The dental students must be trained to be proficient dentists and focus on techniques and instruments rather than patients' care. In addition, due to the centrality of the need to develop dental treatment of students, promotional and preventive skills have often been regulated to be a marginal role in dental education. Requirements still represent competent operations, especially manual skills of the dental students. All of these evidences make the dental students spend much time on carrying out the treatments for their patients in clinics and laboratories. In addition, they focus on individual teeth rather than the

patients as a whole.

Discussion

The results of this study showed that the biomedical science discourse was influenced the learning process through the dental education system. All of the evidences were found from this study, were in accordance with the study of Nettleton⁽⁹⁾. She stated that

"As for present dental education, dental students are learning to consider dentistry field under the fundamental construction of the object for dentistry during the pre-clinical stage. Learning to think, write and speaking in dental professional pattern is critical during the year of clinical training stage. Dental students are cultivated to focus only on diseases than patient as a whole, and concern the technique than patient feeling. Dental students have their attitude towards their patients as if they were the objects for students to repair and restore the defect of teeth and oral tissue, as carpenters repair houses. Today dentists who come from the Faculty of Dentistry are enamored with the technological aspect of dentistry. The training gives an the emphasis on instruments rather than interactions between patients and dentists, and the power of curative has sapped the power of promotion and prevention, including the power of care."

However, dental health concept was influenced and reproduced by the biomedical science discourse during the dental educational process. Dental students had to study the various subjects concerning general science, such as physics and chemistry in the first year and they also studied basic medical science and dental science, such as microbiology, pathology, physiology, biochemistry, etc. All of the subjects in dental education that dental students studied were influenced by the discourse of biomedical science. This discourse was reproduced in the process of dental education in the Faculty of Dentistry. Both scientific and medical lecture and laboratory classes, such as biochemistry, physiol-

ogy, microbiology, anatomy, histology were the discursive practice to stabilize the explanation of biomedical science of dental disease.

For instance: dental plaque is a crucial factor which affects dental caries. Dental students studied the dental plaque in several lecture classes. Also, they studied operation, periodontic, pedodontic, oral health promotion and prevention, and described the mechanism of the dental plaque and dental diseases through the biomedical science. The dental plaque is formed by the carbohydrate food substrate and interacts with the oral bacteria under the proper oral environment. Accordingly, acid is produced and damage the structure of enamel and dentine of teeth. The structure of enamel is hydroxyapatite in OH- group, whereas the acid is in H+ groups, therefore the H+ tries to weaken the enamel structure by subtracting the OH- from the enamel. This process is called demineralization.

In clinical settings, dental students were trained to use the "basic fucin" to stain the dental plaque. The dental plaque that was stained would turn to be red-dened and could be seen clearly. Every patient had to have the dental plaque stained in order to be able to check up their oral hygiene by the dental students before treatment. Therefore, staining the dental plaque was one of the discursive practices of biomedical science discourse on the oral health promotion and disease prevention.

Dental students also provided the dental health education to patients by explaining the mechanism of dental plaque and dental diseases and the reasons of brushing their teeth twice a day to remove dental plaque. This was another discursive practice of biomedical science discourse and it was reproduced during the dental education in the Faculty of Dentistry.

In conclusion, dental health concept of dental students in Faculty of Dentistry, Chiang Mai University was based on biomedical science discourse, and the

discursive practices were constructed and reproduced all the time during the learning process of dental education. Data from this study found that dental students' concept on dental health were disease-focused and considered only risk groups. Most of the activities were based on the biomedical science framework: mechanistic, reductionism, determinism. The main reason that should be considered, was the biomedical science cultural system which affected to the dental health concept and activities of dental students.

Biomedical science cultural system

Almost every country in the world has a basic framework for health management based on paradigm of science. The paradigm of science as a culture is basically Newtonian physics. The process of biological and biomedical science has undergone through the same rules of science, therefore biomedical science is as a cultural system as well. Based on physics knowledge, it was extended to chemical knowledge, biology and biomedicine.

The Newtonian physics is a basic principle for classical science, health science as well as biomedical science. The Newtonian physics consists of three concepts:⁽¹⁴⁾

1. Materialism is the ideal belief that human body is composed of matter and only matter controls biological process in the body.
2. Reductionism is the belief that human being is just a sophisticated machine and can be understood only by reducing them to smaller separated parts.
3. Determinism is the idea that every phenomenon has determinants.

"Newtonian view of health" considers chemical agent as an instrument used to intervene in the biological process in order to cure diseases. The way of biomedical science to think about life, disease, illness and the world is attached to health personnel. Thus, it could

be considered as a cultural system surrounding the concept and activities of health personnel.

Dental students' concept on dental health fell into the trap of biomedical science cultural system. Their ways of thinking, acting and believing were mechanism, reductionism, individualism and determinism. If we consider dental cavity as an example, dental caries would be explained that it is a disease of mineralized tissue of teeth, namely enamel, dentine, cementum and pulp, and is caused by the interaction of oral microorganism and fermented carbohydrate or food substrate.

Under the biomedical science cultural system, dental students understand that dental caries of every person is the same evidence which emerges from the same determinants that are oral microorganism and food substrate. The normal ways of preventing caries for everyone are also considered: eliminating the determinants with brushing teeth after meal, increasing the resistance of teeth by appropriate exposure to fluoride and sealing the deep pit and fissure with a resin or sealant. These are mechanism and reductionism approaches.

Biomedical science cultural system is surrounded in the dental educational system. Dental students' clinical perspective focused almost entirely on the disease and patient as the objects for students to detect and cure. They instilled many discourses of dental profession in accordance with the biomedical knowledge and dental technique. As mention above, biomedicine represented the reductionism, mechanism thinking and the mind/body dualism as well.

In dental educational process, dental students were shaped by learning how to see (the disease of teeth and oral tissue), and learning how to cure (treatment techniques) more than how to caring. Dental students studied the etiology of dental disease in the epidemiological model which based on biomedical science and

focusing on treatment rather than promotion and prevention. The new concept of health promotion by Ottawa Charter was marginalized in the dental education. Although, Faculty of Dentistry, Chiang Mai University was praised for the training process of community action on oral health promotion which was managed by Department of Community Dentistry, most of dental students from Chiang Mai University is still focused on traditional health promotion and health education.

Nowadays, Newtonian physics model which is the roots of biomedical science has been shifted by Quantum physics. Materialism is replaced by energism concept, reductionism is replaced by holism and determinism is replaced by uncertainty⁽¹⁴⁾. However, health paradigm, dental health are still attached to Newtonian science and reductionism. Medical doctors still focus on a special part of body, organ, and cell and they try to discover determinants. In addition, dental profession still focuses on teeth and dental plaque. Mind and environmental contexts are not taken into consideration. Medicine and dentistry are totally based on biomedicine⁽¹⁵⁾, whereas social and behavioral issue was only a tiny part of medicine and dental education curriculum⁽⁶⁾.

Based on Quantum physics paradigm, dental caries could be explained by the dynamic process of remineralization and demineralization of the interaction between exchanging mineral elements in composition of teeth. This explanation describes how materialism is replaced by energism. Health and illness is not constructed from the germ theory, but contributed from the socio-cultural context of everyday life⁽¹⁶⁾, therefore dental diseases are also not constructed from the bacteria, *Streptococcus mutans*. Concerning to the context of everyday life of human which is a holistic approach in Quantum physics paradigm. Everyone has his/her everyday life context which is dynamic, it

means that the determinants is uncertainty and varies on one's dynamic context.

In conclusion, dental health concept of dental students in Faculty of Dentistry, Chiang Mai University were in the cultural system of biomedical science. The way of thinking, seeing and doing were based on mechanism, reductionism, individualism and determinism.

At last, the suggestion from this study is the curriculums and learning process of the dental education should be reformed to emphasize:

- Health-oriented direction rather than disease-oriented direction
- Caring that is related to attitude, compassion and empathy rather than competence that is associated with knowledge, skill and technique.
- Holistic oral health care rather than segmental oral health care.
- Human skill and communicative skill rather than only manual skill

It is important that, the concept of health and dental health in the instructors and dental students must be shifted from Newtonian physics to Quantum physics paradigm at the beginning of the reforming period.

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